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Тематика журнала: актуальные вопросы современной экономики и социологии - от теоретических и экспериментальных исследований до непосредственных результатов управленческой и производственной деятельности. Публикации в журнале учитываются как опубликованные работы при защите диссертаций на соискание ученых степеней России и зарубежья.

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- Основной раздел: социально-экономические аспекты развития современного государства;
- Современные технологии управления организацией;
- Актуальные вопросы политики и права;
- Современные науки и образование;
- Информационные и коммуникативные технологии;
- Здоровоохранение в обществе.

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KARER QURILISH JARAYONIDA POG'ONANING QAYRILISH QISMLARINI SERPANTIN ORQALI JOYGA O'TKAZISHNI ASOSLASH

Annotatsiya. Ochiq konlarda transport yo'llarini loyihalash kon ishlab chiqarish jarayonining samaradorligi va xavfsizligini ta'minlashda muhim ahamiyatga ega. Ayniqsa, pog'onalar orasidagi balandlik farqlari mavjud bo'lgan joylarda transport vositalarining harakatini tashkil etish murakkab hisoblanadi. Bunday sharoitlarda serpantin yo'llari qo'llanilib, ular keskin qiyaliklarni yumshatish va transport vositalarining xavfsiz harakatlanishini ta'minlaydi. Mazkur maqolada karer qurilish jarayonida pog'onalar qayrilish qismlarini serpantin orqali joyga o'tkazish usullari, serpantinni rejalash bosqichlari, asosiy geodezik hisoblashlar, piketaj hisobi, serpantinning tor joyidagi uchastka kengligini aniqlash hamda serpantin yo'lining bo'ylama profili va ko'ndalang kesimlarini qurish metodikasi tahlil qilingan. Tadqiqot natijalariga ko'ra serpantin elementlarini to'g'ri aniqlash transport yo'llarining xavfsizligi va ekspluatatsiya samaradorligini oshirishi isbotlangan.

Kalit so'zlar: ochiq kon, serpantin yo'llari, karer transporti, pog'ona yo'llari, geodezik rejalash, piketaj, bo'ylama profil, ko'ndalang kesim, yo'l loyihalash.

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SUBSTANTIATION FOR IMPLEMENTING BENCH TURNS VIA SERPENTINES DURING QUARRY CONSTRUCTION

Abstract. Designing transport routes in open-pit mines is crucial for ensuring the efficiency and safety of the mining production process. Organizing vehicle movement is particularly complex in areas with significant height differences between benches. Under such conditions, serpentine roads are

employed to mitigate steep gradients and ensure the safe transit of vehicles. This article analyzes the methods for implementing bench turns via serpentines during quarry construction, the planning stages for a serpentine, essential geodetic calculations, stationing calculations, determining the width of the narrowest section of the serpentine, and the methodology for constructing the longitudinal profile and cross-sections of the serpentine road. The research results demonstrate that the correct determination of serpentine elements increases the safety and operational efficiency of transport routes.

Keywords: open-pit mine, serpentine roads, quarry transport, bench roads, geodetic planning, stationing, longitudinal profile, cross-section, road design.

Kirish

Konchilik sanoatida foydali qazilmalarni ochiq usulda qazib olish keng qo'llanilmoqda. Ochiq konlarda ishlab chiqarish jarayonining samaradorligi ko'p jihatdan transport tizimining to'g'ri tashkil etilishiga bog'liq. Karer transport tizimi foydali qazilmalarni qazib olish, tashish va qayta ishlash jarayonlarining uzluksizligini ta'minlaydi.

Karer transport yo'llari ko'pincha pog'onalar bo'ylab joylashadi va katta balandlik farqlari bilan tavsiflanadi. Bunday sharoitda transport vositalarining xavfsiz harakatlanishini ta'minlash uchun yo'l qiyaligini me'yoriy darajada saqlash zarur. Agar qiyalik juda katta bo'lsa, transport vositalarining harakatlanishi qiyinlashadi, yoqilg'i sarfi ortadi va avariya xavfi kuchayadi.

Shu sababli kon yo'llarini loyihalashda serpantin shaklidagi yo'llardan foydalaniladi. Serpantin yo'llari – bu qiyalik bo'ylab joylashgan bir necha ketma-ket egri burilishlardan iborat bo'lgan transport yo'llaridir. Bunday yo'llar transport vositalarining katta balandlik farqlarini asta-sekin bosib o'tishiga imkon yaratadi.

Serpantin yo'llarini loyihalash jarayoni murakkab muhandislik hisoblashlarini talab qiladi. Ularning geometrik elementlari, egri chiziq radiuslari, yo'l kengligi, qiyalik parametrlari hamda geodezik rejalash ishlari aniq hisoblanishi zarur. Mazkur tadqiqotda karer qurilish jarayonida pog'ona qayrilish qismlarini serpantin orqali joyga o'tkazishning nazariy va amaliy jihatlari tahlil qilinadi.

Adabiyotlar tahlili va metodlar

Serpantin yo'llari asosan tog'li hududlarda yoki katta qiyaliklarda joylashgan transport yo'llarida qo'llaniladi. Ularning asosiy vazifasi transport vositalari uchun xavfsiz va qulay harakat sharoitini yaratishdir.

Serpantin yo'lining asosiy elementlariga quyidagilar kiradi: yo'l o'qi, egri chiziq radiusi, burilish burchagi, yo'l kengligi, yordamchi egri chiziqlar, bo'ylama qiyalik va ko'ndalang qiyalik.

Serpantin yo'llarini loyihalashda quyidagi talablar hisobga olinadi:

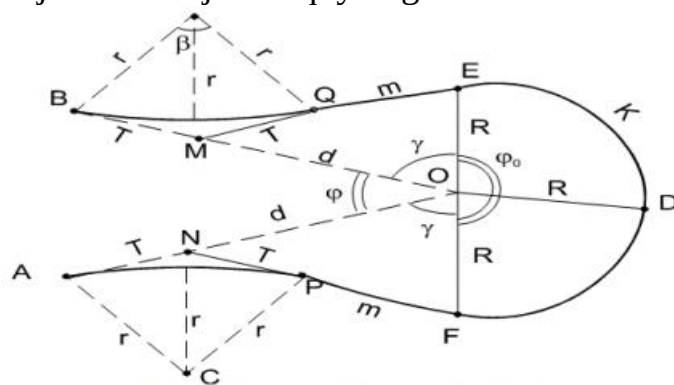
- transport vositalarining minimal burilish radiusi;
- yo'lining maksimal bo'ylama qiyaligi;
- yo'l kengligi va xavfsizlik zonalari;
- yer ishlari hajmini minimallashtirish;

- kon texnologik jarayonlari bilan moslashuv.

Serpantin yo'llari karer transport tizimining eng murakkab elementlaridan biri hisoblanadi. Shu sababli ularni joyga o'tkazishda aniq marksheyderlik o'lchashlar amalga oshiriladi.

Muhokama va natijalar

Serpantinni rejalash ishlari teodolit yoki elektron taxiometrlar yordamida bajariladi. Rejalash quyidagi ketma-ketlikda amalga oshiriladi.



1-rasm. Serpantenni qurish sxemasi

Avvalo teodolit burilish burchagining O nuqtasiga o'rnatiladi. Bu nuqta serpantin egri chizig'ining markaziy nuqtasi hisoblanadi. Shundan so'ng OA va OB yo'nalishlari aniqlanadi. Ushbu yo'nalishlar bo'ylab d (ON, OM) masofa o'lchanadi va natijada M hamda N nuqtalar hosil qilinadi. Bu nuqtalar yordamchi

egri chiziqlarning cho'qqilari hisoblanadi.

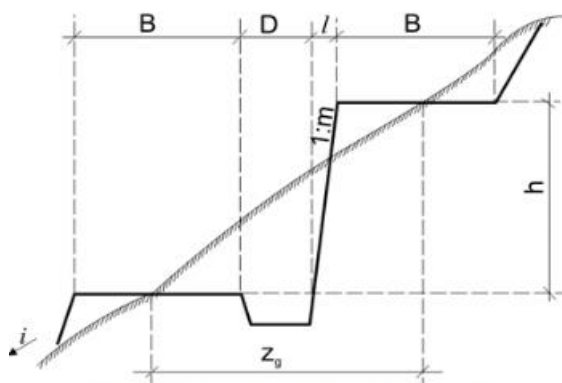
Keyingi bosqichda T (AN, BM) masofa o'lchanadi va A hamda B nuqtalar aniqlanadi. Ushbu nuqtalar serpantin boshlanish va tugash nuqtalari hisoblanadi.

So'ngra γ (ONF, OME) burchagi o'lchanadi va shu yo'nalishlarda R (OE, OF) radius masofasi o'lchanib E va F nuqtalar aniqlanadi. Ushbu nuqtalar serpantin asosiy egri chizig'i elementlarini belgilaydi.

Asosiy egri chiziq har $K/4$ masofada batafsil rejalashtiriladi. Buning uchun umumiy burilish burchagi φ_0 bir necha kichik burchaklarga ($\varphi_0/4$) bo'linadi.

Yordamchi egri chiziqlarni aniqlash uchun teodolit M yoki N nuqtaga o'rnatiladi. Bu nuqtadan β burchagi qo'yiladi va T (NP, MQ) masofa o'lchanib Q yoki P nuqtalar hosil qilinadi.

Nazorat sifatida OEF burchagi o'lchanadi. Ushbu burchak hisoblangan φ_0 qiymatiga teng bo'lishi kerak.



2-rasm. Serpantin eng qisqa masofasini aniqlash sxemasi

Serpantin eng qisqa joyidagi uchastka kengligini aniqlash. Serpantin eng tor joyidagi uchastkaning kengligini hisoblash uchun (2-rasm) quyidagi ifodalar orqali analitik hisoblashlar bilan amalga oshiriladi:

$$Z_c = M'M + MN + NN' = B + 2 \cdot d \sin \frac{\varphi}{2}$$

h - avtomobil yo'li yuqori qismining pastki qismidan balandligi;

i - joyning $M'N'$ chiziq bo'yicha

qiyaligi.

$$Z_g = \frac{h}{i}$$

$$h = \left(\frac{B}{2} + D + l + \frac{B}{2} \right) \cdot i;$$

$$l = h \cdot m$$

$$h = (B + D + m \cdot h) \cdot i$$

$$h = \frac{(B + D) \cdot i}{1 - m \cdot i}$$

$$Z_g = \frac{B + D}{1 - m \cdot i}$$

Agar $Z_c > Z_g$ dan kichik bo'lsa, yo'l to'g'ri loyihalashtirilgan hisoblanadi.

Serpantinning bo'ylama profili va ko'ndalang kesimlarini qurish

Serpantinning bo'ylama profili yo'l o'qining asosiy nuqtalari belgilariga asoslanib quriladi.

Bo'ylama profilni qurishda quyidagi talablar hisobga olinishi lozim: ruxsat etilgan maksimal qiyalikni; transport vositalarining texnik imkoniyatlarini; er ishlari hajmini minimallashtirishni.

Profil qurishda qizil chiziq loyihasi tabiiy relyefga maksimal darajada moslashtiriladi. Serpantinning ko'ndalang kesimlari yo'lning geometrik parametrlari va yer ishlari hajmini aniqlash uchun quriladi.

Ko'ndalang kesimlarni qurish jarayoni quyidagi bosqichlardan iborat bajarilishi lozim: Millimetrlig qog'ozda vertikal o'q chizig'i o'tkaziladi. O'qdan o'ng va chap tomonga $B/2$ masofa qo'yiladi. Ariq kengligi D belgilanadi. Tabiiy va loyiha belgilar chiziladi. Yo'lning o'yama va ko'tarma qismlari aniqlanadi.

Ko'ndalang kesimlar asosida 1:500 masshtabda serpantin rejasi quriladi.

Xulosa

Tahlillar shuni ko'rsatadiki, serpantin yo'llarini to'g'ri loyihalash karer transport tizimining samaradorligini sezilarli darajada oshiradi. Serpantin yo'llari quyidagi afzalliklarga ega: katta qiyaliklarni transport uchun qulay shaklga keltirish, transport vositalarining harakat xavfsizligini oshirish, yo'lning ekspluatatsiya muddatini uzaytirish va yer ishlari hajmini optimallashtiradi.

Shuningdek serpantin yo'llarini loyihalashda zamonaviy geodezik texnologiyalar (GPS, elektron taximetrlar, dronlar)dan foydalanish loyihalash aniqligini oshiradi.

Karer transport tizimida serpantin yo'llarini loyihalash muhim muhandislik vazifalaridan biridir. Tadqiqot natijalariga ko'ra quyidagi xulosalar chiqarildi:

- serpantin yo'llari katta qiyaliklarda transport harakatini xavfsiz tashkil etish imkonini beradi;
- serpantin elementlarini aniqlashda geodezik rejalar usullari muhim rol o'ynaydi;
- piketaj hisoblari serpantin elementlarini aniq joylashtirish imkonini beradi;
- serpantinning eng tor joyidagi kenglikni hisoblash transport xavfsizligini ta'minlaydi;

- bo‘ylama va ko‘ndalang profillar asosida serpantin yo‘lining optimal loyihasi ishlab chiqiladi.

Mazkur metodika ochiq konlarda transport yo‘llarini loyihalash jarayonida qo‘llanilishi mumkin va karer transport tizimining samaradorligini oshirishga xizmat qiladi.

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AIMS AND OBJECTIVES OF FINE ARTS EDUCATION, METHODOLOGY FOR DEVELOPING THE CONTENT OF CLASSES

Abstract: *The article analyzes the goals and objectives of visual arts education, as well as the content of its lessons from a scientific-methodological perspective. The study employed literature review, pedagogical observation, and comparative analysis methods. The results indicate that visual arts education plays a significant role in developing students' creative thinking, aesthetic taste, technical skills, and social competencies.*

Keywords: *visual arts, education, lessons, pedagogical approach, creative development, aesthetic education*

Introduction

Fine arts education is currently regarded as a vital component of the pedagogical process within schools. It serves not only to develop artistic skills in students but also to cultivate aesthetic taste, creative thinking, and visual literacy. Fine arts classes enrich student cognition, teaching them to think independently, solve problems creatively, and express their internal emotions through visual representation.

Modern pedagogical approaches define creative development, individualized instruction, and the principles of inclusive education as core pillars. Consequently, the objective of fine arts education is not merely the formation of technical and practical skills but the assurance of the students' personal and social development. This perspective allows the educational process to be viewed not just as a transfer of information, but as a process that enriches students creatively, aesthetically, and emotionally.

Furthermore, through fine arts activities, students gain opportunities to strengthen interpersonal interactions within a group, develop critical thinking, and acquire social skills. Lessons consist of theoretical, practical, and reflective components, implemented by educators based on individualized and creative approaches.

Methods

Several methods were employed in this research to define the aims and objectives of fine arts education, analyze the content of lessons, and study pedagogical approaches.

1. Literature Review National and foreign scientific sources, curricula, methodological manuals, and scholarly articles on fine arts were systematically studied. This method was necessary to identify the theoretical foundations of the educational process and to shape the content of the classes.

2. Pedagogical Observation During the research, students' activities in lessons, their creative works, and the application of pedagogical methods were observed in schools and supplementary art studios. Observation allowed for the evaluation of the effectiveness of various pedagogical approaches within the educational process.

3. Analytical Methods Students' creative outputs were assessed, and observational and experimental data were analyzed. Results were visually represented using graphs, tables, and diagrams.

Results

Research and analysis indicated that the primary aims and objectives of fine arts education are implemented across the following dimensions:

1. Creative Development One of the fundamental tasks is the formation of independent creative thinking, visual expression, and imaginative capacity in students. By working with various techniques and materials (colored pencils, watercolor, gouache, collage, graphics), students gain the opportunity to express their imaginations freely.

2. Aesthetic Education Fine arts classes are oriented toward developing students' ability to understand and appreciate works of art and cultivating their aesthetic taste. According to pedagogical observations, students acquire aesthetic cognition by comprehending color harmony, composition, and imagery during the lessons.

3. Formation of Technical Skills Lessons are directed toward the development of technical proficiency. Students master graphic and visual techniques through drawing, painting, creating collages, and other creative activities.

4. Personal Growth and Social Skills Fine arts activities develop not only technical and creative skills but also personal and social competencies. Collective activities enhance students' abilities in cooperation, discussion, critical thinking, and the free expression of their opinions.

Discussion

The results clearly demonstrate the significance of fine arts education not only in technical mastery but also in personal, social, and cognitive development. As observed during the research, students learn to express their thoughts freely by creating original works, which in turn enhances their critical thinking abilities.

When lessons are organized through individual and group work formats within pedagogical frameworks, students develop social skills such as cooperation,

problem-solving, and the exchange of ideas. For instance, in group drawing and collage sessions, students have the opportunity to analyze each other's work, provide constructive feedback, and make collaborative creative decisions.

Pedagogical approaches must also focus on creating creative incentives and positive motivation. Acknowledging student success, evaluating creative achievements, and providing constructive recommendations activate their participation. Simultaneously, a culture of experimentation and "fearlessness toward creative errors" is established among students.

Conclusion

Fine arts education plays a significant role in the creative and aesthetic development of students, the formation of technical skills, and the evolution of personal and social competencies. The research results indicate that fine arts classes not only enrich the educational process but also broaden student thinking, teaching them to think independently, solve problems creatively, and evaluate their own artistic output.

Pedagogical approaches are oriented toward individual and creative development, taking into account the unique abilities of each student. Through these approaches, students can freely manifest their creativity, test new techniques, and develop personal taste in their work. Furthermore, group work and collaborative activities play a crucial role in forming social skills, exchanging ideas, and accepting constructive criticism.

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IJTIMOIIY RIVOJLANISHIDA YOSHLARNING MAS'ULIYATINI OSHIRISH USTIVOR MASALA

Annotatsiya: Mamlakatimizda ijtimoiy munosabatlarning rivojlanishida yoshlarning mas'uliyatini oshirish va uni takomillashtirish masalalari ustivor vazifalardan biri sifatida e'tirof etilishi, Yoshlarga oid davlat siyosati masalalarini fuqarolik jamiyatini qurishning eng muhim jihatiga aylanishi asosida hayotiy istiqbollari xususida so'z boradi.

Kalit so'zlar: jamiyat, fuqarolik jamiyati, ijtimoiy faollik, ijtimoiy munosabatlar, innovatsion faollik, ijtimoiy muammo, iqtisod, ma'naviy islohotlar.

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INCREASING YOUTH RESPONSIBILITY FOR SOCIAL DEVELOPMENT IS A PRIORITY ISSUE.

Abstract: The article discusses the prospects for life in the development of social relations in our country, based on the recognition of the issues of increasing the responsibility of young people and their improvement as one of the priority tasks, and the transformation of state policy issues related to youth into the most important aspect of building civil society.

Keywords: society, civil society, social activism, social relations, innovative activism, social problem, economy, spiritual reforms.

Yoshlarga oid davlat siyosati mamlakatimizda olib borilayotgan islohotlarning ustuvor yo'nalishi bo'lib, undan ko'zlangan maqsadlar yoshlarni ijtimoiy hayotda to'liq va mukammal ravishda o'z o'rnini topishi, har tomonlama bilimli, irodali, iste'dodli va salohiyatli bo'lib kamol topishi, o'z iste'dodlarini doimiy ravishda erkin asosda namoyon etib borishi borasida olib boriladigan dasturiy chora-tadbirlar majmuidir. Bu jarayonlarni ro'yobga chiqarishda davlatimiz tomonidan tashkiliy, me'yoriy, madaniy, ijtimoiy, iqtisodiy va siyosiy jihatdan barcha shart-sharoitlar yaratib berilmoqda. Yoshlarning ijtimoiy hayotda o'z imkoniyatlarini to'laqonli ravishda ro'yobga chiqarish borasida barcha masalalar kafolatli ravishda hal etib kelinmoqda. Yoshlarga oid davlat siyosatining barcha me'yoriy-huquqiy va qonunchilik

amaliyoti mukammal shakllantirilgan bo'lib, bu borada qonun osti hujjatlar tegishli shart-sharoitlarda o'z vaqtida qabul qilinib borilmoqda.

Mamlakatimizda ijtimoiy munosabatlarning rivojlanishida yoshlarning daxldorligini oshirish va uni takomillashtirish masalalari ustivor vazifalardan biri sifatida e'tirof etildi. Yoshlarga oid davlat siyosati masalalarini fuqarolik jamiyatini qurishning eng muhim qadriyatiga aylanishi, demokratik an'analar asosida hayotiy istiqbollarini belgilanishi muhim mezon sifatida namoyon bo'lmoqda. O'zbekistonda yoshlar hayotiga doir amaliy jarayonlar, yoshlarni har tomonlama qo'llab quvvatlash, ularga eng zamonaviy asosdagi shart-sharoitlar yaratish borasidagi masalalar davlat siyosatining ustuvor darajasiga ko'tarildi.

Jamiyat taraqqiyotida yoshlar faolligining barcha shakllarini takomillashtirishga uzoq tarixiy davrlardan buyon e'tibor qaratib kelingan. Yunon faylasufi Suqrot jamiyatda yoshlarning axloqida taraqqiyotga daxldorlik tuyg'ularini tarbiyalash muhimligini ta'kidlagan. Arastuning insoniy xislatlarni aks ettiruvchi aqliy fazilatlar va yaxshi xulq-atvor tarzi to'g'risidagi qarashlari ham shular jumlasiga kiradi.

O'zbekiston Respublikasi Konstitutsiyasida barcha fuqarolarga taalluqli me'yorlardan tashqari, aynan yoshlarga tegishli bo'lgan qoidalar ham mavjud. Jumladan yangi tahrirdagi Konstitutsiyamizning 50, 51, 52, 53-moddalari ta'limga oid hisoblanib, 50-moddasida: «Har kim ta'lim olish huquqiga ega. Davlat uzluksiz ta'lim tizimi, uning har xil turlari va shakllari, davlat va nodavlat ta'lim tashkilotlari rivojlanishini ta'minlaydi. Davlat maktabgacha ta'lim va tarbiyani rivojlantirish uchun shart-sharoitlar yaratadi. Davlat bepul umumiy o'rta ta'lim va boshlang'ich professional ta'lim olishni kafolatlaydi. Umumiy o'rta ta'lim majburiydir. Maktabgacha ta'lim va tarbiya, umumiy o'rta ta'lim davlat nazoratidadir. Ta'lim tashkilotlarida alohida ta'lim ehtiyojlariga ega bo'lgan bolalar uchun inklyuziv ta'lim va tarbiya ta'minlanadi», deb belgilab qo'yilgan. Bundan tashqari, konstitutsiyamizning "78-moddasida "Farzandlar ota-onasining nasl-nasabi va fuqarolik holatidan qat'i nazar, qonun oldida tengdirlar. Bolaning huquqlari, erkinliklari va qonuniy manfaatlarini ta'minlash hamda himoya qilish, uning jismoniy, aqliy va madaniy jihatdan to'laqonli rivojlanishi uchun eng yaxshi shart-sharoitlarni yaratish davlatning majburiyatidir; "79-moddasida "Davlat yoshlarning shaxsiy, siyosiy, iqtisodiy, ijtimoiy, madaniy, ekologik huquqlari himoya qilinishini ta'minlaydi, ularning jamiyat va davlat hayotida faol ishtirok etishini rag'batlantiradi. Davlat yoshlarning intellektual, ijodiy, jismoniy va axloqiy jihatdan shakllanishi hamda rivojlanishi uchun, ularning ta'lim olishga, sog'lig'ini saqlashga, uy-joyga, ishga joylashishga, bandlik va dam olishga bo'lgan huquqlarini amalga oshirish uchun shart-sharoitlar yaratadi"; "80-moddasida "Voyaga yetgan mehnatga layoqatli farzandlar o'z ota-onalari haqida g'amxo'rlik qilishga majburdirlar", degan me'yorlar qayd etilgan.

Jamiyatda yoshlarning ijtimoiy hayotda o'z o'rnini topishi, farovon yashashi, kundalik turmushidagi ijobiy o'zgarishlarining xususiyatlari bilan bog'liqdir. Yoshlarga oid davlat siyosatini ta'minlash tizimida yoshlar va jamiyatning boshqa aholi toifalari o'rtasida doimiy tizimiy o'zaro aloqadorlik kuzatiladi. Bu o'zaro aloqadorlik jamiyat milliy manfaatlarini ta'minlash, unda mavjud bo'lgan barcha Konstitutsiyaviy-huquqiy tamoyillarga og'ishmay amal qilish, mamlakat farovonligi uchun birgalikda kurashish bilan bog'liq barqaror xususiyatlarni o'z ichiga oladi.

Barcha me'yoriy va tashkiliy asoslardagi chora-tadbirlar nazariyasi va amaliyotida yoshlar mamlakatimizning kelajagi va istiqbolini ta'minlaydigan ijtimoiy guruh sifatida e'tirof etilmoqda. So'ngi yillarda, yoshlarning jamiyatdagi nufuzini mustahkamlash, ularning hayotiy pozitsiyasini mustahkamlash, ijtimoiy-iqtisodiy jihatdan qo'llab-quvvatlash maqsadida ko'plab me'yoriy-huquqiy hujjatlar qabul qilindi. Masalan, O'zbekiston Respublikasi Prezidentining 2020-yil 30-iyundagi PF-6017-sonli "O'zbekiston Respublikasida yoshlarga oid davlat siyosatini tubdan isloh qilish va yangi bosqichga olib chiqish chora-tadbirlari to'g'risida"gi Farmoni, O'zbekiston Respublikasi Prezidentining "Mahallalarda yoshlar bilan ishlash tizimini tubdan takomillashtirish chora-tadbirlari to'g'risida"gi O'zbekiston Respublikasi Prezidentining 2022-yil 19-yanvardagi PQ-92-sonli "Mahallalarda yoshlar bilan ishlash tizimini tubdan takomillashtirish chora-tadbirlari to'g'risida"gi Qarori, O'zbekiston Respublikasi Vazirlar Mahkamasining 2022-yil 7-iyundagi "2022–2023-yillarda O'zbekiston Respublikasida yoshlarga oid davlat siyosatini amalga oshirish dasturini tasdiqlash to'g'risida"gi 310-sonli Qarori", shular jumlasidandir.

Yuqoridagi me'yoriy hujjatlar ijrosi yuzasidan mamlakatimizda O'zbekiston Respublikasi Yoshlar ishlari agentligi hamda uning Qoraqalpog'iston Respublikasi, viloyatlar, Toshkent shahar boshqarmalari va tuman (shahar) bo'limlari tashkil etildi. Farmonda Yoshlar ishlari agentligi bajaradigan ko'plab vazifalar o'rin oldiki, ularda yoshlarning har tomonlama qo'llab-quvvatlashning innovatsion mexanizmlari ko'rsatib o'tildi.

Xulosa qilib aytadigan bo'lsak, jamiyatda bugungi kunda yoshlar tomonidan ijtimoiy masalalarni hal etish borasida taklif va tashabbuslar, hududlarda mavjud muammo hamda masalalarni yechimi yuzasidan dasturlar qabul qilinib borilmoqda. Bu masala bo'yicha hukumat, viloyatlar va Toshkent shahar, tuman va shahar hokimliklari ham doimiy ravishda yoshlar muammolarini hal etish bilan aloqador ravishda ko'plab dasturlar va chora-tadbirlar rejalari qabul qilinmoqda. Demak, yoshlar muammolari davlat, hukumat va hokimliklar darajasida doimiy ravishda hal etilib, muhim chora-tadbirlar ijrosi ta'minlanmoqda.

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FACTORS FOR THE FORMATION OF ERGONOMIC COMPETENCE IN THE TRAINING OF FUTURE COMPUTER SCIENCE TEACHERS

Abstract. *Factors affecting the quality of the use of educational tools by an information technology teacher, his/her activity and motivational stability (consistency and rationality of the set of teaching aids, time spent on learning information, organization of feedback, student-teacher activity, motivational stability of the teacher's activity).*

Keywords: *ergonomics, computer, ergonomic competence, ergonomic approach, algorithm, block diagram, technological device.*

With the automation of education, the growth of technical means and technological devices in the education system, and informatization, the need to conduct ergonomic research arises within the framework of the requirements for improving the educational process. The science of pedagogy deals with the problems of preparing a person for work, training, and education. These include the transfer and assimilation of educational information in the educational process, as well as methods of cognitive activity. It is intended to consider three forms of cognitive activity of students: speech, mental, and cultural activity. Today, the optimal ratio and optimization of all these forms within the framework of ergonomic requirements of the educational process, and the improvement of the educational process have not yet been studied, and a practical solution to this issue can be implemented empirically, based on the accumulated pedagogical experience.

Mental activity is the leader in the study of the material. Speech activity is a means of expressing thoughts. Cultural activity is used to a limited extent in the actions of students during practical training. Thus, we see that there are "direct" and "inverse" relationships between the three forms of cognitive activity. In the learning process, in the assimilation of essentially new knowledge and methods of activity, the culturalized form gives rise to a speech form in which mental actions, after assimilation, precede speech and determine the effectiveness of practical activity. Since the study of human capabilities in systems in order to ensure the effectiveness of the learning process reflects the integrative nature of the modern stage of scientific knowledge, we can talk about the interdisciplinary unity of ergonomics and pedagogy. In this regard, the emergence of scientific pedagogical

ergonomics - a synthetic subject that opens up the field of activity in the "educational-cognitive environment" of improving the educational process - is relevant. Pedagogical ergonomics is a generalization of the interaction of people in the educational process in order to ensure the well-being of human life and optimize the overall functioning of the pedagogical system. The use of an ergonomic approach allows us to consider the educational process and the content of education as a whole.

At the theoretical level, the validity of the content, methods and organizational forms of teaching is determined by the discipline of didactics, which studies the pedagogical theory of education and the practical activity of participants in the educational process. Increasing the theoretical level of the system of relations in teaching leads to a more effective impact on practice, increasing the integrity and efficiency of the educational process, changing and optimizing it. The educational process takes place in the unity of the substantive, procedural and motivational aspects of didactics. Today, any educational process is meaningless without appropriate educational products. In order to form a positive and stable motivation in the student in the educational activity of the teacher, it is necessary to understand the role of educational material products in the structure, rationally organize educational activities, and develop the student's interest in learning. In this regard, the problem of creating qualitatively new educational materials arises. The system of relations "student-learning environment-teacher" gives a cognitive result from the pedagogical point of view, and from the ergonomic point of view, an effectively obtained synergistic result. Thus, improving the ergonomic properties of educational material is a factor in intensifying the educational process. Ergonomics studies the "man-machine" system in the environment as an ergative system. When studying the phenomena of the pedagogical process, it is necessary to take into account the relationship between four objects: teacher, student and educational material, environment. The introduction of computers into the educational process means that, from an ergonomic point of view, the educational process is considered as a "teacher-student-computer" system in the educational environment. Thus, when a computer is introduced into the educational process, it becomes a learning tool for both the teacher and the student.

The computer as a learning tool reflects the modernization of the traditional educational system. To activate and accelerate the learning activities of students with the help of a computer, technologies based on the didactic reconstruction of educational materials can be used. In the "Teacher - Student - Computer" system, the teacher organizes the student's educational and cognitive activity using a computer, thereby enhancing the student's effective work process.

If the learning process is organized correctly, then the student will develop a strong interest in the learning process, independent learning activities, which contributes to increasing the effectiveness of the learning process. Pedagogical ergonomics in didactics and in pedagogy in general, ergonomic forms of presenting educational information pose a number of problems, such as searching

for means of presenting them in the didactic process, in educational and cognitive procedures, in teaching methods and techniques. The problem of qualitative use of the five human senses in the learning process: vision, hearing, smell, taste, touch, and perception is becoming increasingly relevant.

Studies have shown that students learn more quickly from graphically presented educational information than from textual information. The requirements for working with symbols and sign systems, diagrams, and graphs that are actively used in the educational process are studied in pedagogical ergonomics. The use of automated educational systems and programs in the educational process leads to a review of teaching methods and forms, analysis, and improvement of the educational process from an ergonomic perspective. Ergonomic educational technologies require the development of an educational process based on ergonomic standards and requirements. The introduction of new information technologies into education forces us to view the pedagogical process as an information process in the educational environment. Informatization of education should be considered not only as the use of computers, but also as a new ergonomic approach to organizing learning in the "teacher - student - computer" system.

In conclusion, programmed learning occurs due to the individual mastery of knowledge according to the curriculum based on a special computer program. Computers equipped with special computer programs allow solving almost all didactic problems. The effectiveness of computer-based learning technology is determined by the quality of educational programs and computer technology. Modeling, designing, monitoring, analyzing, evaluating the effectiveness of the educational process from the perspective of a systematic approach is the most important condition for implementing the tasks of pedagogical ergonomics. The educational process in modern higher education is an integral pedagogical system.

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MONITORING AND MAPPING THE CHANGE IN GROUNDWATER LEVELS

Abstract. *The article presents information on mapping the current state of groundwater in the Republic of Karakalpakstan, a theoretical study of the mapping process, monitoring of groundwater through GIS software, a geoinformation system, studying the quality of groundwater, monitoring changes in groundwater levels using GIS technologies to ensure the rational use of water resources in Karakalpakstan.*

Keywords: *mapping, groundwater, GIS technologies, irrigated areas, drainage, database, ArcGis software, collector.*

Mapping the current state of groundwater is crucial for sustainable water resource management, environmental protection, and policy development. Theoretical foundations and foreign experience contribute to the formation of an effective system for monitoring and mapping groundwater.

Groundwater, as the most important component of nature, plays an invaluable role in socio-economic development. The process of in-depth study and mapping of their current state is theoretically based on the integration of hydrogeology, geoecology, and geoinformation systems (GIS). The main theoretical approach in groundwater mapping is the analysis of quantitative and qualitative indicators of water resources in connection with the regularities of territorial distribution. This requires taking into account natural-geographical factors, geological structure, climatic conditions, and anthropogenic impacts.

In foreign experience, a number of modern methods for mapping groundwater have been introduced. In particular, in the USA and European countries, groundwater monitoring maps are being created based on remote sensing technologies and GIS. In the experience of Japan and Korea, the practice of forecasting the water balance and assessing environmental risks using geoinformation models has been established. At the same time, a number of international projects are being implemented in the countries of Central Asia in the direction of integrated management of transboundary water resources and the compilation of common electronic maps.

One of the GIS software is the ILWIS software, which is used to predict the potential zone of groundwater in the study area. For the development of a forecast map of potential groundwater zones, a system of overlapping or combining all thematic maps based on weight values was used. For processing data influencing

the formation of remote groundwater and mapping the potential zones of groundwater in the studied territory, methods of probing and GIS are used.

The works of Professor S.Sh.Mirzaev, one of the well-known scientists of the republics of Central Asia and Russia, are mainly devoted to methods for determining groundwater reserves. In ancient Greece, Rome, China, and Egypt, the first scientific concepts about the water cycle in nature and its properties appeared.

To monitor changes in groundwater levels in the Republic of Karakalpakstan and map them using GIS technologies, we will need to collect data on the hydrogeology of the region, especially on the level, distribution, flow direction, and quality of groundwater. Subsequently, this data can be used to create groundwater maps using GIS technology.

Such maps help in planning the sustainable use of water resources and making decisions on managing the water balance of the territory.

In the Republic of Karakalpakstan, irrigated areas are fully provided with drainage, and the length of the collector per 1 hectare is 31.88 p.m. The level of groundwater removed from irrigated land areas by collectors is monitored by an engineer and technical specialist of the existing land reclamation department in each district every 10 days. Analysis of chlorine and solid residues in collector and irrigation water is carried out once a month in the chemical laboratory. One of the main sources for assessing the melioration state of lands is the operation of 3,583 observation wells for monitoring the groundwater level.

Groundwater monitoring through the geoinformation system is carried out by studying the quality of groundwater and modeling it using algorithms and software. In this case, we consider two indicators: the first is an increase in the water level and the second is a decrease in the water level. Based on these two main indicators, we can analyze the overall water situation in the region. In these processes, the following conditions are controlled: spatial distribution of geofiltration parameters; spatial distribution of the aquifer balance of groundwater; spatial distribution of the initial conditions of geofiltration and hydrogeochemistry; boundary conditions of groundwater flows. The data obtained as a result of this analysis are combined in an automated system in the form of analysis results and maps, and computational experiments are conducted to determine geofiltration examples, initial and boundary conditions. The obtained data are entered into a computerized system as layers by geographical coordinates, and based on the "Geoinformation Modeling" method, the relationship between thematic layers is determined.

In the Republic of Karakalpakstan, the design and construction of maps using GIS technologies is an important engineering project aimed at improving wastewater collection and treatment infrastructure. Geographic Information Systems (GIS) As an example, we can take the KC-3-4 collector system for creating dot maps, analyzing territories, optimizing network routes, and managing backup system data.

This will allow improving the planning and monitoring of the system's construction and operation, as well as increasing the efficiency of resource

management. To minimize the negative impact on the environment, it is also important to consider the environmental situation of the project.

Creating a database for the KC-3-4 collector system includes several stages, mainly:

1. Data collection: collection of all necessary information about the existing collector system, mainly geographical coordinates, topographic maps, utilities, and other information.

2. Defining the database structure: defining the database structure, especially tables, relationships between them, attributes, and keys.

3. Creating a database: creating a database using specialized database management software (e.g., PostgreSQL, MySQL, Oracle, etc.).

4. Data upload: Uploads all collected data into the database, especially geographical information, topographic maps, utility programs, and other data.

5. Development of a GIS interface: development of a user interface based on GIS technologies for convenient use of collector system data.

6. These stages require a comprehensive approach and cooperation of various specialists, for example, specialists in geodesy, geology, databases, and GIS technology.

The KC-3-4 collector in the Karauzyak and Takhtakupyr districts of the Republic of Karakalpakstan was mapped. When creating the map, a database, i.e., a chp file, was created using the ArcGis program and brought to the map's appearance. The map shows the boundaries of the districts, views of the district observation well and the collector. In the attribute data of the Arc GIS program, the length of the collector is recorded at the time of excavation.

When creating a map using ArcCatalog, a database (container) was created, the necessary shp file was created, and the district boundary, collector, and observation wells were mapped (Figure 1).

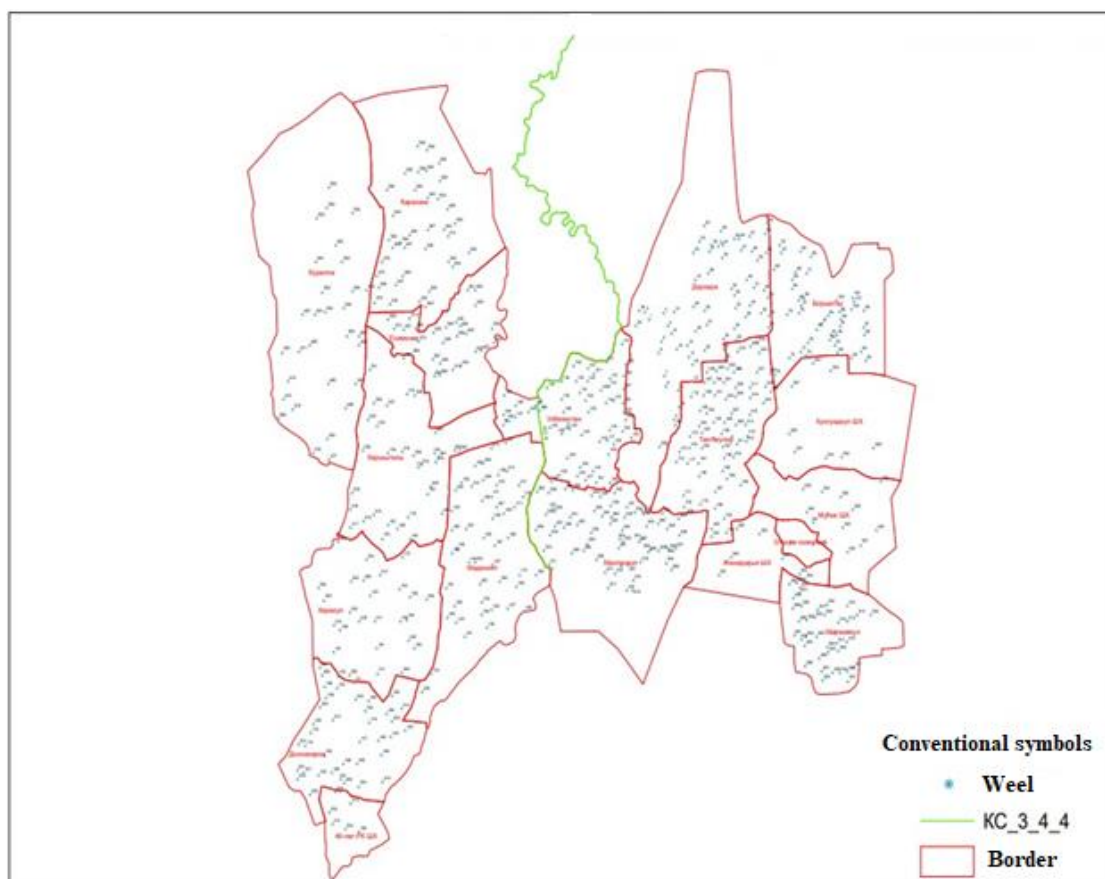


Figure 1. Map of the KC-3-4 collector, passing through the Karauzyak and Takhtakupir districts of the Republic of Karakalpakstan

In conclusion, since the world in which we live is developing day by day, the technologies used and the hydrological cycle must be adapted for effective management. It is necessary to ensure the interdisciplinary exchange of information about all layers of the planet. The constant development of GIS software and remote sensing technology contributes to the quality and accuracy of the models we create and the forecasts we provide, as well as the development of new research methods. This increases important opportunities for improving our analysis and forecasting by integrating the data model, real-time learning, and recursive future prediction.

In Karakalpakstan, the introduction of best practices into the processes of management and protection of groundwater is of great importance. In particular, the possibilities of sustainable management of groundwater resources can be expanded by adapting modern geoinformation systems, satellite observations, and modeling methods to national conditions.

An important task in ensuring the rational use of water resources in Karakalpakstan is the observation of changes in groundwater levels using GIS technologies and the compilation of a map of their distribution. GIS technologies help decision-makers better understand groundwater problems and develop more effective water management plans.

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MAVZU: QISHLOQ XO‘JALIGINI HUDUDIIY TASHKIL ETISHDA KLASSIK GO‘YALARNING AHAMIYATI

Annotatsiya. Ushbu maqola qishloq xo‘jalik tarmoqlarini hududiy tashkil etishda klassik g‘oyalardan foydalanish, hamda ushbu g‘oyalarni hozirgi kunda yirik shaharlar atrofida qishloq xo‘jalik mahsulotlari yetishtirishda klasterli yondoshuvga bog‘lagan holda tashkil etishning afzalliklari ochib berilgan. Klasterlar hududlarning iqtisodiy mustaqilligini mustahkamlashda katta rol o‘ynaydi. Ushbu yondashuv iqtisodiy jihatdan ustuvor tarmoqlar va loyihalarni aniqlash imkonini beradi. Bugungi kunda xo‘jalik tarmoqlarini bunday tizimli joylashtirish yuqori samara beradi.

Kalit so‘zlar. Intensiv, qishloq xo‘jaligi, klassik yondoshuv, klasterli yondoshuv, tyunen xalqalari, manufaktura, geografik konveyr, kooperatsiya, kombinatlashuv

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THE IMPORTANCE OF CLASSICAL IDEAS IN THE TERRITORIAL ORGANIZATION OF AGRICULTURE

Annotation. This article reveals the advantages of using classical ideas in the territorial organization of agricultural sectors, as well as organizing these ideas in the present day, connecting them to a cluster approach in the production of agricultural products around large cities. Clusters play a large role in strengthening the economic independence of territories. This approach makes it

possible to identify economically priority industries and projects. Today, such a systematic placement of farm tobacco has a high effect.

Keywords. *Intensive, agriculture, classical approach, cluster approach, Thunen rings, manufacturing, geographical conveyor, cooperation, combinatorics*

Kirish

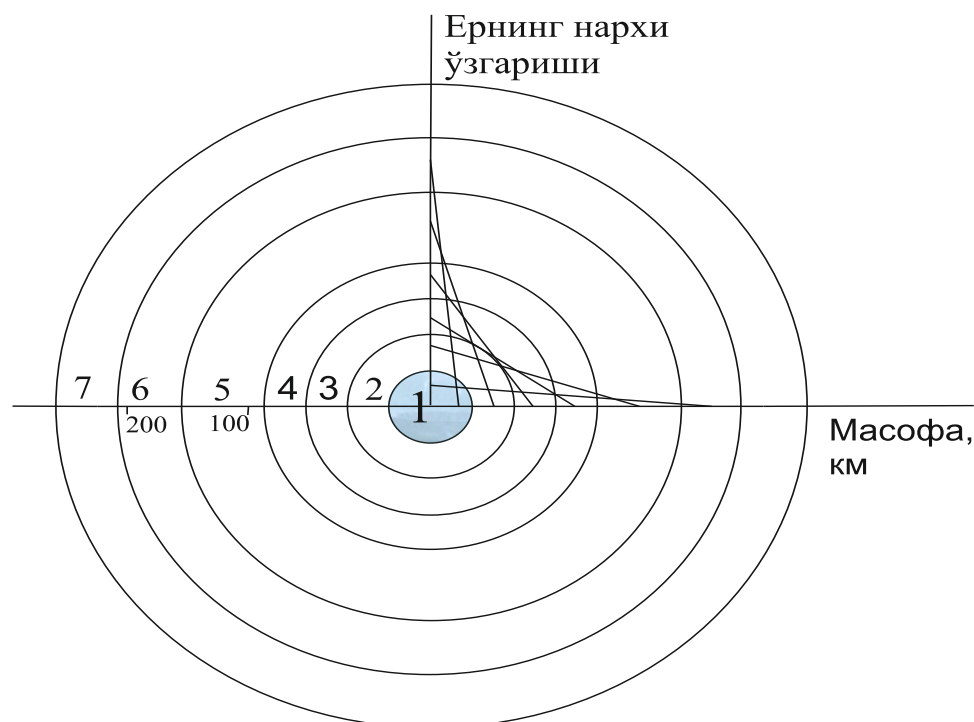
Iqtisodiyot tarmoqlari ichida eng qadimiysi qishloq xo‘jaligidir. Uning evolyutsion rivojlanishi hududiy tashkil qilish shakllarining murakkablashib borishi va takomillashuvi bilan birga sodir bo‘ladi. Qishloq xo‘jalik tarmoqlari-dehqonchilik va chorvachilikning aynan shu olim iqtisodiyot nazariyasida birinchi bo‘lib ishlab chiqarishning hududiy jihatiga e‘tibor qaratdi, hududiy iqtisodiyot ta‘limotiga qo‘l urdi, iqtisodiy makon tushunchasini fanga kiritdi. U Iqtisodiyotni hududiy tashkil etish masalalariga majmuali, tizimli yondoshuv, qishloq xo‘jaligi tarmoqlari joylashuvining qonuniyatlarini ochib berdi.

I. Tyunen o‘zining ilmiy g‘oyasini alohida, boshqa mamlakatlar bilan bog‘liq bo‘lmagan, ajralib turgan hudud, o‘zining mulki misolida yaratdi. Uning faraz qilishicha, bu mamlakatda atigi bitta shahar mavjud bo‘lib, u qishloq xo‘jalik mahsulotlarini iste‘mol qiluvchi yagona bozor yoki markaz vazifasini o‘taydi. Mazkur shahar atrofida qishloq xo‘jalik mahsulotlarini yetishtirish asosan transport xarajati, mahsulot vazni, uning sifatini buzilmasligi va keltirish masofasi belgilaydi. Aynan ana shu transport omili, uning iqtisodiy jihatlari qishloq xo‘jalik tarmoqlarini shahardan uzoq yoki yaqin masofada joylashuv tizimini shakllantirdi. Mahsulot yetishtirish va uni markazga keltirish ancha arzon bo‘ladi, u shuncha yaqin masofada bo‘ladi, aks holda uzoqroqda joylashadi. Bunda mahsulotning iste‘mol, talab “zichligi” ham katta ahamiyatga ega. Har doim va barcha uchun kerak bo‘lgan mahsulotlar shaharga yaqin joylashtiriladi.

Yuqoridagi tartibda qishloq xo‘jaligini joylashtirish shahar atrofida o‘ziga xos aylanalarni hosil qiladiki, ular ilmiy adabiyotlarda “Tyunen xalqalari” nomi bilan mashxur. Bu xalqaning eng birinchisi yuqori darajada unumdor shahar atrofi xo‘jaligidan iborat bo‘lib, undan keyingi xalqa o‘rmon xo‘jaligi, uchinchisi-meva va urug‘chilikdan tashkil topadi. Jami Tyunen tomonidan 6 xalqa belgilagan bo‘lib, ular turli yo‘nalishdagi chorvachilikni ham o‘z ichiga oladi.

Albatta, I. Tyunen g‘oyasi ma‘lum darajada abstraktdir; chunki hech qanday davlat, ayniqsa iqtisodiyotning hozirgi globallashuv va baynalminallashuv jarayonida jahon xo‘jaligi tizimidan ajralgan holda, alohida rivojlana olmaydi. Qolaversa, bu mamlakatda odatda, bir emas, bir necha shahar mavjud bo‘ladi va o‘rnashgan joyning tabiiy sharoiti aynan bir xil emas. Biroq, shunga qaramasdan, muallifning ushbu ta‘limoti o‘zining nazariy ahamiyatini, xususan bozor iqtisodiyoti sharoitida saqlab qolgan. Shahar atrofi qishloq xo‘jaligi hozirgi kunda ham ma‘lum darajada xalqasimon tashkil etiladi: eng yaqin joyda sabzavot, karam, kartoshka, undan uzoqroqda sut chorvachiligi, donchilik, parrandachilik, bog‘dorchilik va uzumchilik, go‘sht-jun chorvachiligi ma‘lum tartibda joylashadi. Bunday hududiy agrotizimning vujudga kelishida transport, bozor omili,

mahsulotning arzonligi va xaridorgirligi, sifatining buzilmasligi katta ahamiyatga ega.



1. Shahar; 2. Sabzavot va meva yetishtirish; 3. O‘rmon xo‘jaligi; 4. Sut chorvachiligi; 5. Donli ekinlar; 6. Ekstensiv qoramolchilik; 7. Foydalanilmaydigan erlar.

1-rasm. Tyunenning qishloq xo‘jalik tarmoqlarini joylashtirish sxemasi.

Manba: Бурдина Е.А., Крылов П.М. Экономическая география //Учебное пособие. – М.: МГИУ, 2010, с. 26.

Asosiy qism: Shu bilan birga, keyingi yaqin yillarda transport infratuzilmasining takomillashuvi, iste’molning xususiylashuvi (individullashuvi), “yashil inqilob”, qishloq xo‘jaligining mexanizatsiyalashuvi, sanoatning qishloq joylarga kirib borishi kabi yangiliklar, agrobiznes, ya’ni qishloq xo‘jaligidagi tadbirkorlikni qayta ishlash sanoati bilan uyg‘unlashtirish, birlashtirish bu sohaning hududiy tashkil etishga ancha o‘zgartirishlar kiritdi. Bundan tashqari, yuqorida qishloq xo‘jaligi tarmog‘ining faqat bir funksiyasiga, ya’ni uning aholini oziq-ovqatga bo‘lgan ehtiyojini qondirish tomoniga ko‘proq e’tibor qaratildi, xolos. Agar shu nuqtai nazardan yondoshadigan bo‘lsak, rus olimi K. I. Ivanovning “geografik konveyr” g‘oyasi ham ma’lum ahamiyat kasb etadi. Ushbu g‘oyaning asosiy mazmuni, avval ta’kidlanganidek, qishloq xo‘jaligi mahsulotlarini yetishtirish, qayta ishlash va ularni iste’molchiga yetkazishni hududlarda bosqichma-bosqich tashkil etishdan iborat. Qishloq xo‘jaligining ikkinchi muhim funksiyasi qayta ishlash sanoatini xom ashyo bilan ta’minlashdir. Bu sanoat tarmog‘ining tarixan vujudga kelishi aholi sonining ko‘payib borishi va uning ehtiyojlarini (oziq-ovqat, kiyim-kechak) faqat tabiiy mahsulotlar bilan ta’minlashga bog‘liq. O‘z navbatida, hozirgi kunda qayta ishlash sanoati

mahsulotlarini ko'p va sifatli ishlab chiqarish talab etiladi. Qishloq xo'jaligi bilan aloqador mazkur sanoat tarmoqlari dastlabki vaqtlarda iste'molchiga yaqin, ya'ni shaharlarda joylashtirilgan. Hatto yaqin yillargacha Toshkentda paxta tozalash, konserva zavodlari, go'sht kombinatlari mavjud edi. Keyingi yillarda bunday sanoat korxonalari asta-sekin o'rta va mayda shaharlarga, qishloq joylarga, bevosita xom ashyo rayonlariga ko'chmoqda. Bunga transport tizimining rivojlanishi, ekologik muammolar, qishloq mehnat resurslaridan foydalanish ham sababchidir. Natijada, qishloq landshafti, uning iqtisodiy makoni faqat an'anaviy soha-qishloq xo'jaligi bilangina emas, balki qisman "shahar xo'jaligi" bilan ham to'ldirilmoqda, o'ziga xos hududiy ishlab chiqarish tizimlari yoki hududiy agrosanoat majmualari shakllanmoqda.

Qishloq xo'jaligi ishlab chiqarishi uchun quyidagilar xos:

- Agrar soha bevosita tabiiy sharoit bilan bog'liqligi tufayli u mavsumiy xarakterga ega;
- Mavsumiyligi uchun mehnat resurslari ham yil davomida band emas;
- qishloq xo'jaligi rivojlanishi sanoatga nisbatan o'zgaruvchan ko'rinishda boradi;
- bu tarmoqda ishlab chiqarishni ijtimoiy tashkil qilish shakllari o'ziga xos-mujassamlashuv va ixtisoslashuv torroq, kooperatsiya va kombinatlashuv esa juda kam hollarda uchraydi;
- qishloq xo'jaligi tarmoqlari areal yoki maydon shaklida hududiy tashkil qiladi;
- mazkur tarmoqda ekstensiv va intensiv rivojlanish yaqqol ko'rinadi;
- qishloq xo'jaligining tarmoqlar tarkibi sanoatga o'xshash uncha boy emas;
- qishloq xo'jaligida mulkchilikni xususiylashtirish osonroq;
- xorijiy mamlakatlar bilan hamkorlik qilish, chet el investorlarini qishloq xo'jaligiga jalb qilish kamroq va hakazolar:

Yuqoridagi xususiyatlar ushbu tarmoqning iqtisodiyoti va geografiyasiga jiddiy ta'sir ko'rsatadi. Chunonchi, tabiiy sharoitning iqlim va ob-havoning noqulayligi qishloq xo'jaligi unumdorligi, u esa qayta ishlovchi sanoatga va pirovard natijada xalqning turmush darajasini pasayishiga olib keladi. Qolaversa, qishloq xo'jaligi bilan sanoatning boshqa tarmoqlari: mashinasozlik, kimyo, qurilish sanoati va elektr-energetika ham aloqador. Mehnat resurslaridan foydalanishning mavsumiyligi, ishlab chiqarishning mujassamlashuv darajasini yuqori emasligi mazkur tarmoqning iqtisodiy ko'rsatkichlarini pasaytiradi. Bundan tashqari, qishloq xo'jaligida yer ishlab chiqarish vositasi bo'lib, uning tabiiy xosildorligi hamma joyda ham bir xil emas.

So'nggi yillarda ba'zi bir mahsulotlarning yetishtirilishida mavsumiy xususiyatini yo'qotib bormoqda. Masalan, Toshkent bozorlarida bunday mahsulotlar deyarli yil bo'yi mavjud. Albatta, bu o'rinda "geografik konveyr"-ning roli ham bor. Chunki, yuqoridagi qishloq xo'jalik mahsulotlarini yetkazib turish turli hududlarda, ularning agroiklimiy sharoitlaridan kelib chiqqan holda navbatma-navbat amalga oshiriladi. Yana shuni qayd etish joizki, ayrim qishloq

xo'jaligi mevalarining geografiyasi tobora kengayib bormoqda. Chunonchi, anjir, anor va ayniqsa xurmo faqat alohida, subtropik rayonlarning mevasi bo'libgina qolmay, ular endigi sharoitda ko'pgina hududlarda yetishtirilmoqda.

Qishloq xo'jaligi tarmoqlarini joylashtirishga tabiiy va ijtimoiy-iqtisodiy omillar ta'sir ko'rsatadi. Tabiiy komponentlar ichida eng avvalo iqlim, suv va tuproqning ahamiyati katta. Iqlim sharoitlari, harorat, yer osti va yer usti suvlari, tuproq xususiyatlari qishloq xo'jaligining tarmoqlar va hududiy tarkibini ko'p jihatdan belgilab beradi. Shuningdek qishloq xo'jaligini ishlab chiqarish bilan tizimli ravishda bog'lash, ya'ni klasterli yondoshishni talab qiladi.

Masalan, paxta-to'qimachilik klasterining texnologik zanjiri paxta xomashyosini ishlab chiqarish, uni qayta ishlash, paxta tolasidan kalava ip ishlab chiqarish, gazlama ishlab chiqarish va tayyor mahsulotlar ishlab chiqarishni o'z ichiga qamrab oladi. Shu bilan birga, fermerlarni (paxta xomashyosini yetishtiruvchilarni), paxta tozalash zavodini, paxtani qayta ishlash korxonasini, to'qimachilik fabrikasini va kiyim-kechak ishlab chiqaruvchi korxonani birlashtirishning maqsadi har bir ishlab chiqaruvchining xarajatlarini kamaytiradigan va yakuniy mahsulotning raqobatbardoshligini oshiradigan yagona tuzilma yaratishdir.

Xulosa

Klaster uslubini qo'llash, ayniqsa bir-biri bilan bog'liq bo'lgan korxonalar mavjud hududlar uchun katta ahamiyatga ega. Klasterlar hududlarning iqtisodiy mustaqilligini mustahkamlashda katta ro'l o'ynaydi. Ushbu yondashuv iqtisodiy jihatdan ustuvor tarmoqlar va loyihalarni aniqlash imkonini beradi. Hududlar iqtisodiyotining rivojlanishida klasterli yondashuvning asosiy afzalliklaridan biri - iqtisodiy omillarning ro'lini kuchaytirish va ma'muriy omillarning rolini kamaytirishdan iborat. Hududiy ma'muriyatlarning roli faqat dastlabki bosqichda yuqoridir. Masalan, yangi klasterlarni tashkillashtirishda, aynan shu hudud manfaatlarni xisobga olgan holda, istiqbolli klasterlarni tanlashda hudud ma'muriyatining roli yuqori bo'ladi. Keyinchalik esa, hududiy ma'muriyatlarning roli kamayib boradi va bozor iqtisodiyoti qonunlari va omillari oldinga planga chiqadi. Hudud hokimiyatlarining roli eng muhim va istiqbolli klasterlarni qo'llab-quvvatlash va "o'yin qoidalari" ni tartibga solishdan iborat bo'ladi. Shu tartibda klasterlar mustahkam qishloq xo'jaligi va sanoat integratsiyasini tashkil qiladi.

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DZYUDUCHILARNING KUCH SIFATLARINI RIVOJLANTIRISH

Annotatsiya: Ushbu maqolada dzyudochilarning kuch sifatlarini rivojlantirishning o'ziga xos xususiyatlari, mashg'ulot usullari va sport natijalarini yaxshilashda kuch tayyorgarligining ahamiyati yoritilgan.

Kalit so'zlar: Dzyudo, jismoniy tayyorgarlik, portlovchi kuch, mashg'ulot metodikasi, sport chidamliligi.

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DEVELOPMENT OF STRENGTH QUALITIES OF JUDO ATHLETES

Abstract: This article discusses the specifics of developing strength qualities in judo athletes, training methods, and the importance of strength training in improving sports results.

Keywords: Judo, physical training, explosive power, training methodology, sports endurance.

Kirish

Zamonaviy dzyudo sporti yildan-yilga yuqori dinamika va shiddatli kurash uslubi bilan ajralib bormoqda. Xalqaro dzyudo federatsiyasi (IJF) tomonidan kiritilgan yangi qoidalar bellashuv vaqtini qisqartirib, sportchilardan har bir soniyada faollik ko'rsatishni talab qilmoqda. Shu sababli, dzyudochining g'alabasi nafaqat uning texnik-taktik mahoratiga, balki funksional tayyorgarligi, xususan, kuch sifatlarining qay darajada rivojlanganligiga bevosita bog'liqdir.

Dzyudoda kuch sifati shunchaki og'irlikni ko'tarish emas, balki raqibning qarshiligini sindirish, muvozanatdan chiqarish (kuzushi) va usulni yakuniga yetkazish (kake) jarayonida namoyon bo'ladigan murakkab asab-mushak reaksiyasidir. Tadqiqotlar shuni ko'rsatadiki, yuqori malakali dzyudochilar boshqa sportchilardan o'zlarining portlovchi kuchi va mushak simmetriyasi bilan ajralib turadilar.

Ushbu maqolada dzyudochilarning kuch tayyorgarligini tizimli rejalashtirish, maxsus kuch mashqlarining saralanishi va ularning bellashuvdagi samaradorligi masalalari tahlil qilinadi. Shuningdek, zamonaviy dzyudoda kuch

tayyorgarligi jarohatlarning oldini olishda (profilaktika) qanday rol o'ynashi ko'rib chiqiladi.

Dzyudochilarning jismoniy tayyorgarligida kuch sifatlarini rivojlantirish muhim o'rin tutadi. Dzyudo nafaqat texnika, balki portlovchi kuch va chidamlilikni ham talab qiladigan sport turi hisoblanadi. Dzyudo - bu dinamik kurash turi bo'lib, unda g'alaba qozonish uchun sportchidan yuqori darajadagi jismoniy quvvat talab etiladi. Kuch sifatleri dzyudochiga raqibning qarshiligini yengish, usullarni (priyomlarni) tez va samarali bajarish hamda jarohatlarning oldini olish imkonini beradi.

Tadqiqot maqsadi — zamonaviy dzyudochilarning tayyorgarlik jarayonida kuch sifatlarini rivojlantirishning eng samarali metodikasini asoslash hamda maxsus tanlangan kuch mashqlarining sportchining texnik harakatlari (usul bajarish tezligi va kuchi) samaradorligiga ta'sirini ilmiy jihatdan tahlil qilishdan iborat.

Tadqiqotning vazifalari:

Maqsadga erishish uchun quyidagi vazifalar belgilab olindi:

Dzyudochilarning jismoniy holatini tahlil qilish: Turli vazn toifalaridagi dzyudochilar uchun kuch tayyorgarligining o'ziga xos xususiyatlarini o'rganish.

Mashqlar majmuasini saralash: Umumiy kuchni oshiruvchi bazaviy mashqlar bilan dzyudo texnikasiga yaqin bo'lgan maxsus kuch mashqlari (rezina, gi bilan ishlash) o'rtasidagi optimal mutanosiblikni aniqlash.

Samaradorlikni baholash: Tavsiya etilgan metodika asosida shug'ullanish natijasida sportchilarning portlovchi kuch ko'rsatkichlari (masalan, kimosi bilan tortilish yoki vertikal sakrash orqali) o'zgarishini monitoring qilish.

Amaliy tavsiyalar ishlab chiqish: Murabbiy va sportchilar uchun musobaqa oldi davrida kuch sifatlarini saqlab qolish va rivojlantirish bo'yicha metodik tavsiyalar tayyorlash.

Tadqiqot metodlari va tashkil etilishi

Tadqiqot davomida qo'yilgan vazifalarni hal qilish uchun quyidagi ilmiy-pedagogik metodlardan foydalanildi:

Ilmiy-uslubiy adabiyotlar tahlili: Mavzuga oid mahalliy va xorijiy olimlarning dzyudo nazariyasi va metodikasi bo'yicha ilmiy ishlari, o'quv qo'llanmalari va zamonaviy sport fiziologiyasi ma'lumotlari o'rganildi.

Pedagogik kuzatuv: Dzyudochilarning o'quv-mashg'ulot jarayoni hamda musobaqa faoliyati davomida kuch sifatlarining namoyon bo'lish darajasi kuzatildi.

Antropometrik o'lchovlar: Sportchilarning tana tuzilishi, mushak massasining rivojlanishi va vazn ko'rsatkichlari tahlil qilindi.

Pedagogik testlash (Nazorat mashqlari): Dzyudochilarning kuch sifatlarini aniqlash uchun quyidagi testlar majmuasi qo'llanildi:

Maksimal kuch uchun: Shtanga bilan o'tirib-turish (squats) va shtangani yotgan holda yuqoriga itarish (bench press).

Portlovchi kuch uchun: Joyidan turib uzunlikka sakrash va 30 soniya davomida kimosi (gi) bilan turnikda tortilish.

Kuch chidamliligi uchun: 1 daqiqa davomida "uchikomi" (usulga kirish) harakatlarini maksimal tezlikda bajarish.

Matematik-statistika usullari: Olingan natijalarni qayta ishlash va ularning ishonchlik darajasini aniqlash uchun variatsion statistika metodlaridan foydalanildi.

Dzyudochilar uchun kuch turlari

Dzyudo amaliyotida kuch tayyorgarligi uchta asosiy yo'nalishga bo'linadi:

Maksimal kuch: Raqibni ko'tarish va nazorat qilish uchun zarur bo'lgan asosiy quvvat.

Portlovchi kuch: Usulni bajarishda soniyalar ichida maksimal kuch sarflash qobiliyati (masalan, kake bosqichida).

Kuch chidamliligi: Bellashuvning oxirgi daqiqalarigacha yuqori tempni saqlab qolish va charchoq fonida ham kuch ishlatish qobiliyati.

Mashg'ulot Metodikasining Asosiy Vositalari

Dzyudochilarning kuchini oshirishda quyidagi mashqlar majmuasi tavsiya etiladi:

Bazaviy mashqlar: Shtanga bilan o'tirib-turish (squats), yerdan ko'tarish (deadlift) va yotgan holda shtangani yuqoriga itarish (bench press). Bu mashqlar umumiy mushak massasi va poydevor kuchini shakllantiradi.

Maxsus-tayyorgarlik mashqlari: Rezina amortizatorlar bilan ishlash, dzyudo kimosini (gi) tortish mashqlari. Bu usullarni bajarishda ishlaydigan mushaklar guruhini aynan dzyudo harakatlariga moslashtiradi.

Plyometrik mashqlar: Sakrashlar, to'ldirma to'plar (medball) bilan ishlash. Bu mashqlar asab-mushak tizimining reaksiyasini tezlashtiradi.

Kuch sifatlarini rivojlantirishda davriylashtirish (periodizatsiya) muhim. Musobaqadan uzoq davrda asosiy e'tibor maksimal kuchga qaratilsa, musobaqa yaqinlashgani sayin mashg'ulotlar portlovchi kuch va tezkorlikka yo'naltirilishi lozim.

Xulosa

Dzyudochining muvaffaqiyati faqatgina texnik mahoratga bog'liq emas. Tizimli ravishda tashkil etilgan kuch tayyorgarligi sportchining funksional imkoniyatlarini kengaytiradi va xalqaro arenalarda yuqori natijalarga erishishiga zamin yaratadi.

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TIBBIY TA'LIMDA TURLI PEDAGOGIK USULLAR ASOSIDA TALABALARNING KLINIK FIKRLASH KOMPETENSIYASINI RIVOJLANTIRISH METODIKASI

Annotatsiya: Ushbu tadqiqot muammoga asoslangan ta'lim (PBL) metodining tibbiyot talabalari klinik fikrlash kompetensiyasiga ta'sirini o'rganishga qaratilgan. FJSTI da PBL usulida o'qitilgan 125 nafar talaba (asosiy guruh) ADTI ning an'anaviy o'qitish dasturidagi 125 nafar talaba (nazorat guruhi) bilan taqqoslandi. OSCE natijalari Student t-testi yordamida tahlil qilindi. PBL guruhi OSCE umumiy ballarda nazorat guruhiga nisbatan statistik jihatdan sezilarli yuqori ko'rsatkichlarni namoyish etdi ($78,4 \pm 8,2$ va $68,6 \pm 9,1$; $p < 0,001$). PBL metodologiyasi klinik fikrlash ko'nikmalarini rivojlantirishda an'anaviy usullardan ustun keladi va tibbiy ta'lim dasturlarida keng joriy etilishi tavsiya etiladi.

Kalit so'zlar: muammoga asoslangan ta'lim; klinik fikrlash; OSCE; tibbiy ta'lim; pedagogik usullar; kompetensiyaga yo'naltirilgan ta'lim; pediatriya.

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METHODOLOGY FOR DEVELOPING THE CLINICAL REASONING COMPETENCE OF STUDENTS IN MEDICAL EDUCATION THROUGH VARIOUS PEDAGOGICAL METHODS

Abstract: This study aims to investigate the impact of the problem-based learning (PBL) method on the clinical reasoning competence of medical students. A total of 125 students trained with the PBL method at FMIPH (the main group) were compared with 125 students from ASMI's traditional training program (the control group). OSCE results were analyzed using the Student's t-test. The PBL group demonstrated statistically significant higher overall OSCE scores compared to the control group (78.4 ± 8.2 vs. 68.6 ± 9.1 ; $p < 0.001$). The PBL methodology is superior to traditional methods in developing clinical reasoning skills and is recommended for widespread implementation in medical education programs.

Keywords: *problem-based learning; clinical reasoning; OSCE; medical education; pedagogical methods; competency-based education; pediatrics.*

KIRISH

Zamonaviy tibbiyotning jadal rivojlanishi tibbiy ta'lim sifatiga bo'lgan talablarni keskin oshirmoqda. Klinik fikrlash — tibbiyot mutaxassislarining diagnostik va terapevtik qarorlar qabul qilish qobiliyati — kasb kompetensiyasining markaziy elementi sifatida tan olingan [1]. Shu bilan birga, an'anaviy ma'ruza-seminar tizimi ko'pincha talabalarning kognitiv faolligini cheklaydi va amaliy ko'nikmalarni yetarlicha shakllantirmaydi [2, 3]. Muammoga asoslangan ta'lim (Problem-Based Learning — PBL) 1960-yillardan boshlab Garvard va Makmaster universitetlarida amalda sinab ko'rilgan va hozirgi kunda dunyoning 80 dan ortiq tibbiyot maktablarida joriy etilgan. PBL metodining asosiy printsipi — talabani haqiqiy yoki simulyatsiya qilingan klinik muammo atrofida faol bilim konstruksiyasiga jalb etishdir [4]. Tadqiqotlar shuni ko'rsatadiki, PBL bilimni chuqurroq o'zlashtirish, mustaqil fikrlash va guruh hamkorligini rivojlantiradi [5, 6]. Klinik fikrlash kompetensiyasini ob'ektiv baholash masalasi ham alohida ahamiyat kasb etadi. Ob'ektiv Strukturlashtirilgan Klinik Imtihon (OSCE) — bemorni tekshirish, anamnez yig'ish, differensial tashxis qo'yish va muloqot ko'nikmalarini standartlashtirilgan stansiyalarda baholashning eng ishonchli metodologiyalaridan biri hisoblanadi [7, 8]. OSCE natijalari o'quv jarayonining samaradorligini aniqlashda muhim ahamiyat kasb etadi. O'zbekiston tibbiy ta'limi hozirgi kunda tub islohotlar jarayonida bo'lib, kompetensiyaga yo'naltirilgan ta'lim (KYT) modeli tobora keng joriy etilmoqda. Biroq mahalliy sharoitda PBL metodining an'anaviy o'qitish tizimi bilan qiyosiy tahlili hanuz yetarlicha o'rganilmagan [9]. Pedagogik uslublar samaradorligi mahalliy ta'lim muhitiga, madaniy kontekstga va resurs ta'minotiga bog'liq ekanligi inobatga olinganda, bunday tadqiqotlar davlat ahamiyatiga ega [10]. Reflektiv amaliyot — Shon (Schön) ta'kidlaganidek — shifokorning o'z xatolaridan o'rganish va klinik muhokamani takomillashtirish jarayonining ajralmas qismidir [1]. Zamonaviy tibbiy ta'lim esa shu refleksiyani tizimli tarzda shakllantirishga intiladi. Klinik holatlarga asoslangan o'qitish, skript-konkordans testi va simulyatsiya tibbiy ta'limda klinik fikrlashni rivojlantirishning eng istiqbolli vositalariga kiradi [2, 3]. Ushbu tadqiqotning asosiy maqsadi — FJSTI pediatriya klinikasi bazasida PBL metodidan foydalanilgan asosiy guruh bilan ADTI nazorat guruhi talabalarining OSCE natijalari bo'yicha klinik fikrlash kompetensiyasini qiyosiy tahlil qilish hamda PBL metodining tibbiy ta'limdagi samaradorligini empirik dalillar asosida isbotlashdir.

MATERIAL VA METODLAR

Tadqiqot dizayni. Ushbu ish 2022–2023 o'quv yilida o'tkazilgan prospektiv qiyosiy nazoratlangan tadqiqot bo'lib, to'liq axloq qo'mitasi tomonidan tasdiqlangan (FJSTI, № 18-2022).

Ishtirokchilar. Asosiy guruhga FJSTI pediatriya poliklinikida o'qiyotgan 125 nafar 4–5-kurs talabasi kiritildi (o'rtacha yosh $25,0 \pm 1,6$ yil; 68 nafar ayol, 57

nafar erkak). Nazorat guruhiga ADTI ning xuddi shu o'quv dasturi va semestriga mos keladigan 125 nafar talabasi (o'rtacha yosh $24,8 \pm 1,7$ yil) kiritildi. Ikkala guruh ham bir xil o'quv rejasi va darslik asosida o'qishdi. Psixik yoki jismoniy kasalligi mavjud talabalar tadqiqotdan chetlashtirildi.

Intervensiya. PBL guruhi 12 hafta davomida haftasiga 2 marta 90 daqiqalik PBL sessiyalarida qatnashdi. Har bir sessiyada real klinik holat taqdim etildi; talabalar kichik guruhlarda (5–7 kishi) muammo tahlili, gipotezalar shakllantirish va dalilga asoslangan yechim topish jarayonini amalga oshirdi. Nazorat guruhi an'anaviy ma'ruza-seminar formatida o'qidi.

Baholash. O'n ikki haftalik kurs yakunida ikkala guruh ham 5 stansiyadan iborat OSCE imtihonini topshirdi: anamnez yig'ish, jismoniy ko'rik, differensial diagnostika, davolash rejasi va kommunikatsiya ko'nikmalari. Har bir stansiya 100 ball ustida baholandi. Statistik tahlilda Student t-testi, Cohen d effekt hajmi va Pearson korrelyatsiya koeffitsienti qo'llanildi; $p < 0,05$ ahamiyatli farq mezoni sifatida qabul qilindi. Tahlil SPSS 26.0 dasturida bajarildi.

NATIJALAR

Demografik ko'rsatkichlar. PBL guruhi ($n = 125$) va nazorat guruhi ($n = 125$) o'rtasida yosh ($t = 1,02$; $p = 0,310$), jins taqsimoti ($\chi^2 = 0,42$; $p = 0,518$) va kirish OSCE ballari ($65,1 \pm 7,4$ va $64,8 \pm 7,9$; $t = 0,28$; $p = 0,780$) bo'yicha statistik jihatdan ahamiyatli farq aniqlanmadi, bu esa guruhlarining dastlabki tengligi bilan tasdiqlanadi.

OSCE umumiy natijalari. 12 haftalik kurs yakunida PBL guruhi o'rtacha $78,4 \pm 8,2$ ball, nazorat guruhi esa $68,6 \pm 9,1$ ball to'pladi. Student t-testi natijalari ikkala guruh o'rtasidagi farq statistik jihatdan yuqori darajada ahamiyatli ekanini tasdiqladi ($t = 8,95$; $df = 248$; $p < 0,001$). Cohen d effekt hajmi 1,13 ni tashkil etdi, bu kuchli effektga mos keladi. PBL guruhidagi talabalarning 87,2% (109/125) OSCE da 70 ball va undan yuqori to'plagan bo'lsa, nazorat guruhida bu ko'rsatkich 61,6% (77/125) ni tashkil etdi ($\chi^2 = 20,4$; $p < 0,001$).

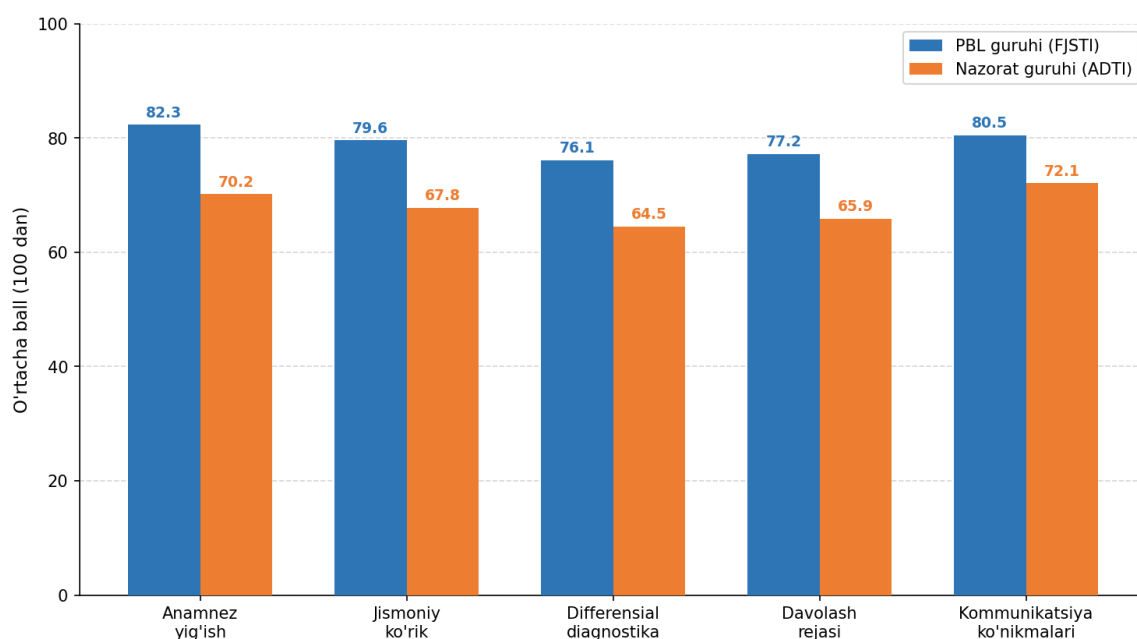
1-jadval.

OSCE stansiyalari bo'yicha guruhlar natijalari ($M \pm SD$)

OSCE stansiyasi	PBL guruhi ($n=125$) $M \pm SD$	Nazorat guruhi ($n=125$) $M \pm SD$	t ($df=248$)	p qiymat
Anamnez yig'ish	$82,3 \pm 7,1$	$70,2 \pm 8,9$	10,52	$< 0,001$
Jismoniy ko'rik	$79,6 \pm 8,4$	$67,8 \pm 9,3$	9,37	$< 0,001$
Differensial diagnostika	$76,1 \pm 9,2$	$64,5 \pm 10,1$	8,49	$< 0,001$
Davolash rejasi	$77,2 \pm 8,8$	$65,9 \pm 9,7$	8,58	$< 0,001$
Kommunikatsiya ko'nikmalari	$80,5 \pm 7,6$	$72,1 \pm 8,5$	7,31	$< 0,001$
Umumiy OSCE bali	$78,4 \pm 8,2$	$68,6 \pm 9,1$	8,95	$< 0,001$

Izoh: M — o'rtacha qiymat; SD — standart og'ish; barcha farqlar uchun $Cohen d \geq 1,04$ (kuchli effekt).

Stansiyalar bo'yicha qiyosiy tahlil. 1-jadval PBL va nazorat guruhlarining OSCE stansiyalari bo'yicha batafsil natijalarini aks ettiradi. Eng katta farq differensial diagnostika stansiyasida kuzatildi (PBL: $76,1 \pm 9,2$; nazorat: $64,5 \pm 10,1$; $t = 8,49$; $p < 0,001$; $d = 1,21$), bu klinik muhokama darajasida PBL ning aniq ustunligini ko'rsatadi. Kommunikatsiya stansiyasida farq nisbatan kichikroq bo'lsa-da (PBL: $80,5 \pm 7,6$; nazorat: $72,1 \pm 8,5$; $t = 7,31$; $p < 0,001$; $d = 1,04$), statistik jihatdan ahamiyatli farq saqlanib qoldi.



1-rasm. OSCE natijalari bo'yicha guruhlararo taqqoslama

Korrelyatsiya tahlili. PBL guruhida guruh secciyalarida faollik darajasi va yakuniy OSCE bali o'rtasida kuchli ijobiy korrelyatsiya aniqlandi ($r = 0,72$; $p < 0,001$). Shuningdek, o'z-o'zini baholash natijalariga ko'ra PBL guruhi talabalari an'anaviy guruhga nisbatan klinik muammolarni hal qilishda o'z ishonchlarini ancha yuqori baholadi ($4,2 \pm 0,6$ va $3,4 \pm 0,8$, 5 ballik shkala bo'yicha; $t = 7,90$; $p < 0,001$).

MUHOKAMA

Ushbu tadqiqot natijalari PBL metodining klinik fikrlash kompetensiyasini rivojlantirishdagi samaradorligini ishonchli tarzda tasdiqlaydi. Olingan topilmalar Bouen [6] va Kassirer [3] tadqiqotlari bilan to'liq uyg'unlashib, klinik muhokama ko'nikmalarini rivojlantirishda muammoga yo'naltirilgan yondashuvlarning an'anaviy ta'limdan sezilarli ustunligini yana bir bor isbotlaydi.

Differensial diagnostika va anamnez yig'ish stansiyalarida kuzatilgan kuchli effekt hajmi ($d \geq 1,2$) PBL ning aynan kognitiv yuqori darajali ko'nikmalar (tahlil, sintez, baholash) ni shakllantirishi bilan izohlanadi. Bu Bloom taksonomiyasining yuqori darajalari bilan mos keladi. Charlin va boshqalarning [4] script-concordance kontseptsiyasiga ko'ra, haqiqiy klinik kontekstda o'qitish sxema va skriptlarni tezroq va mustahkamroq shakllantirishga olib keladi.

Tadqiqotda kommunikatsiya ko'nikmalarida ham ahamiyatli yaxshilanish kuzatildi. Bu Hardenning [5] "tibbiyot o'qituvchisining sakkiz roli" kontseptsiyasida ta'kidlangan rollarga asoslanib, o'qituvchining fasilitator sifatidagi roliga bog'liq. Yusupova va Rahimov tadqiqotlari [1, 2] ham O'zbekiston sharoitida interfaol metodlarning muloqot ko'nikmalariga ijobiy ta'sirini ko'rsatgan.

Tadqiqotning bir qancha cheklovlari mavjud. Birinchidan, kuzatuv davri 12 hafta bilan cheklangan — uzoq muddatli ta'sir o'rganilmagan. Ikkinchidan, tadqiqot ikkita muassasa bilan cheklangan bo'lib, topilmalarni umumlashtirish ehtiyoqkorlikni talab etadi. Uchinchidan, PBL seanslarini o'tkazgan o'qituvchilarning PBL tajribasi har xil bo'lishi natijaga ta'sir qilgan bo'lishi mumkin. Kelajak tadqiqotlarda ko'proq muassasalarni qamrovchi, uzoq muddatli takroriy o'lchashlarni o'z ichiga olgan va o'qituvchi omillarini nazorat qiladigan dizaynlar tavsiya etiladi.

XULOSA

Ushbu tadqiqot natijalari shuni ko'rsatadiki, PBL metodologiyasini tibbiy ta'limga — xususan pediatriya poliklinikasiga — integratsiyalash talabalarning klinik fikrlash kompetensiyasini an'anaviy o'qitishga qaraganda statistik jihatdan sezilarli darajada yaxshilaydi ($p < 0,001$; $d = 1,13$). PBL usulining O'zbekiston tibbiy oliy ta'lim muassasalarining o'quv dasturlariga keng joriy etilishi tavsiya etiladi. Kelajak tadqiqotlarda ko'p markazli dizaynlar, uzoq muddatli kuzatuv va o'qituvchi tayyorgarligi omillarini inobatga olish muhim.

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EFFICACY AND SAFETY OF MUCOLYTIC THERAPY IN COMMUNITY-ACQUIRED PNEUMONIA: CLINICAL LITERATURE REVIEW

Abstract: *Mucolytic agents are widely used to manage excessive bronchial secretions, improve mucus clearance, and alleviate cough in patients with community-acquired pneumonia (CAP). Their efficacy and safety have been discussed in multiple clinical studies and systematic reviews. This article provides a comprehensive review of the clinical evidence regarding the use of mucolytic therapy in CAP, emphasizing clinical outcomes, safety profiles, and rational application as adjunct therapy. The analysis demonstrates that mucolytic agents, particularly ambroxol, acetylcysteine, and carbocisteine, are effective in improving respiratory function and symptom relief, with a favorable safety profile when used according to recommended guidelines.*

Keywords: *mucolytic therapy, community-acquired pneumonia, cough, bronchial secretion, clinical efficacy, safety.*

Introduction

Community-acquired pneumonia (CAP) remains one of the most prevalent respiratory infections worldwide, affecting both adults and children. Despite the availability of effective antibiotics, CAP continues to be associated with significant morbidity and, in severe cases, mortality. One of the key pathophysiological features of CAP is the accumulation of excessive bronchial secretions, which can impair gas exchange, prolong symptoms, and contribute to secondary complications such as atelectasis or persistent cough.

Mucolytic agents, including ambroxol, acetylcysteine, and carbocisteine, act primarily by reducing mucus viscosity, enhancing mucociliary clearance, and facilitating expectoration. Their therapeutic effect is especially relevant in patients with CAP accompanied by pronounced bronchial hypersecretion. In addition to symptomatic relief, mucolytic therapy may support antibiotic efficacy by improving drug distribution within the bronchial tree and reducing obstruction-related hypoxia.

Clinical guidelines for CAP management emphasize the importance of supportive therapies alongside antimicrobials. While much attention is paid to antibiotic selection and supportive oxygen therapy, the rational use of mucolytic

agents remains under debate. Variability in study designs, patient populations, and outcome measures contributes to differing recommendations. Nevertheless, a synthesis of current literature suggests that mucolytics may play a beneficial role in improving clinical outcomes, especially in patients with excessive mucus production.

The aim of this review is to evaluate the clinical efficacy and safety of mucolytic therapy in patients with CAP and to provide an evidence-based framework for rational use as adjunct therapy.

Materials and Methods

A structured literature review was conducted using the PubMed, Scopus, and Google Scholar databases. The search strategy combined keywords such as “mucolytic therapy”, “community-acquired pneumonia”, “cough”, “bronchial secretion”, “ambroxol”, and “acetylcysteine”. Peer-reviewed articles published between 2010 and 2025 were prioritized. Both adult and pediatric studies were included.

Clinical outcomes, including duration of cough, improvement in sputum clearance, oxygenation parameters, length of hospital stay, and adverse events, were extracted. Studies assessing safety profiles and drug tolerability were also reviewed. Data were synthesized to provide an integrated perspective on the efficacy and safety of mucolytic therapy in CAP.

Results

The review of clinical studies demonstrates several consistent findings:

1. **Symptom improvement:** Mucolytic therapy significantly reduces the duration and severity of cough in patients with CAP. Patients receiving ambroxol, acetylcysteine, or carbocysteine reported faster expectoration and improved comfort.
2. **Bronchial secretion clearance:** Studies consistently show that mucolytics enhance mucus clearance, facilitating lung ventilation and gas exchange.
3. **Adjunct therapy benefits:** Mucolytic agents support the action of antibiotics by improving drug penetration and reducing hypoxia caused by mucus obstruction.
4. **Safety profile:** Adverse events are generally mild, including occasional gastrointestinal discomfort or transient rash. Severe adverse effects are rare.
5. **Special populations:** Pediatric and elderly patients generally tolerate mucolytic therapy well, with clinical improvements similar to the adult population.

Discussion

Mucolytic therapy is an important adjunctive measure in the management of CAP, particularly in patients with significant bronchial hypersecretion. Its benefits extend beyond mere symptomatic relief. By facilitating mucus clearance, mucolytics contribute to improved oxygenation and reduce the risk of secondary complications such as atelectasis or persistent airway obstruction.

Clinical studies consistently report reductions in cough duration and improvements in sputum properties, leading to enhanced patient comfort and potentially faster clinical recovery. Furthermore, improved mucus clearance may indirectly support antibiotic therapy, as unobstructed airways allow for better distribution of antimicrobial agents and more effective pathogen eradication.

Safety data from multiple clinical trials indicate that mucolytic therapy is generally well tolerated. Gastrointestinal discomfort is the most frequently reported adverse effect, while severe reactions are uncommon. These findings support the inclusion of mucolytic agents as part of a comprehensive CAP management strategy, particularly in patients with productive cough and thick bronchial secretions.

Nevertheless, certain limitations remain. The heterogeneity of study populations, variations in dosing regimens, and differences in outcome measures make direct comparisons challenging. Additionally, many studies focus on short-term clinical endpoints, and long-term effects of mucolytic therapy in CAP remain underexplored. Future randomized controlled trials with standardized protocols are needed to confirm the optimal dosing, timing, and patient selection criteria for mucolytic therapy.

Conclusion

Mucolytic therapy represents a safe and effective adjunctive intervention in the management of community-acquired pneumonia. Clinical evidence indicates that ambroxol, acetylcysteine, and carbocysteine improve cough severity, facilitate bronchial secretion clearance, and support overall respiratory function. Adverse events are generally mild and rare.

Rational use of mucolytic therapy, particularly in patients with excessive mucus production, can enhance patient comfort, accelerate recovery, and complement standard antibiotic regimens. Clinicians should consider patient-specific factors, such as age, comorbidities, and severity of secretions, when prescribing mucolytics to maximize efficacy and safety.

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KITOB TUMANINING INVESTITSIIYA JOZIBADORLIGINI OSHIRISH OMILLARI VA ULARNING HUDUDIIY RIVOJLANISHGA TA'SIRI

Annotatsiya. Mazkur tadqiqotda Kitob tumanining investitsiya jozibadorligini oshirishga ta'sir etuvchi asosiy omillar va ularning hududiy rivojlanish jarayonlariga ta'siri tahlil qilinadi. Tadqiqot davomida iqtisodiy-geografik joylashuv, tabiiy-resurs salohiyati, infratuzilma holati, mehnat resurslari hamda institutsional muhitning investitsiyalarni jalb etishdagi o'rni ilmiy asosda yoritilgan. Shuningdek, investitsiya faolligining ishlab chiqarish hajmi, bandlik darajasi va ijtimoiy-iqtisodiy barqarorlikka ta'siri aniqlangan. Olingan natijalar hududning investitsiya siyosatini takomillashtirish va barqaror hududiy rivojlanishni ta'minlashda amaliy ahamiyat kasb etadi.

Kalit so'zlar: investitsiya jozibadorligi, hududiy rivojlanish, iqtisodiy salohiyat, infratuzilma, mehnat resurslari, institutsional muhit

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FACTORS ENHANCING THE INVESTMENT ATTRACTIVENESS OF THE KITOB DISTRICT AND THEIR IMPACT ON TERRITORIAL DEVELOPMENT

Abstract. This study analyzes the main factors influencing the enhancement of investment attractiveness of the Kitob district and their impact on territorial development processes. In the course of the research, the role of economic-geographical location, natural resource potential, infrastructure condition, labor resources, and the institutional environment in attracting investments is scientifically examined. In addition, the impact of investment activity on production volume, employment level, and socio-economic stability is identified. The obtained results are of practical significance for improving the investment policy of the territory and ensuring sustainable territorial development.

Keywords: investment attractiveness, territorial development, economic potential, infrastructure, labor resources, institutional environment.

Hududlarning barqaror ijtimoiy-iqtisodiy rivojlanishi ko'p jihatdan investitsiya oqimlarining hajmi va samaradorligiga bog'liq. Ayniqsa, mahalliy

resurslardan oqilona foydalanish, infratuzilmani modernizatsiya qilish va institutsional muhitni takomillashtirish hududiy taraqqiyotning asosiy omillari hisoblanadi. Shu nuqtayi nazardan, Kitob tumanining investitsiya jozibadorligini oshirish masalasi dolzarb ilmiy-amaliy ahamiyat kasb etadi.

Mazkur maqolaning maqsadi — Kitob tumanining investitsiya jozibadorligiga ta'sir etuvchi asosiy omillarni aniqlash, ularning hududiy rivojlanish jarayonlariga ta'sirini baholash hamda investitsiya siyosatini takomillashtirish bo'yicha ilmiy asoslangan takliflar ishlab chiqishdan iborat. Tadqiqot jarayonida tahlil va sintez, statistik ma'lumotlarni taqqoslash, tizimli yondashuv hamda iqtisodiy-geografik baholash usullaridan foydalanildi.

Kitob tumani Qashqadaryo viloyatining shimoli-sharqiy qismida joylashgan bo'lib, tabiiy landshaft xilma-xilligi va qulay geografik o'rni bilan ajralib turadi. Hudud relyefining xilma-xilligi, tabiiy, siyosiy va iqtisodiy geografik o'rnining qulayligi, transport kommunikatsiyalarining mavjudligi hududning mavjud imkoniyatlariga mos bo'lgan investitsion loyihalarni amalga oshirish uchun qulay shart-sharoit yaratadi.

Iqtisodiy-geografik joylashuvning ustunliklari ichki bozor va xomashyo manbalariga yaqinlik, qishloq xo'jaligi uchun qulay agroiklim sharoiti hamda turizmni rivojlantirish imkoniyatlarida namoyon bo'ladi. Mazkur omillar investorlar uchun xarajatlarni kamaytirish va ishlab chiqarish samaradorligini oshirish imkonini beradi.

Hudud tabiiy resurslarga boy bo'lib, qishloq xo'jaligi, bog'dorchilik va chorvachilikni rivojlantirish uchun katta salohiyatga ega. Sug'oriladigan yer maydonlarining mavjudligi va iqlim sharoitining qulayligi agrar sektorni investitsiya nuqtayi nazaridan istiqbolli yo'nalishga aylantiradi.

2023- yilning yanvar-dekabr oylarida shahar va tumanlar bo'yicha sanoat mahsulotlari va iste'mol tovarlari ishlab chiqarish ko'rsatkichlariga e'tibor qaratadigan bo'lsak, Kitob tumani shu vaqt mobaynida 1319,0 mlrd so'm sanoat mahsuloti ishlab chiqarganini kuzatishimiz mumkin bo'ladi.

Shu bilan birga, mavjud resurslardan to'liq va samarali foydalanish darajasi yetarli emas. Hududning agroiklim resurslari oziq-ovqat sanoatini rivojlantirish va mahsulot hajmini oshirishga imkoniyat yaratadi va bu eksport salohiyatini oshirish imkonini ham beradi. Zamonaviy agrotekhnologiyalarni joriy etish, qishloq xo'jaligi mahsulotlarini qayta ishlash sanoatini rivojlantirish hamda qo'shimcha qiymat zanjirini yaratish hudud investitsiya salohiyatini oshirishning muhim omillari hisoblanadi. Tabiiy resurslardan oqilona foydalanish investitsiya jozibadorligini mustahkamlaydi.

2023-yil 1-yanvar holatidagi Qashqadaryo viloyatining tumanlari kesimidagi statistikada sabzavot yetishtirish hajmiga ko'ra Kitob tumani 74 285 tonna bilan, meva va rezavor yetishtirish hajmiga ko'ra 35 775 tonna bilan, uzum yetishtirish 48 366 tonna bilan yetakchiligini ko'rishimiz mumkin. Bundan tashqari, kartoshka yetishtirish hajmiga ko'ra 32 647 tonna mahsulot bilan yetakchi o'rinlardan birida turishini ko'rishimiz mumkin.

Investitsiya jozibadorligi ishlab chiqarish, transport va ijtimoiy infratuzilmaning rivojlanganlik darajasiga bevosita bog'liq. Kitob tumanida so'nggi yillarda yo'l-transport tarmog'i, elektr energiyasi ta'minoti va kommunikatsiya tizimlarini yaxshilash bo'yicha muayyan ishlar amalga oshirilmoqda.

Biroq sanoat zonalarining yetarli darajada shakllanmaganligi, logistika markazlarining kamligi va muhandislik-kommunikatsiya tarmoqlarining to'liq rivojlanmaganligi ayrim investitsion loyihalarning samaradorligiga salbiy ta'sir ko'rsatmoqda. Ushbu muammolarni bosqichma-bosqich hal etish hududga investitsiya oqimini sezilarli darajada oshirish imkonini beradi.

Hududda mehnatga layoqatli aholi salmog'i yuqori bo'lib, bu investitsiya loyihalarini amalga oshirishda muhim ustunlik hisoblanadi. Ishchi kuchining mavjudligi yangi ishlab chiqarish quvvatlarini yaratish va xizmat ko'rsatish sohasini kengaytirish imkonini beradi.

Shu bilan birga, malakali kadrlar tayyorlash tizimini takomillashtirish, kasb-hunar ta'limini hudud iqtisodiyoti ehtiyojlariga moslashtirish va yoshlar bandligini ta'minlash dolzarb vazifalardan biridir. Inson kapitalining rivojlanishi investitsiya samaradorligini oshirishning asosiy shartidir.

Investitsiya muhitining jozibadorligi ma'muriy tartib-taomillarning soddaligi, soliq imtiyozlari, davlat tomonidan qo'llab-quvvatlash mexanizmlari va huquqiy kafolatlar bilan belgilanadi. Hududda tadbirkorlikni rivojlantirishga qaratilgan chora-tadbirlar amalga oshirilmoqda.

Investitsiya siyosatini yanada takomillashtirish uchun hududiy investitsiya dasturlarini ishlab chiqish, davlat-xususiy sheriklik mexanizmlarini kengaytirish, zamonaviy sanoat zonalarini tashkil etish va xorijiy investorlar bilan hamkorlikni mustahkamlash zarur. Institutsional barqarorlik investorlar ishonchini kuchaytiradi hamda uzoq muddatli investitsion faollikni ta'minlaydi.

Investitsiyalar hajmining oshishi ishlab chiqarish quvvatlarining kengayishiga, yangi ish o'rinlarining yaratilishiga va aholi daromadlarining o'sishiga olib keladi. Natijada hududiy budget tushumlari ko'payadi, ijtimoiy infratuzilma rivojlanadi va iqtisodiy barqarorlik mustahkamlanadi.

Investitsion jarayonlarning faollashuvi kichik biznes va xususiy tadbirkorlikning rivojlanishiga ham turtki beradi. Bu esa hudud iqtisodiyotining diversifikatsiyasini ta'minlab, uzoq muddatli barqaror rivojlanish uchun zamin yaratadi.

XULOSA

Tadqiqot natijalari shuni ko'rsatadiki, Kitob tumanining investitsiya jozibadorligi iqtisodiy-geografik joylashuv, tabiiy-resurs salohiyati, infratuzilma rivojlanish darajasi, mehnat resurslari va institutsional muhit bilan uzviy bog'liq. Ushbu omillarni kompleks va tizimli rivojlantirish hududning investitsiya salohiyatini sezilarli darajada oshiradi.

Hududiy investitsiya siyosatini takomillashtirish, zamonaviy infratuzilmani shakllantirish, inson kapitalini rivojlantirish va innovatsion loyihalarni qo'llab-quvvatlash barqaror hududiy rivojlanishni ta'minlashning ustuvor yo'nalishlari

hisoblanadi. Mazkur ilmiy xulosalar amaliyotda qo'llanilganda, hududning iqtisodiy salohiyati yanada mustahkamlanadi va ijtimoiy-iqtisodiy barqarorlik ta'minlanadi.

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MAZMUN VA TILNI INTEGRALLASHGAN HOLDA O'QITISH (CLIL) ASOSIDA TALABALARNING INGLIZ TILIDAGI KOMMUNIKATIV KOMPETENTLIGINI OSHIRISH USULLARI

***Annotatsiya:** Ushbu maqolada mazmun va tilni integrallashgan holda o'qitish, ya'ni CLIL yondashuvi asosida talabalarning ingliz tilidagi kommunikativ kompetentligini oshirish usullari tahlil qilinadi. Tadqiqotda CLIL texnologiyasining nazariy asoslari, uning til o'rganish jarayonida predmet mazmuni bilan uyg'unlashgan holda qo'llanilishi hamda talabalar nutqiy faoliyatini rivojlantirishdagi didaktik imkoniyatlari yoritiladi. Shuningdek, tinglab tushunish, o'qish, gapirish va yozish ko'nikmalarini kompleks rivojlantirishda autentik materiallar, interfaol metodlar, muammoli vaziyatlar, hamkorlikka asoslangan topshiriqlar va mavzuga yo'naltirilgan kommunikativ mashqlarning ahamiyati ochib beriladi. Maqolada CLIL asosida tashkil etilgan darslar talabalarning nafaqat til birikmalarini o'zlashtirishiga, balki kasbiy fikrlash, muloqot madaniyati, mustaqil tahlil qilish va xalqaro akademik muhitga moslashish ko'nikmalarining shakllanishiga ham xizmat qilishi asoslanadi. Natijada, mazkur yondashuv ingliz tilini o'qitishda samarali pedagogik vosita sifatida talabalarning kommunikativ faolligini oshirish, lug'at boyligini kengaytirish va real muloqot sharoitida erkin fikr bildirish kompetensiyasini mustahkamlashga yordam berishi ta'kidlanadi.*

***Kalit so'zlar:** CLIL, integrallashgan ta'lim, kommunikativ kompetentlik, ingliz tili, mazmun va til uyg'unligi, interfaol metodlar, autentik materiallar, nutqiy ko'nikmalar.*

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METHODS FOR ENHANCING STUDENTS' COMMUNICATIVE COMPETENCE IN ENGLISH THROUGH CONTENT AND LANGUAGE INTEGRATED LEARNING (CLIL)

Abstract: *This article analyzes methods for improving students' communicative competence in English based on Content and Language Integrated Learning (CLIL). The study examines the theoretical foundations of CLIL, its application through the integration of subject content and language learning, and its didactic potential in developing students' speech activity. It also highlights the importance of authentic materials, interactive methods, problem-based situations, collaborative tasks, and topic-oriented communicative exercises in the integrated development of listening, reading, speaking, and writing skills. The article substantiates that lessons organized on the basis of CLIL contribute not only to the acquisition of language units by students, but also to the formation of professional thinking, communication culture, independent analysis, and adaptation to the international academic environment. As a result, this approach is emphasized as an effective pedagogical tool in teaching English, helping to increase students' communicative activity, expand their vocabulary, and strengthen their ability to express ideas freely in real communication contexts.*

Keywords: *CLIL, integrated learning, communicative competence, English language, content and language integration, interactive methods, authentic materials, speech skills.*

Kirish

Bugungi globallashuv va axborot almashinuvi jadallashgan davrda ingliz tilini o'qitish masalasi faqat grammatik qoidalarni o'zlashtirish yoki alohida lug'aviy birliklarni yodlash bilan cheklanib qolmayapti. Zamonaviy ta'lim tizimi talabdan tilni real ijtimoiy, akademik va kasbiy vaziyatlarda samarali qo'llay olishni talab etadi. Shu bois chet tilini o'qitishda kommunikativ kompetentlikni shakllantirish ustuvor maqsadlardan biriga aylandi. Kommunikativ kompetentlik talabning til birliklarini bilishi bilan birga, ularni maqsadga muvofiq, vaziyatga mos va mazmunan to'g'ri qo'llay olish qobiliyatini ham anglatadi. Ayniqsa, pedagogik oliy ta'lim muassasalarida tahsil olayotgan talabalar uchun bu masala yanada muhimdir, chunki bo'lajak mutaxassis nafaqat tilni bilishi, balki uni ta'limiy va kasbiy faoliyatda vosita sifatida qo'llay olishi kerak.

Mazmun va tilni integrallashgan holda o'qitish, ya'ni CLIL yondashuvi ana shu ehtiyojdan kelib chiqqan innovatsion metodik yo'nalishlardan biridir. Ushbu yondashuvda til maqsad emas, balki muayyan fan mazmunini o'zlashtirish vositasi sifatida ham namoyon bo'ladi. Natijada talaba tilni sun'iy mashqlar orqali emas, balki mazmunli kontekstda, real kommunikativ ehtiyoj asosida egallaydi. CLIL texnologiyasi dars jarayonida ikki asosiy vazifani birlashtiradi: bir tomondan, predmetga oid bilimlarni kengaytiradi, ikkinchi tomondan esa, ingliz tilidagi nutqiy ko'nikmalarni rivojlantiradi. Bu esa o'qitish jarayonini yanada tabiiy, maqsadli va samarali qiladi.

Hozirgi kunda oliy ta'lim tizimida fanlararo integratsiya, amaliy yo'naltirilgan ta'lim va talaba markazli yondashuvlar keng qo'llanilmoqda. CLIL ana shu zamonaviy tendensiyalar bilan uyg'unlashib, tinglab tushunish, o'qish, gapirish va yozish ko'nikmalarini bir butun tizimda rivojlantirish imkonini beradi.

Mazkur yondashuv, ayniqsa, ingliz tili yoʻnalishidagi talabalar uchun muhim boʻlib, ularda mustaqil fikrlash, muloqotga kirishish, dalillash, taqdimot qilish va kasbiy matnlar bilan ishlash kabi kompetensiyalarni shakllantiradi. Shundan kelib chiqib, CLIL asosida talabalarning ingliz tilidagi kommunikativ kompetentligini oshirish usullarini ilmiy-pedagogik jihatdan tahlil qilish dolzarb masalalardan biri hisoblanadi.

Metodlar

Mazkur tadqiqotda mazmun va tilni integrallashgan holda oʻqitish asosida talabalarning ingliz tilidagi kommunikativ kompetentligini oshirish usullarini aniqlash uchun bir necha oʻzaro bogʻliq metodlardan foydalanildi. Avvalo, mavzuga oid ilmiy-pedagogik, metodik va psixologik adabiyotlarni tahlil qilish metodi qoʻllanildi. Ushbu metod yordamida CLIL yondashuvining nazariy mohiyati, uning asosiy tamoyillari, chet tilini oʻqitishdagi oʻrni hamda kommunikativ kompetentlik bilan aloqador jihatlari oʻrganildi. Shuningdek, xorijiy va mahalliy tadqiqotlarda CLIL texnologiyasidan foydalanish tajribasi tahlil qilinib, samarali metodik yondashuvlar ajratib olindi.

Tadqiqot jarayonida kuzatish metodi ham muhim oʻrin tutdi. Ingliz tili mashgʻulotlarida talabalarning darsdagi ishtiroki, savol-javoblardagi faolligi, guruhli ishlardagi muloqoti, fikrni ogʻzaki va yozma shaklda ifodalash darajasi muntazam kuzatildi. Ayniqsa, CLIL asosida tashkil etilgan mashgʻulotlarda talabalarning mavzuga oid terminlarni qoʻllash, mantiqiy izchillikda fikr bildirish, autentik matnlar bilan ishlash va oʻzaro hamkorlikda nutqiy faoliyat olib borish koʻrsatkichlariga alohida eʼtibor qaratildi. Bu usul orqali kommunikativ kompetentlikning amaliy koʻrinishlari aniqlashtirildi.

Suhbat va savolnoma metodlari yordamida talabalarning CLIL darslariga munosabati, ularning ingliz tilida muloqot qilishdagi qiyinchiliklari, motivatsiya darajasi hamda mazkur yondashuvning oʻquv faoliyatiga taʼsiri oʻrganildi. Savolnomalarda talabalar uchun tushunarliklik, qiziqarlilik, interfaollik va foydalilik kabi mezonlar asos qilib olindi. Ushbu usullar natijasida talabalarning nafaqat bilim darajasi, balki ularning ichki ehtiyoji va oʻquv motivlari ham tahlil qilindi.

Bundan tashqari, taqqoslash va umumlashtirish metodlari orqali anʼanaviy ingliz tili darslari bilan CLIL asosidagi mashgʻulotlarning farqli jihatlari yoritildi. Dars jarayonida muammoli vaziyatlar, mavzuga yoʻnaltirilgan topshiriqlar, juftlik va kichik guruhlardagi faoliyat, taqdimot va muhokama usullarining kommunikativ kompetentlikka taʼsiri umumlashtirildi. Shu tariqa, qoʻllanilgan metodlar tadqiqot mavzusini har tomonlama yoritish, CLIL asosidagi samarali usullarni aniqlash hamda ularning pedagogik ahamiyatini asoslash imkonini berdi.

Natijalar

Tadqiqot natijalari mazmun va tilni integrallashgan holda oʻqitish asosida tashkil etilgan mashgʻulotlar talabalarning ingliz tilidagi kommunikativ kompetentligini rivojlantirishda sezilarli ijobiy taʼsir koʻrsatishini namoyon etdi. Avvalo, CLIL yondashuvi qoʻllangan darslarda talabalar mavzuni chuqurroq anglash bilan birga, ingliz tilida fikr bildirishga nisbatan faolroq munosabat

ko'rsata boshladi. Ular dars jarayonida yangi atamalarni kontekst asosida o'zlashtirgani sababli lug'at boyligi sun'iy yodlashga emas, balki mazmunli qo'llashga tayangan holda kengaydi. Bu esa nutqning tabiiyligini va ifoda aniqligini oshirdi.

Kuzatishlar shuni ko'rsatdiki, CLIL asosidagi mashg'ulotlarda talabalar guruhli ishlarda faolroq qatnashdi, savollarga javob berishda ko'proq tashabbus ko'rsatdi hamda mavzu yuzasidan mustaqil munosabat bildirishga intildi. Ayniqsa, muammoli vaziyatlar, taqdimot, matn tahlili va hamkorlikka asoslangan topshiriqlar talabalarning gapirish va tinglab tushunish ko'nikmalarini rivojlantirishda samarali bo'ldi. Talabalar dars jarayonida mazmunni tushunishga intilgani sababli til vositalaridan maqsadli foydalanishga harakat qildi. Natijada nutqiy faollik, savol berish madaniyati, mantiqiy javob qaytarish va suhbatni davom ettirish qobiliyatlari kuchaydi.

Savolnoma va suhbat natijalari ham CLIL yondashuvining samaradorligini tasdiqladi. Talabalarning aksariyati bunday darslar an'anaviy mashg'ulotlarga nisbatan qiziqarliroq va foydaliroq ekanini ta'kidladi. Ular ayniqsa autentik materiallar bilan ishlash, real hayotga yaqin mavzular asosida munozara qilish va fan mazmunini ingliz tilida anglash imkoniyatini ijobiy baholadi. Ayrim talabalar dastlab terminologiya va murakkab matnlarni tushunishda qiyinchilik sezgan bo'lsa-da, muntazam mashg'ulotlar davomida bu to'siqlar bosqichma-bosqich kamaygani aniqlandi.

Shuningdek, CLIL asosida dars olib borish talabalarda mustaqil fikrlash, tahlil qilish, taqqoslash va xulosa chiqarish ko'nikmalarining faollashuviga xizmat qildi. Bu holat ularning yozma ishlari va og'zaki chiqishlarida ham yaqqol sezildi. Umuman olganda, tadqiqot natijalari CLIL yondashuvi ingliz tilidagi kommunikativ kompetentlikni oshirishda samarali metodik vosita ekanini, ayniqsa pedagogik oliy ta'limda uning amaliy ahamiyati yuqori ekanini ko'rsatdi.

Muhokama

Olingan natijalar mazmun va tilni integrallashgan holda o'qitish yondashuvi talabalarning ingliz tilidagi kommunikativ kompetentligini rivojlantirishda yuqori pedagogik salohiyatga ega ekanini ko'rsatadi. Mazkur holatni izohlashda, avvalo, CLIL metodining tabiiy kommunikativ muhit yaratish xususiyatiga e'tibor qaratish lozim. An'anaviy til darslarida ko'pincha grammatik shakllar va leksik birliklar alohida o'rgatiladi, natijada til mazmundan uzilib qoladi. CLIL yondashuvida esa til o'quv materialining ajralmas qismi sifatida amal qiladi. Shu sababli talabalar ingliz tilidan foydalanishni nazariy vazifa emas, balki amaliy zarurat sifatida qabul qiladi. Bu esa ularning muloqotga kirishish ehtiyojini kuchaytiradi va nutqiy faolligini oshiradi.

Muhokama jarayonida shuni ta'kidlash mumkinki, kommunikativ kompetentlik faqat til birliklarini bilish bilan belgilanmaydi. U nutq vaziyatini tushunish, mos uslubni tanlash, mazmunni aniq ifodalash, suhbatdosh bilan o'zaro aloqani saqlash va fikrni mantiqiy bayon qilish kabi ko'plab komponentlarni o'z ichiga oladi. CLIL aynan mana shu ko'p qirrali kompetensiyani rivojlantirishga xizmat qiladi. Chunki talaba darsda muayyan mavzuni anglash, tahlil qilish,

taqqoslash, tushuntirish va himoya qilish jarayonida til vositalaridan faol foydalanadi. Demak, mazkur yondashuv tilni o'rganish bilan tafakkurni rivojlantirishni birlashtiradi. Bu esa, ayniqsa, pedagogik oliy ta'limda muhimdir, chunki bo'lajak o'qituvchi kelajakda chet tilini faqat o'zi bilib qolmasdan, uni boshqalarga yetkazish malakasiga ham ega bo'lishi zarur.

Shuningdek, CLIL darslarida autentik materiallardan foydalanish masalasi alohida muhokamaga loyiq. Autentik matnlar, videolar, diagrammalar, ilmiy-populyar maqolalar va mavzuga oid taqdimotlar talabalarni sun'iy o'quv muhitidan real axborot maydoniga olib kiradi. Bunday materiallar bir tomondan tilning tabiiy qo'llanishini ko'rsatadi, ikkinchi tomondan esa talabalarning akademik va kasbiy dunyoqarashini kengaytiradi. Natijada o'quvchi yoki talaba matnni nafaqat til nuqtai nazaridan, balki mazmuniy jihatdan ham tahlil qilishga odatlanadi. Bu esa uning o'qib tushunish, asosiy g'oyani ajratish, muallif pozitsiyasini anglash va unga nisbatan mustaqil munosabat bildirish ko'nikmalarini mustahkamlaydi.

Biroq CLIL yondashuvini samarali joriy etish ma'lum shart-sharoitlarni talab etadi. Birinchidan, o'qituvchi nafaqat til metodikasini, balki integratsiyalashgan mavzu mazmunini ham yetarli darajada bilishi kerak. Ikkinchidan, topshiriqlar talabani til darajasi va predmetni anglash imkoniyatiga mos holda ishlab chiqilishi zarur. Agar matn yoki vazifa haddan tashqari murakkab bo'lsa, talaba mazmunni ham, tilni ham to'liq o'zlashtira olmaydi. Uchinchidan, baholash tizimi faqat grammatik xatolarni emas, balki mazmunni tushunish, fikrni ifodalash va kommunikativ ishtirok darajasini ham hisobga olishi lozim. Demak, CLILni qo'llashda metodik muvozanat va bosqichma-bosqichlik tamoyili muhim ahamiyat kasb etadi.

Umuman, muhokama natijalari shuni ko'rsatadiki, CLIL yondashuvi talabalarning ingliz tilidagi kommunikativ kompetentligini oshirishda zamonaviy, samarali va istiqbolli pedagogik model sifatida namoyon bo'ladi. U til va mazmun o'rtasidagi sun'iy chegarani bartaraf etadi, talabani fikrlash faoliyatini faollashtiradi, muloqotga bo'lgan ichki ehtiyojini rag'batlantiradi hamda akademik va kasbiy kommunikatsiyaga tayyorlaydi. Shu bois mazkur yondashuvni pedagogik oliy ta'lim tizimida kengroq qo'llash, o'qituvchilarni maxsus tayyorlash va CLIL asosidagi o'quv resurslarini ishlab chiqish dolzarb ilmiy-amaliy vazifa hisoblanadi.

Xulosa

Mazmun va tilni integrallashgan holda o'qitish, ya'ni CLIL yondashuvi talabalarning ingliz tilidagi kommunikativ kompetentligini oshirishda samarali pedagogik vosita sifatida muhim ahamiyat kasb etadi. Mazkur yondashuvning asosiy ustunligi shundaki, u tilni alohida o'quv predmeti sifatida emas, balki muayyan mazmunni anglash, tahlil qilish va ifodalash vositasi sifatida qo'llash imkonini beradi. Natijada talabalar ingliz tilini sun'iy mashqlar doirasida emas, balki real kommunikativ ehtiyoj asosida, mazmun bilan bog'liq holda o'zlashtiradi. Bu esa ularning tilga nisbatan qiziqishini oshiradi, nutqiy faolligini kuchaytiradi va muloqotga kirishishdagi ishonchini mustahkamlaydi.

Tadqiqot davomida aniqlanganidek, CLIL yondashuvi tinglab tushunish, o'qish, gapirish va yozish kabi asosiy nutqiy ko'nikmalarni bir-biri bilan uzviy bog'liq holda rivojlantirishga xizmat qiladi. Ayniqsa, autentik materiallardan foydalanish, muammoli vaziyatlar yaratish, guruhli ishlash, taqdimotlar tashkil etish hamda mavzuga yo'naltirilgan topshiriqlar berish talabalarning ingliz tilida fikrni erkin ifodalashiga ijobiy ta'sir ko'rsatadi. Ular yangi leksik birliklar va terminlarni kontekst asosida o'zlashtiradi, mazmunni tushungan holda so'zlaydi, dalillaydi va munozara olib borishga o'rganadi. Shu bilan birga, CLIL yondashuvi talabalarni faqat til jihatidan emas, balki intellektual va kasbiy nuqtai nazardan ham rivojlantiradi.

Pedagogik oliy ta'lim muassasalari sharoitida bu yondashuvning qo'llanishi ayniqsa dolzarbdir. Chunki ingliz tili yo'nalishida tahsil olayotgan talabalar kelgusida nafaqat tilni biluvchi mutaxassis, balki uni samarali o'rgata oluvchi pedagog sifatida shakllanishi lozim. CLIL ularning fanlararo fikrlashini rivojlantiradi, akademik muloqot tajribasini boyitadi va kelajakdagi kasbiy faoliyat uchun zarur bo'lgan kommunikativ tayyorgarlikni kuchaytiradi. Bunday jarayonda talaba ma'lumotni tayyor holda qabul qilmaydi, balki uni mustaqil tahlil qiladi, qayta ishlaydi va ingliz tilida ifodalaydi. Shu ma'noda CLIL o'qitish jarayonini faol, mazmunli va talabaga yo'naltirilgan shaklga olib chiqadi.

Biroq mazkur yondashuvni muvaffaqiyatli joriy etish uchun bir qator metodik shartlarga amal qilish zarur. O'qituvchi dars mazmunini va til materialini o'zaro uyg'unlashtira olishi, talabalar til darajasiga mos topshiriqlar tuzishi, kommunikativ faoliyatni rag'batlantiruvchi muhit yaratishi kerak. Shuningdek, baholash tizimi ham faqat grammatik to'g'rilikka emas, balki mazmunni tushunish, fikrni ifodalash sifati, muloqotdagi ishtirok va nutqiy mustaqillik darajasiga tayanishi maqsadga muvofiqdir. Demak, CLILni qo'llash faqat metod tanlash emas, balki ta'lim jarayonini yangicha tashkil etishni ham anglatadi.

Umuman olganda, mazmun va tilni integrallashgan holda o'qitish asosida talabalarning ingliz tilidagi kommunikativ kompetentligini oshirish zamonaviy ta'limning ustuvor yo'nalishlaridan biri sifatida namoyon bo'ladi. Ushbu yondashuv talabalarni faol fikrlashga, mustaqil muloqot qilishga, akademik va kasbiy vaziyatlarda ingliz tilidan samarali foydalanishga tayyorlaydi. Shuning uchun pedagogik oliy ta'lim tizimida CLIL texnologiyasini keng joriy etish, unga mos dars ishlanmalari yaratish va o'qituvchilarning metodik salohiyatini oshirish istiqbolli vazifa sifatida e'tirof etilishi lozim.

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OCHIQ SUV MANBALARINING IFLOSLANISHI: GIGIYENIK BAHOLASH VA SOG'LIQ OQIBATLARI

Annotatsiya: *Tadqiqotda Buxoro viloyatidagi ochiq suv manbalarining ifloslanishi, gigiyenik holati va aholining sog'ligiga ta'siri baholandi. 2023 yil davomida Zarafshon daryosi va mahalliy ariqlardan 240 ta suv namunasi olindi va tahlil qilindi. Bakteriologik tahlil (umumiy mikroblar soni, ichak tayoqchasi), kimyoviy tahlil (nitratlar, nitritlar, og'ir metallar, pestitsidlar) va fizik xususiyatlar (rangi, hidi, tiniqlik) o'rganildi. Natijalariga ko'ra: 68% namunalarda bakteriologik ifloslangan, 45% da kimyoviy moddalar me'yordan oshgan, 23% da pestitsid qoldiqlari aniqlandi. Sog'liq oqibatlari: ichburug' kasalliklari 3.2 barobar ko'p, jigar kasalliklari 2.1 barobar, teri kasalliklari 1.8 barobar yuqori. Ifloslangan suv manbalaridan foydalanuvchi qishloqlarda diareya chastotasi shahar aholisiga nisbatan 4.5 barobar ko'p. Profilaktik chora-tadbirlar ishlab chiqildi: suv tozalash stansiyalarini modernizatsiya qilish, aholini toza suv bilan ta'minlash, chiqindilar utilizatsiyasini yaxshilash, sanitariya-gigiyena ta'limi, ekologik monitoring.*

Kalit so'zlar: *suv ifloslanganligi, ochiq suv manbalari, bakteriologik tahlil, ichburug' kasalliklari, gigiyenik baholash, suv sifati.*

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HYGIENIC ASSESSMENT OF OPEN WATER SOURCES POLLUTION

Abstract: *The study evaluated pollution of open water sources in Bukhara region, hygienic condition and impact on population health. In 2023, 240 water samples from Zarafshan River and local irrigation channels were collected and analyzed. Bacteriological analysis (total microbial count, E.coli), chemical analysis (nitrates, nitrites, heavy metals, pesticides) and physical properties (color, odor, clarity) were studied. Results: 68% samples bacteriologically contaminated, 45% with excess chemicals, 23% with pesticide residues. Health consequences: intestinal infections 3.2 times more frequent, liver diseases 2.1*

times, skin diseases 1.8 times higher. In villages using contaminated sources, diarrhea frequency 4.5 times higher than urban population. Preventive measures developed: modernization of water treatment plants, providing clean water to population, improving waste disposal, sanitary-hygienic education, environmental monitoring.

Keywords: water pollution, open water sources, bacteriological analysis, intestinal infections, hygienic assessment, water quality.

KIRISH

Suv hayot uchun zarur resurs bo'lib, uning sifati aholining sog'ligiga bevosita ta'sir qiladi. WHO ma'lumotlariga ko'ra, dunyoda har yili 2 millionga yaqin odam, asosan bolalar, ifloslangan suv bilan bog'liq kasalliklardan vafot etadi.

O'zbekistonda, ayniqsa Markaziy Osiyo mintaqasida, suv resurslari cheklangan va ularning sifati tobora yomonlashmoqda. Buxoro viloyatida asosiy suv manbai - Zarafshon daryosi va undan tarmoqlangan ariqlar tizimi - turli manbalardan ifloslangan.

Tadqiqotning maqsadi: Buxoro viloyatidagi ochiq suv manbalarining gigiyenik holatini baholash, ifloslangan suvning aholining sog'ligiga ta'sirini o'rganish va profilaktik chora-tadbirlarni ishlab chiqish.

MATERIAL VA METODLAR

Tadqiqot ob'ektlari: Zarafshon daryosi (8 nuqta) va mahalliy ariqlar (16 nuqta), 2023 yil mart-oktabr.

Usullar:

- Bakteriologik tahlil (OMM, E.coli, patogen mikroorganizmlar)
- Kimyoviy tahlil (nitratlar, nitritlar, og'ir metallar, pestitsidlar)
- Fizik xususiyatlar (T° , pH, rangi, hidi, tiniqlik)
- Epidemiologik tahlil (kasallanish statistikasi)
- Statistik qayta ishlash (SPSS 26.0)

NATIJALAR

Jadval 1.

Suv namunalarining bakteriologik ifloslangan

Ko'rsatkich	Me'yor	Ifloslangan (%)	O'rtacha qiymat
OMM (KOE/ml)	<100	68	420 ± 180
E.coli (KOE/100ml)	0	72	85 ± 45
Enterokokklar	0	54	32 ± 18
Patogen bakteriyalar	0	12	Salmonella, Shigella

Jadval 2.**Kimyoviy ifloslangan ko'rsatkichlari**

Modda	YRK (mg/l)	Oshgan (%)	O'rtacha (mg/l)
Nitratlar (NO ₃)	45	38	62 ± 28
Nitritlar (NO ₂)	3	28	4.8 ± 2.1
Qo'rg'oshin (Pb)	0.01	15	0.018 ± 0.008
Kadmiy (Cd)	0.003	12	0.006 ± 0.003
Pestitsidlar	0.001	23	0.004 ± 0.002

Jadval 3.**Suv ifloslanganligi va kasallanish (1000 aholiga)**

Kasallik guruhi	Toza suv hududi	Ifloslangan suv	Nisbat
Ichburug' infeksiyalari	8.2	26.4	3.2x
Jigar kasalliklari	12.5	26.3	2.1x
Teri kasalliklari	15.8	28.4	1.8x
Diareya (bolalarda)	18.5	83.3	4.5x
Gepatit A	2.1	8.5	4.0x

MUHOKAMA

Tadqiqot natijalari Buxoro viloyatidagi ochiq suv manbalarining jiddiy ifloslangan ekanligini ko'rsatadi. 68% namunalarda bakteriologik, 45% da kimyoviy ifloslangan WHO va milliy standartlardan oshadi.

Bakteriologik ifloslangan asosiy sabablari: kanalizatsiya tizimining yo'qligi yoki noqulay holati (qishloq joylarida 65%), chiqindilarning to'g'ridan-to'g'ri suvga tushishi, chorvachilik fermalaridan chiqindilar, tualet joylarining suv manbalariga yaqinligi.

Kimyoviy ifloslangan sabablari: qishloq xo'jaligida o'g'itlar va pestitsidlarning haddan tashqari ishlatilishi, sanoat chiqindilari (Buxoroda to'qimachilik, oziq-ovqat sanoati), urbanizatsiya va maishiy chiqindilar.

Sog'liq oqibatlari jiddiy: ifloslangan suvdan foydalanuvchi qishloqlarda ichburug' infeksiyalari 3.2 barobar, diareya (bolalarda) 4.5 barobar ko'p. Bu WHO ma'lumotlari bilan mos keladi - ifloslangan suv global kasallik yukining 10% ni tashkil etadi.

Xalqaro tajriba: Hindiston va Bangladeshda suv tozalash texnologiyalari (filtratsiya, UV yorug'lik, xlor) diareya chastotasini 40-50% kamaytirishga yordam berdi. Rossiya va Yevropa mamlakatlarida qat'iy suv sifati standartlari va monitoring tizimi joriy.

PROFILAKTIK CHORA-TADBIRLAR**1. Suv tozalash infratuzilmasi:**

- Zamonaviy tozalash stansiyalari
- Qishloq joylarida filtratsiya tizimlari
- UV va xlor dezinfektsiyasi

- Muntazam texnik xizmat

2. Chiqindilar boshqaruvi:

- Kanalizatsiya tizimini kengaytirish
- Sanoat chiqindilarini tozalash
- Chorvachilik fermalarida chiqindi tozalash
- Qattiq chiqindilarni utilizatsiya

3. Qishloq xo'jaligi:

- O'g'itlar va pestitsidlarni tejamkorlik bilan ishlatish
- Organik o'g'itlarga o'tish
- Suv havzalariga yaqin joyda kimyoviy vositalarni cheklash
- Fermerlar ta'limi

4. Suv sifati monitoringi:

- Muntazam laboratoriya tekshiruvlari (oylik)
- Xavfli nuqtalarni aniqlash
- Tezkor reaksiya tizimi
- Ma'lumotlarni oshkor qilish

5. Aholi ta'limi:

- Suvni qaynating yoki filtratsiya qilish
- Shaxsiy gigiyena qoidalari
- Suv manbalarini muhofaza qilish
- Kasallik belgilarida darhol murojaat

6. Normativ-huquqiy baza:

- Suv sifati standartlarini kuchaytirish
- Ifloslantiruvchilarni jazolash
- Suv havzalarini himoya zonalari
- Xalqaro standartlarga moslash

XULOSA

1. Buxoro viloyatidagi ochiq suv manbalari jiddiy ifloslangan: 68% bakteriologik, 45% kimyoviy, 23% pestitsid qoldiqlari.

2. Asosiy ifloslantiruvchilar: kanalizatsiya chiqindilari, qishloq xo'jaligi (o'g'itlar, pestitsidlar), sanoat chiqindilari, chorvachilik.

3. Sog'liq oqibatlari: ichburug' kasalliklari 3.2x, diareya 4.5x, jigar kasalliklari 2.1x, gepatit A 4x yuqori.

4. Zarur chora-tadbirlar: suv tozalash modernizatsiyasi, kanalizatsiya kengaytirish, chiqindilar boshqaruvi, muntazam monitoring, aholi ta'limi.

5. Qishloq joylarida toza suv ta'minoti eng dolzarb muammo - 65% da kanalizatsiya yo'q, 72% ifloslangan manbalardan foydalanadi.

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UMUMIY O'RTA TA'LIM MAKTABLARI DIREKTORLARINING BOSHQARUV SAMARADORLIGINI OSHIRISHDA O'QUV JARAYONINI TASHKIL ETISHNING SAMARADORLIK MEZONLARI

Annotatsiya: Mazkur maqolada umumiy o'rta ta'lim maktablari direktorlarining boshqaruv samaradorligini oshirishda o'quv jarayonini tashkil etishning samaradorlik mezonlari tahlil qilinadi. Ta'lim tizimidagi islohotlar sharoitida maktab direktorlarining boshqaruv faoliyati samaradorligini ta'minlashda o'quv jarayonini to'g'ri tashkil etish muhim omil hisoblanadi. Tadqiqot jarayonida o'quv jarayonini tashkil etishning asosiy mezonlari, jumladan, rejalashtirish, monitoring, pedagogik jamoa faoliyatini muvofiqlashtirish va natijadorlik ko'rsatkichlari o'rganildi. Natijada ushbu mezonlar maktab direktorlarining boshqaruv samaradorligini oshirishga bevosita ta'sir ko'rsatishi ilmiy asoslab berildi.

Kalit so'zlar: boshqaruv samaradorligi, o'quv jarayoni, maktab direktori, ta'lim menejmenti, samaradorlik mezonlari, monitoring.

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IN IMPROVING THE MANAGEMENT EFFICIENCY OF GENERAL SECONDARY SCHOOL PRINCIPALS THROUGH THE ORGANIZATION OF THE EDUCATIONAL PROCESS

Abstract: This article analyzes the effectiveness criteria of organizing the educational process in improving the management efficiency of general secondary school principals. In the context of educational reforms, the proper organization of the educational process is an important factor in increasing managerial efficiency. The study examines key criteria such as planning, monitoring, coordination of teaching staff, and performance indicators. The results demonstrate that these criteria have a direct impact on improving the management efficiency of school principals.

Keywords: management efficiency, educational process, school principal, educational management, efficiency criteria, monitoring.

Kirish

Bugungi kunda ta'lim tizimini modernizatsiya qilish, uning samaradorligini oshirish va xalqaro standartlarga moslashtirish dolzarb vazifalardan biri hisoblanadi. Ta'lim sifatini ta'minlashda umumiy o'rta ta'lim maktablarini samarali boshqarish muhim omil bo'lib, bu jarayonda maktab direktorlarining boshqaruv faoliyati hal qiluvchi ahamiyat kasb etadi. Maktab direktorining boshqaruv samaradorligi nafaqat tashkiliy jarayonlarga, balki o'quv-tarbiya jarayonining sifatiga ham bevosita ta'sir ko'rsatadi.

Ta'lim tizimida amalga oshirilayotgan islohotlar maktab direktorlaridan zamonaviy boshqaruv yondashuvlarini qo'llashni talab etmoqda. Bunda o'quv jarayonini ilmiy asosda tashkil etish, uning samaradorligini oshirish hamda natijadorlikni ta'minlash muhim vazifalardan biri hisoblanadi. O'quv jarayonini samarali tashkil etish ta'lim mazmuni, metodlari, vositalari va boshqaruv jarayonining uyg'unligini ta'minlashni nazarda tutadi.

Boshqaruv samaradorligi — bu rahbarning mavjud resurslardan oqilona foydalanib, belgilangan maqsadlarga erishish darajasini ifodalovchi kompleks ko'rsatkichdir. Ushbu samaradorlik ko'p jihatdan o'quv jarayonini qanday tashkil etilganiga bog'liq bo'lib, aynan shu jarayon boshqaruv faoliyatining markaziy elementi hisoblanadi.

O'quv jarayonini tashkil etishning samaradorlik mezonlari deganda ta'lim jarayonining rejalashtirilganligi, tizimliliigi, monitoringi, natijadorligi hamda barqarorligi tushuniladi. Ushbu mezonlar asosida maktab direktorlarining boshqaruv faoliyatini baholash hamda takomillashtirish imkoniyati yuzaga keladi.

Mazkur maqolaning maqsadi umumiy o'rta ta'lim maktablari direktorlarining boshqaruv samaradorligini oshirishda o'quv jarayonini tashkil etishning samaradorlik mezonlarini aniqlash va ularning amaliy ahamiyatini ilmiy jihatdan asoslashdan iborat.

Tadqiqot metodlari

Tadqiqot jarayonida ilmiy bilishning bir qator metodlaridan foydalanildi. Jumladan, tahlil va sintez, induksiya va deduksiya, taqqoslash, pedagogik kuzatuv, so'rovnoma hamda statistik tahlil metodlari qo'llanildi. Ushbu metodlar orqali maktab direktorlarining boshqaruv faoliyati va o'quv jarayonini tashkil etish darajasi o'rganildi.

Tadqiqot Toshkent viloyatidagi umumta'lim maktablari misolida olib borildi. Tadqiqot jarayonida maktab direktorlarining o'quv jarayonini rejalashtirish, nazorat qilish, pedagogik jamoa faoliyatini boshqarish va natijalarni baholashga doir faoliyati tahlil qilindi.

So'rovnoma orqali direktorlar va o'qituvchilarning o'quv jarayonini tashkil etishdagi muammolari va mavjud imkoniyatlari o'rganildi. Shuningdek, o'quvchilar bilim ko'rsatkichlari hamda ta'lim natijalari tahlil qilinib, boshqaruv samaradorligi bilan o'zaro bog'liqligi aniqlashtirildi.

Tadqiqot natijalari

Tadqiqot natijalari shuni ko'rsatdiki, o'quv jarayonini samarali tashkil etish maktab direktorlarining boshqaruv samaradorligiga bevosita ta'sir ko'rsatadi. Tadqiqot davomida quyidagi asosiy samaradorlik mezonlari aniqlandi:

Birinchidan, o'quv jarayonini strategik rejalashtirish darajasi muhim ahamiyatga ega. Rejalashtirishning aniq va tizimli yo'lga qo'yilishi ta'lim jarayonining barqarorligini ta'minlaydi.

Ikkinchidan, o'quv jarayonini muntazam monitoring qilish boshqaruv samaradorligini oshirishda muhim omil hisoblanadi. Monitoring orqali ta'lim jarayonidagi kamchiliklar aniqlanib, ularni bartaraf etish imkoniyati yaratiladi.

Uchinchidan, pedagogik jamoa faoliyatini samarali muvofiqlashtirish ta'lim sifatiga bevosita ta'sir ko'rsatadi. Jamoaviy ishlash va hamkorlik asosida tashkil etilgan boshqaruv tizimi yuqori natijalarga olib keladi.

To'rtinchidan, o'quvchilar bilim darajasi va ta'lim natijalarining barqarorligi boshqaruv samaradorligining muhim ko'rsatkichlaridan biri hisoblanadi.

Tadqiqot natijalari shuni ko'rsatdiki, yuqoridagi mezonlar asosida o'quv jarayonini samarali tashkil etgan maktablarda boshqaruv samaradorligi sezilarli darajada yuqori bo'ladi.

Muhokama

Olingan natijalar shuni ko'rsatadiki, o'quv jarayonini samarali tashkil etish maktab direktorlarining boshqaruv faoliyatini takomillashtirishda muhim omil hisoblanadi. Ayniqsa, strategik rejalashtirish va monitoring jarayonlarining to'g'ri yo'lga qo'yilishi boshqaruv samaradorligini oshiradi.

Zamonaviy ta'lim sharoitida boshqaruv samaradorligini ta'minlash uchun tizimli yondashuvni qo'llash zarur. Bu esa o'quv jarayonini tashkil etishning samaradorlik mezonlariga asoslangan boshqaruv modelini ishlab chiqishni talab etadi.

Shuningdek, pedagogik jamoaning faoliyatini muvofiqlashtirish, ularning kasbiy rivojlanishini qo'llab-quvvatlash hamda natijadorlikka yo'naltirilgan boshqaruv tizimini joriy etish muhim ahamiyat kasb etadi.

Xulosa

Xulosa qilib aytganda, umumiy o'rta ta'lim maktablarida o'quv jarayonini samarali tashkil etish maktab direktorlarining boshqaruv samaradorligini oshirishda muhim omil hisoblanadi. Tadqiqot natijalari asosida aniqlangan samaradorlik mezonlari boshqaruv faoliyatini takomillashtirishda muhim ahamiyatga ega.

Mazkur mezonlar asosida o'quv jarayonini tashkil etish boshqaruv jarayonining tizimlilikini ta'minlaydi, pedagogik jamoa faoliyatini muvofiqlashtiradi hamda ta'lim sifatini oshirishga xizmat qiladi.

Kelgusida ushbu yo'nalishda ilmiy-amaliy tadqiqotlarni kengaytirish, maktab direktorlarining boshqaruv kompetensiyalarini rivojlantirishga qaratilgan metodik tavsiyalar ishlab chiqish hamda zamonaviy boshqaruv yondashuvlarini ta'lim tizimiga joriy etish muhim vazifa hisoblanadi.

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YANGI O'ZBEKISTONDA TA'LIM TIZIMINING MUXIM BOSQICHLARI

Annotatsiya: *Mazkur maqolada dual ta'lim tizimining nazariy asoslari, uning mohiyati va zamonaviy ta'lim tizimida tutgan o'rni atroflicha tahlil qilingan. Tadqiqotning asosiy maqsadi dual ta'limning kasbiy ta'lim sifatini oshirish, nazariya va amaliyot uyg'unligini ta'minlash hamda mehnat bozori talablariga mos mutaxassislar tayyorlashdagi ahamiyatini ochib berishdan iborat. Tadqiqot jarayonida tahlil, sintez, taqqoslash va kuzatish usullaridan foydalanildi. Natijalar dual ta'lim tizimi kadrlar tayyorlash samaradorligini oshirishda muhim mexanizm ekanini ko'rsatdi.*

Kalit so'zlar: *dual ta'lim, kasbiy ta'lim, amaliyot, mehnat bozori, ta'lim sifati.*

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KEY STAGES OF THE EDUCATION SYSTEM IN NEW UZBEKISTAN

Abstract: *This article provides a comprehensive analysis of the theoretical foundations of the dual education system, its essence, and its role within the modern educational framework. The primary objective of the study is to reveal the significance of dual education in improving the quality of vocational education, ensuring an effective integration of theory and practice, and training specialists who meet labor market requirements. The research employs methods such as analysis, synthesis, comparison, and observation. The findings demonstrate that the dual education system serves as an important mechanism for enhancing the effectiveness of workforce training.*

Keywords: *dual education, vocational education, practice, labor market, quality of education.*

Jahon miqyosida ta'lim tizimini modernizatsiya qilish, uni ishlab chiqarish bilan uzviy bog'lash masalasi dolzarb ahamiyat kasb etmoqda. Ayniqsa, kasbiy ta'lim sohasida bitiruvchilarning nazariy bilimga ega bo'lishi bilan bir qatorda amaliy ko'nikmalarni ham puxta o'zlashtirishi muhim hisoblanadi. An'anaviy ta'lim shakllarida nazariyaga katta e'tibor qaratilgani holda, amaliyotga yetarlicha vaqt ajratilmasligi mehnat bozorida ma'lum muammolarni keltirib chiqaradi. Shu

nuqtai nazardan, dual ta'lim tizimi ta'lim muassasasi va ishlab chiqarish korxonasi o'rtasidagi hamkorlikka asoslangan samarali model sifatida namoyon bo'lmoqda[1.19] Dual ta'limda o'quvchi yoki talaba ta'lim muassasasida nazariy bilim olish bilan bir vaqtda korxonada amaliy faoliyat olib boradi. So'nggi yillarda kasbiy ta'lim tizimini modernizatsiya qilish, mehnat bozori talablariga mos, raqobatbardosh mutaxassislar tayyorlash masalasi dolzarb ahamiyat kasb etmoqda. Ushbu jarayonda dual ta'lim modeli samarali ta'lim shakllaridan biri sifatida ko'plab olimlar va tadqiqotchilar tomonidan o'rganilmoqda. Dual ta'lim tushunchasining nazariy asoslari asosan Germaniya tajribasiga tayanadi. R. Euler va D. Sloane (2019) tadqiqotlarida dual ta'lim ta'lim muassasasi va ishlab chiqarish o'rtasidagi uzviy hamkorlikka asoslangan tizim sifatida talqin qilinadi. Mualliflar ushbu modelning asosiy ustunligi – nazariy bilimlarning amaliy ko'nikmalar bilan uyg'unlashuvida ekanini ta'kidlaydilar[2.15]. Ularning fikricha, dual ta'lim bitiruvchilarning ishga moslashuv davrini sezilarli darajada qisqartiradi. Xalqaro miqyosda olib borilgan tadqiqotlarda dual ta'limning iqtisodiy samaradorligi ham alohida o'rganilgan. Masalan, Cedefop (Yevropa Kasbiy Ta'limni Rivojlantirish Markazi) hisobotlarida dual ta'lim mehnat bozorida yoshlar ishsizligini kamaytirishning samarali vositasi sifatida baholanadi. Tadqiqotlarda dual ta'lim olgan bitiruvchilarning ish bilan ta'minlanish ko'rsatkichi an'anaviy kasbiy ta'lim bitiruvchilariga nisbatan yuqori ekanligi qayd etilgan. O'zbekiston olimlarining ilmiy ishlarida ham dual ta'lim masalasi tobora ko'proq yoritilmoqda. Xususan, Sh. Xudoyberdiyev va M. Abdullayeva (2021) tadqiqotlarida dual ta'lim zamonaviy kasbiy ta'lim tizimining muhim tarkibiy qismi sifatida baholanadi[3.29] Mualliflar dual ta'lim orqali talabalar real ishlab chiqarish sharoitida kasbiy kompetensiyalarni egallashi, shuningdek, korxonalar uchun malakali kadrlar zaxirasi shakllanishini asoslab beradilar. Boshqa tadqiqotlarda dual ta'limning pedagogik jihatlari tahlil qilingan. Jumladan, N. Jo'rayev (2022) dual ta'lim jarayonida kompetensiyaviy yondashuvning ustuvorligini ta'kidlab, o'quv dasturlarini ishlab chiqarish ehtiyojlariga moslashtirish zarurligini ko'rsatadi. Uning fikricha, dual ta'lim o'qituvchidan nafaqat nazariy bilim, balki ishlab chiqarish jarayonlari bilan bog'liq amaliy tajribani ham talab qiladi[4.23]

Tadqiqot natijalari quyidagi asosiy xulosalarni ko'rsatdi

Birinchidan, dual ta'lim tizimi talabalarda amaliy ko'nikmalarni shakllantirishni tezlashtiradi. Talabalar o'qish jarayonidayoq ishlab chiqarish muhiti bilan tanishib, kasbiy tajriba orttiradi. Ikkinchidan, dual ta'lim bitiruvchilarning ish bilan ta'minlanish imkoniyatini oshiradi. Korxonalar o'z ehtiyojlariga mos kadrlarni tayyorlashda bevosita ishtirok etadi. Uchinchidan, ta'lim mazmuni mehnat bozori talablariga moslashadi. Bu esa ta'lim sifatining oshishiga olib keladi. To'rtinchidan, dual ta'lim talabalarda mas'uliyat, intizom, jamoada ishlash kabi ijtimoiy kompetensiyalarni shakllantiradi. Olingan natijalar dual ta'lim tizimining an'anaviy ta'lim shakllariga nisbatan ustun jihatlarga ega ekanini ko'rsatdi. Ilmiy manbalar tahlili ham dual ta'limning kasbiy ta'lim samaradorligini oshirishda muhim omil ekanini tasdiqlaydi[5.31]. Biroq, dual

ta'limni joriy etish jarayonida ayrim muammolar ham mavjud. Jumladan, korxonalar bilan hamkorlikni yo'lga qo'yish, moddiy-texnik bazani yangilash, mutaxassis o'qituvchilar tayyorlash kabi masalalar hal etilishini talab qiladi.

Xulosa qilib aytganda, dual ta'lim tizimi zamonaviy kasbiy ta'limning muhim va istiqbolli yo'nalishlaridan biri hisoblanadi. U nazariya va amaliyot uyg'unligini ta'minlab, talabalarni mehnat bozori talablariga mos ravishda tayyorlashga xizmat qiladi. Dual ta'limni keng joriy etish ta'lim sifati oshishiga, yosh mutaxassislarning ish bilan ta'minlanishiga hamda iqtisodiy taraqqiyotga ijobiy ta'sir ko'rsatadi.

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SARATON (RAK) KASALLIKLARINI DAVOLASHDA RADIOAKTIV ELEMENTLARNING AHAMIYATI

Annotatsiya: Ushbu maqolada saraton (rak) kasalliklarini davolashda radioaktiv elementlarning ahamiyati va ularning tibbiyotda qo'llanilish yo'llari yoritilgan. Radioaktiv izotoplarning onkologiya sohasida radioterapiya va diagnostika maqsadlarida qo'llanishi, ularning o'smali hujayralarga ta'sir mexanizmi hamda davolash samaradorligi haqida ma'lumot berilgan.

Kalit so'zlar: saraton (rak) kasalliklari, radioaktiv elementlar, radioterapiya, radioaktiv izotoplar, onkologiya, ionlashtiruvchi nurlanish, yod-131, kobalt-60, radiy-226, texnetsiy-99, tibbiy kimyo.

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THE IMPORTANCE OF RADIOACTIVE ELEMENTS IN THE TREATMENT OF CANCER (ONCOLOGICAL DISEASES)

Abstract: This article highlights the significance of radioactive elements in the treatment of oncological (cancer) diseases and the ways of their application in medicine. It provides information on the use of radioactive isotopes in oncology for radiotherapy and diagnostic purposes, the mechanism of their effect on tumor cells, as well as the effectiveness of treatment.

Keywords: oncological (cancer) diseases, radioactive elements, radiotherapy, radioactive isotopes, oncology, ionizing radiation, iodine-131, cobalt-60, radium-226, technetium-99, medical chemistry.

Kirish

Hozirgi kunda saraton (rak) kasalliklari dunyo bo'yicha eng keng tarqalgan va inson salomatligiga jiddiy xavf tug'diradigan kasalliklardan biri hisoblanadi. Saraton (rak) yoki saraton kasalligi organizmdagi hujayralarning nazoratsiz ko'payishi natijasida yuzaga keladi. Bu jarayon davomida hujayralar normal tuzilishini yo'qotadi va sog'lom to'qimalarga zarar yetkazadi. Jahon sog'liqni saqlash tashkiloti ma'lumotlariga ko'ra, saraton kasalliklari ko'plab mamlakatlarda o'lim sabablari orasida yetakchi o'rinlardan birini egallaydi. Zamonaviy tibbiyotda saraton (rak) kasalliklarini davolashning bir necha asosiy usullari mavjud. Bularga jarrohlik usuli, kimyoterapiya, immunoterapiya va radioterapiya kiradi. Ushbu usullar orasida radioterapiya alohida ahamiyatga ega bo'lib, u radioaktiv elementlar chiqaradigan ionlashtiruvchi nurlanishdan foydalanishga asoslangan. Radiatsiya o'smali hujayralarning genetik apparatini shikastlab, ularning bo'linishini to'xtatadi va o'smalarning kichrayishiga yoki yo'qolishiga olib keladi. Radioaktiv elementlar tibbiyotda nafaqat davolash, balki kasalliklarni aniqlash jarayonida ham muhim o'rin tutadi. Ayniqsa, radioaktiv izotoplar yordamida o'smalarni erta aniqlash va davolash samaradorligini oshirish mumkin. Radioaktiv elementlar – bu atom yadrosi beqaror bo'lib, o'z-o'zidan parchalanish jarayonida turli xil nurlanishlar chiqaradigan kimyoviy elementlardir. Ushbu nurlanishlar alfa, beta va gamma nurlari ko'rinishida bo'lishi mumkin. Radioaktiv parchalanish jarayonida element boshqa elementga yoki izotopga aylanadi. Ionlashtiruvchi nurlanish biologik to'qimalarga ta'sir ko'rsatish xususiyatiga ega. Bu nurlanish hujayra ichidagi molekulalarni ionlashtirib, DNK tuzilishiga zarar yetkazadi. Natijada hujayralarning bo'linishi buziladi yoki ular butunlay nobud bo'ladi. Aynan shu xususiyat radioaktiv elementlardan tibbiyotda foydalanishga asos bo'ladi. Radioterapiya -bu saraton (rak) kasalliklarini davolashda ionlashtiruvchi nurlanishdan foydalanishga asoslangan usuldir. Radioterapiya jarayonida radioaktiv elementlar chiqaradigan nurlanish o'smali to'qimalarga yo'naltiriladi. Ushbu nurlanish o'smali hujayralarning DNK tuzilishini buzib, ularning ko'payishini to'xtatadi. Radioterapiya ikki asosiy turga bo'linadi: Tashqi nurlantirish – bunda nurlanish maxsus apparatlar yordamida tananing tashqarisidan o'smaga yo'naltiriladi. Ichki nurlantirish ya'ni braxiterapiya -bunda radioaktiv moddalar to'g'ridan-to'g'ri o'smaga yoki uning yaqiniga joylashtiriladi. Radioterapiya ko'pincha boshqa davolash usullari bilan birgalikda qo'llanadi. Masalan, jarrohlikdan oldin o'smalarni kichraytirish uchun yoki operatsiyadan keyin qolgan o'smali hujayralarni yo'q qilish maqsadida qo'llanilishi mumkin. Tibbiyotda turli radioaktiv izotoplardan foydalaniladi. Ularning har biri ma'lum kasalliklarni Yod-131-qalqonsimon bez kasalliklarini, jumladan qalqonsimon bez o'smalarini davolashda keng qo'llaniladi. Ushbu izotop qalqonsimon bez hujayralarida to'planib, ularni nurlanish orqali yo'q qiladi. Kobalt-60-radioterapiya apparatlarida gamma nurlanish manbai sifatida ishlatiladi. U o'smali hujayralarga kuchli ta'sir ko'rsatib, ularning ko'payishini to'xtatadi. Radiy-226-tarixan o'smalarni davolashda ishlatilgan radioaktiv elementlardan biri hisoblanadi. Hozirgi kunda uning o'rnini xavfsizroq izotoplar egallagan bo'lsa-da,

u radiatsion tibbiyot rivojlanishida muhim rol o'ynagan. Texnetsiy-99 - diagnostika maqsadida keng qo'llaniladigan radioaktiv izotopdir. U yordamida turli organlarning faoliyatini tekshirish va o'smalarni aniqlash mumkin. Radioaktiv elementlardan foydalanishning afzalliklari shundaki radioaktiv elementlardan foydalanish saraton (rak)kasalliklarini davolashda bir qator afzalliklarga ega. Birinchidan, nurlanish o'smali hujayralarga aniq ta'sir ko'rsatadi. Ikkinchidan, ayrim hollarda jarrohlik aralashuvisiz ham o'smalarni davolash imkonini beradi. Uchinchidan, radioaktiv izotoplar yordamida kasallikni erta aniqlash mumkin. Shu bilan birga, radioaktiv elementlardan foydalanishda ehtiyot choralariga qat'iy rioya qilish zarur. Chunki ortiqcha nurlanish sog'lom hujayralarga ham zarar yetkazishi mumkin. Shu sababli radioterapiya faqat maxsus tibbiy muassasalarda va mutaxassislar nazorati ostida amalga oshiriladi. Radioaktiv elementlar bilan davolashning ilg'or usullari va kelajak istiqbollari: Ilg'or radioterapiya texnologiyalari: So'nggi yillarda saraton (rak)kasalliklarini davolashda ilg'or radioterapiya usullari joriy etilmoqda. Masalan, konformal radioterapiya va intensivlashtirilgan modulyatsiyalangan radioterapiya (IMRT) yordamida nurlanish o'smaga aniq yo'naltiriladi va sog'lom to'qimalarga zarar kamayadi. Shu bilan birga, proton terapiyasi kabi yangi texnologiyalar yuqori samaradorlik bilan o'smali hujayralarni yo'q qiladi va yon ta'sirlarni minimal qiladi. Radiofarmatsevtiklar va diagnostika: Radioaktiv izotoplar faqat davolashda emas, balki radiofarmatsevtiklar sifatida diagnostikada ham keng qo'llaniladi. Masalan, F-18 fluorodezoksiglyukoza (FDG) pozitron emissiya tomografiyasida (PET) o'smali to'qimalarni aniqlashda ishlatiladi. Bu usul yordamida o'smalarning joylashuvi va faoliyati aniq baholanadi, davolash strategiyasi individual tarzda belgilanadi. Radioaktiv elementlardan foydalanishning kelajak istiqbollari quyidagilarni o'z ichiga oladi: ma'lum to'qimalarga yo'naltirilgan nurlanish – nurlanish faqat o'smali hujayralarga ta'sir qiladi, sog'lom hujayralar saqlanadi. Yangi radioizotoplar va nanozarrachalar - tadqiqotlar nanozarrachalarga birlashtirilgan radioaktiv izotoplar yordamida o'smalarni yanada samarali yo'q qilish imkonini yaratmoqda. Individual davolash strategiyalari - har bir bemor uchun o'smalarning turi va joylashuviga mos radioterapiya usullari ishlab chiqilmoqda, bu davolash samaradorligini oshiradi. Radioaktiv elementlar bilan ishlashda xavfsizlik qoidalariga qat'iy rioya qilish juda muhim. Bu, nafaqat bemor, balki tibbiyot xodimlari uchun ham zarur. Shu sababli, radioterapiya va radioizotoplar diagnostikasi faqat malakali mutaxassislar nazorati ostida amalga oshiriladi. Bundan tashqari, etik jihatdan ham bemor roziligi va xavfsizlik protokollari alohida e'tiborda bo'lishi kerak.

Xulosa

Radioaktiv elementlar saraton (rak) kasalliklarini davolash va diagnostika qilishda nafaqat samarali, balki istiqbolli vosita hisoblanadi. Zamonaviy radioterapiya va radiofarmatsevtik usullar yordamida o'smali hujayralarni yo'q qilish, kasallikni erta aniqlash va individual davolash strategiyasini ishlab chiqish mumkin. Kelajakda yangi texnologiyalar va radioizotoplarning kashf etilishi saraton kasalliklarini davolash samaradorligini yanada oshirishga xizmat qiladi.

Radioaktiv elementlar saraton (rak) kasalliklarini davolash va diagnostika qilishda muhim ahamiyatga ega. Radioterapiya usuli yordamida o'smali hujayralarni yo'q qilish va kasallikning rivojlanishini to'xtatish mumkin. Yod-131, kobalt-60, radiy-226 va texnetsiy-99 kabi radioaktiv izotoplar zamonaviy tibbiyotda keng qo'llanilmoqda. Ularning qo'llanilishi saraton kasalliklarini davolash samaradorligini oshirishga xizmat qiladi. Kelajakda radiatsion tibbiyot sohasidagi ilmiy tadqiqotlarning rivojlanishi yangi radioaktiv izotoplar yaratish va saraton (rak) kasalliklarini yanada samarali davolash imkoniyatlarini kengaytiradi.

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PREDICTING GROUNDWATER LEVEL CHANGES USING AN ARTIFICIAL INTELLIGENCE MODEL

Abstract. *This study analyzes the annual dynamics of surface water bodies using multi-platform satellite remote sensing data and links these changes to the depletion of groundwater reserves. Among transformer-based architectures, the SegFormer model was selected and trained on surface water imagery from the period 2020–2025. The model identified a linear decreasing trend in surface water extent and predicted a further decline in groundwater storage by 2026. The results indicate that total water resources decrease by 19.6% over 2020–2025 and by 23.9% by 2026 relative to 2020, with an expected average annual reduction rate of approximately 3.9%.*

Keywords: *transformers, SegFormer, remote sensing imagery, geology, hydrology, hydrogeology.*

Introduction

Groundwater remains a primary source of water in many parts of the world, enabling irrigation and supporting rural socio-economic activities. Serving as the lifeblood of numerous ecosystems, it plays a vital role in the lives of billions of people globally. Groundwater is essential for hydrological processes, water resource management, environmental sustainability, and adaptation to climate change. It has a particularly profound impact on the ecosystems of the regions under study, therefore necessitating a deep understanding of its dynamics.

The dynamics of changes in groundwater storage are of great significance in hydrology, as they affect the availability, quality, and sustainability of this resource. Furthermore, in the context of increasing anthropogenic activities and the impacts of climate change, an accurate and comprehensive assessment of groundwater storage variations is crucial for effective water resource management and climate adaptation strategies. Our research focus is the Tashkent region. In this study, groundwater monitoring is conducted based on hydrogeological images obtained through remote sensing methods, and recommendation systems are developed for the rational use of natural resources [4].

In recent years, Transformer architectures have demonstrated effective results in high-precision segmentation of natural environment imagery. Previous studies have primarily focused on the segmentation of surface water sources, while the correlation with changes in groundwater reserves has not been sufficiently explored [3]. Based on this, we first conduct an analysis of image segmentation models.

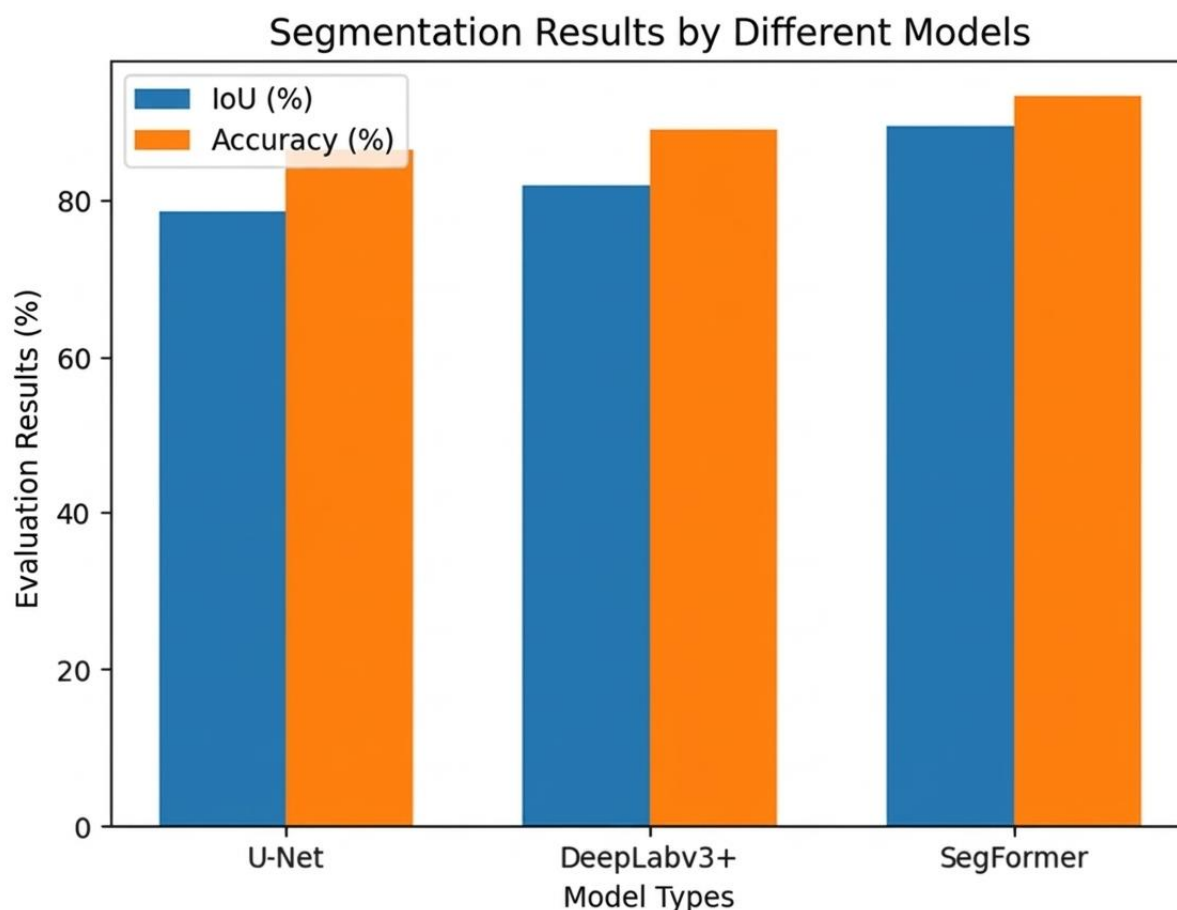


Figure 1. Comparative analysis of Transformer models

The obtained results show that the SegFormer model achieved higher accuracy in determining the volume of surface water reserves from remote sensing imagery compared to the U-Net and DeepLabv3+ models [1]. Based on the analysis of the models, as a result of analyzing the sharp decrease in surface water reserves using SegFormer-B0, it is possible to predict the depletion of groundwater in these and adjacent areas [5].

Table 1.
Comparative analysis of Transformer models by accuracy

Model	IoU (%)	F1-score	Accuracy (%)
U-Net	76.5	0.81	83.2
DeepLabv3+	80.7	0.81	89.3
SegFormer-B0 (bizning)	87.3	0.89	93.2

In our research, based on the analytical results, we utilize the SegFormer model to achieve high accuracy in processing remote sensing imagery. The SegFormer (Segmentation Transformer) model is a neural network architecture primarily consisting of two parts, each with its own mathematical representation [2]. Its objective is to perform Semantic Segmentation, which involves assigning

each pixel of an image to a corresponding class. The mathematical model of SegFormer is mainly represented through the functions of its two core modules: the Mix Transformer (MiT) Encoder (Hierarchical Transformer Encoder) and the Lightweight All-MLP Decoder (Multi-Layer Perceptron Decoder). The encoder divides the image into 4 x 4 overlapping patches [6]. This process can be implemented using Convolution.

$$P_i = \text{Norm}(\text{Conv}(I_i)) \quad (1)$$

Here, P_i is the image patch at stage i , and $f(K=7, S=4)$ is the function with kernel size $K=7$ and stride $S=4$. As a result, a sequence of tokens is generated. In other transformers, the computational complexity of the Self-Attention mechanism is very high, specifically $O(N^2 C)$. Here, N is the number of tokens and C is the channel dimension. To reduce complexity, SegFormer utilizes a special mechanism that shortens the sequence length of the K (Key) and V (Value) matrices (Sequence Reduction):

$$\text{Attention}(Q, K, V) = \text{Softmax}\left(\frac{QK^T}{\sqrt{d_{\text{head}}}}\right)V \quad (2)$$

Efficient Self-Attention (SRA) in SegFormer: The K and V matrices are reduced to K' and V' , where R is the reduction ratio:

$$K' = \text{Linear}(\text{Reshape}(K, R)) \quad (3)$$

The $\text{Reshape}(K, R)$ function transforms K into a new sequence with a length of N/R (or this can be implemented using 2D convolution). Thus, SRA is calculated as follows:

$$\text{SRA}(Q, K, V) = \text{Softmax}\left(\frac{Q(K')^T}{\sqrt{d_{\text{head}}}}\right)V \quad (4)$$

This reduces the computational complexity to $O(N^2 C/R)$. In the next stage, the Mix-FFN (Mix Feed-Forward Network) is implemented. The Mix-FFN in SegFormer does not use Positional Encoding. Instead, to process positional information, it introduces a 3x3 Depthwise Convolution into the standard FFN (Feed-Forward Network) layer:

$$F_{\text{out}} = \text{MLP}\left(\text{DWConv}_{3 \times 3}\left(\text{GELU}\left(\text{MLP}(F_{\text{in}})\right)\right)\right) + F_{\text{in}} \quad (5)$$

Here, F_{in} is the input feature, MLP is the Multi-Layer Perceptron (Linear Layers), GELU is the activation function, and DWConv 3x3 is the 3x3 depthwise convolution. Using the results obtained from the expressions above, the decoding process is performed. The purpose of the Decoder is to combine features of various scales obtained from the encoder and produce a segmentation mask at the pixel level. In the next stage, Feature Alignment and Upsampling are carried out. Features at each scale, F_i , are first projected to a common channel dimension C , and then all features are brought to the same size as the highest-resolution feature (i.e., $H/4 \times W/4$). In Channel Projection, each feature F_i is transformed to the common channel dimension C .

$$\hat{F}_i = \text{Linear}_{C \rightarrow C}(F_i), \forall i \in \{1, 2, 3, 4\} \quad (6)$$

Upsampling: All new features are brought to the same spatial dimension as $\hat{F}_1$ (i.e., $\frac{H}{4} \times \frac{W}{4}$) bilan bir xil fazoviy o'lchamga keltiriladi.

$$\hat{F}_i^{up} = \text{Upsample}_{\frac{H}{4} \times \frac{W}{4}}(\hat{F}_i), \forall i \in \{2, 3, 4\} \quad (7)$$

In the above formula, $\hat{F}_1^{up}$ is equal to $\hat{F}_1$. After the alignment and upsampling stage, we perform Feature Fusion to combine the features. All upsampled features are concatenated and filtered through another Linear Layer [8]:

$$F = \text{Linear}_{4C \rightarrow C}(\text{Concat}(\hat{F}_1^{up}, \hat{F}_2^{up}, \hat{F}_3^{up}, \hat{F}_4^{up})) \quad (8)$$

In the next stage, we perform Segmentation Mask Prediction. The final fused feature F is transformed into a channel dimension of N_{cls} (Number of classes) through another linear projection. This function provides the class probabilities for each pixel:

$$M = \text{Linear}_{C \rightarrow N_{cls}}(F) \quad (9)$$

Here, $M \in \mathbb{R}^{\frac{H}{4} \times \frac{W}{4} \times N_{cls}}$ represents the mask. Based on the segmentation model, the $S(\cdot)$ function produces the segmentation mask M based on the input image I :

$$M = \text{Decoder}(\text{Encoder}(I)) \quad (10)$$

To obtain the final segmentation mask, after applying the Softmax function, the spatial dimension of M is upsampled to the original image size $H \times W$ using Bilinear/Nearest-Neighbor Interpolation.

$$M_{final} = \text{Upsample}_{H \times W}(M)$$

In the formula above, M_{final} is equal to $S(\cdot)$.

1. Selected model architecture.

Transformers were originally created to solve Sequence2Sequence problems such as text generation and translation. The Transformer model, which utilizes self-attention together with encoder and decoder blocks, is a new generation approach developed to transform sequences into other sequences [9].

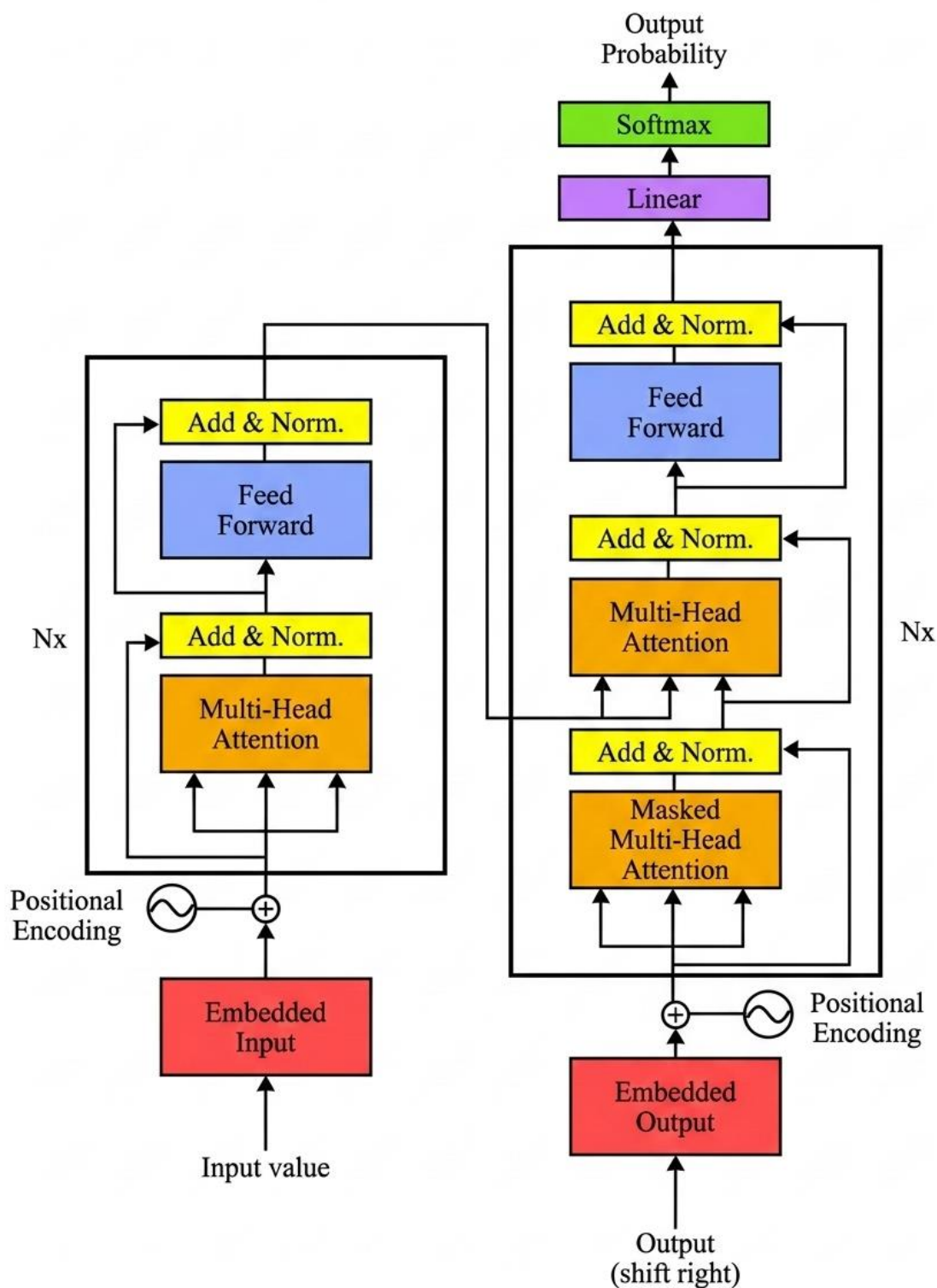


Figure 2. General architecture of Transformers

Based on this architecture, we will construct the SegFormer architecture. This represents a modern architecture designed to transform one sequence into another using an encoder and decoder, integrated with the self-attention mechanism.

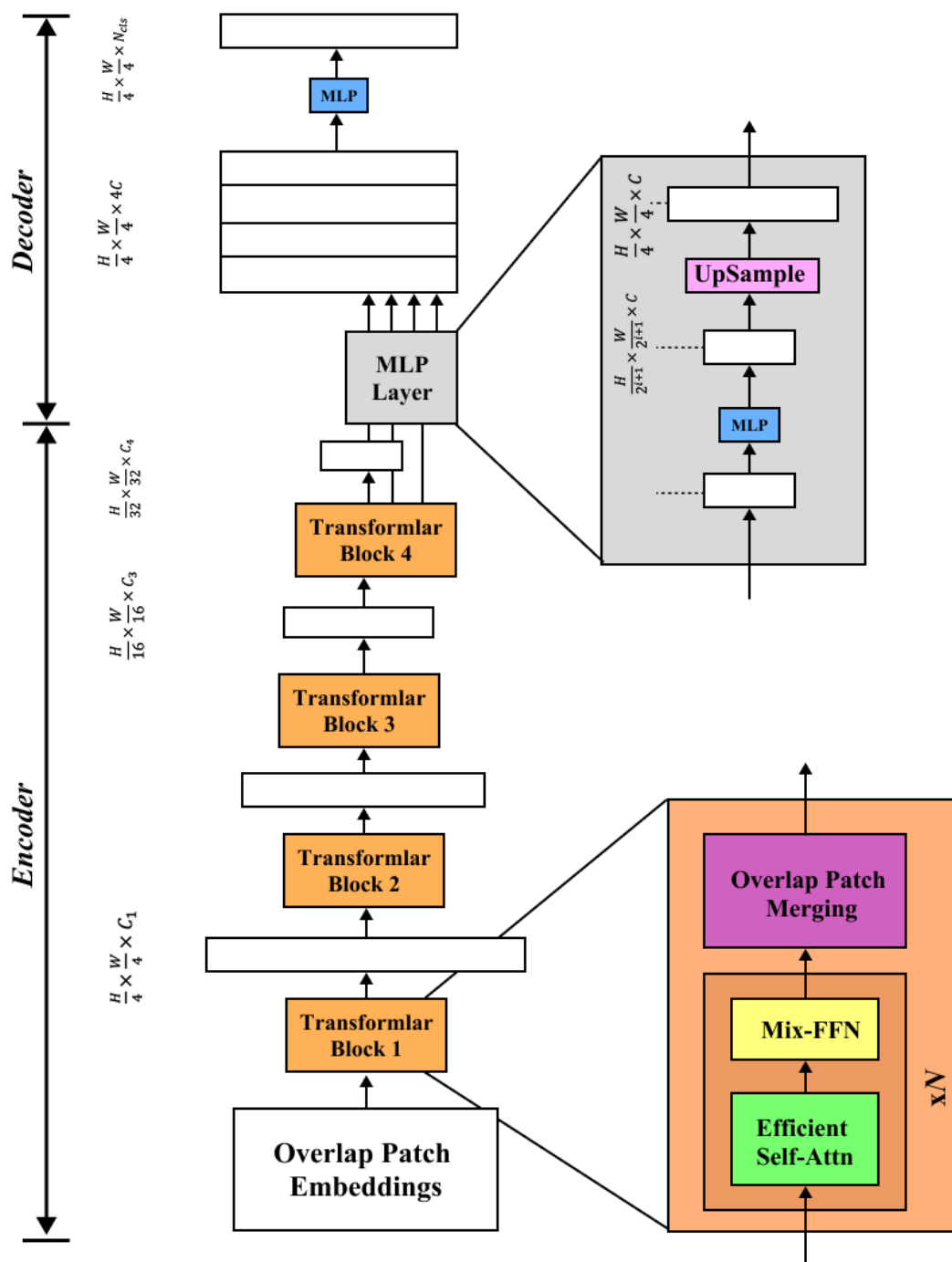


Figure 3. SegFormer architecture

Its architecture has the appearance shown above (Figure 3). The architecture is based on a transformer architecture with Encoder-Decoder heads, where the encoder utilizes Self-Attention.

1. Results obtained based on the model.

Based on the results of the analysis, it can be seen that the accuracy of the SegFormer model is high. Therefore, using the SegFormer model, we will perform the prediction of groundwater changes based on images of surface water reserves.

In the research work, the parameters of the transformer model are configured to obtain results. In this process, we use 3200 images obtained from the Tashkent region, and in the first stage, we separate suitable images as a result of image processing.

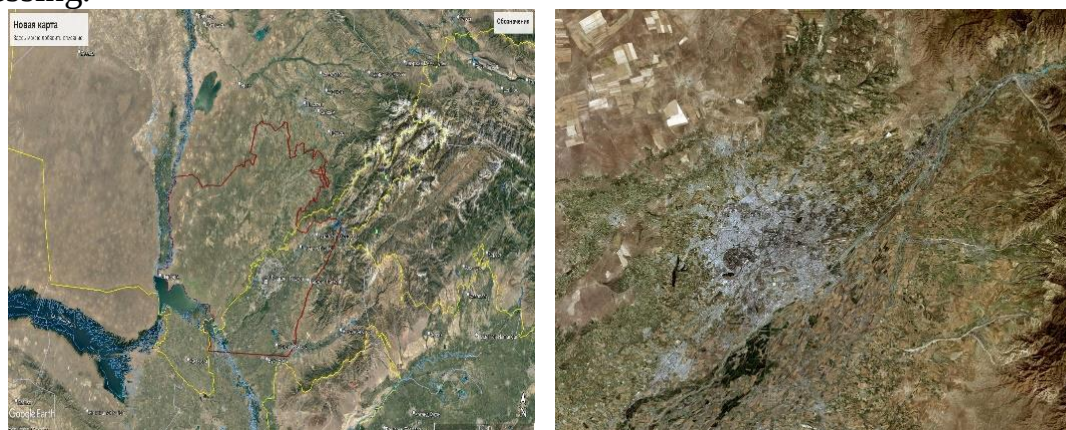


Figure 4. Remote sensing imagery of the areas around Tashkent (dataset)

Based on the images above, images of surface water reserves and the volume of flowing water have been obtained across several years. Using this data, the decrease in water reserves from year to year is analyzed, and its impact on groundwater is predicted. For this purpose, we utilize the aforementioned SegFormer model. The model parameters are configured as follows: to optimize the model, we use the AdamW Optimizer; for error evaluation, CrossEntropyLoss; with a Batch size of 8 and Epoch of 100. The evaluation metrics are F1-score and Accuracy [12].

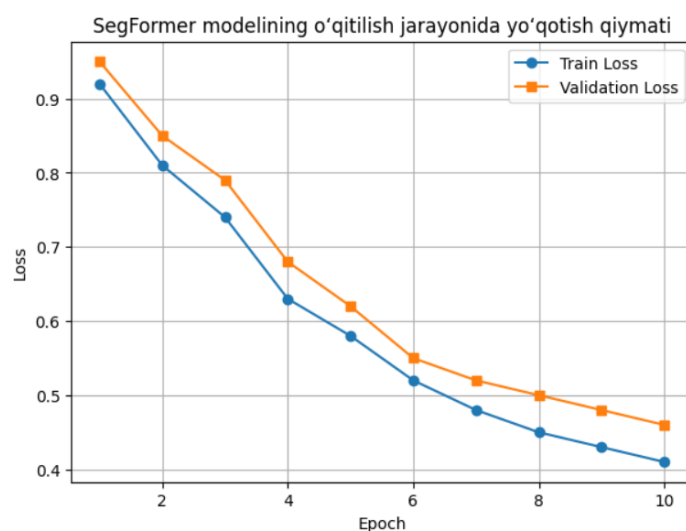


Figure 5. Image training losses

As can be seen from the graph, the loss values during the training and validation processes are steadily decreasing. This indicates that the convergence of the model is good. The results show that the areas where water layers are located have been accurately segmented. Based on the trained model, we predict the state

and impact of the changes in surface water body images across various years on the levels of groundwater.

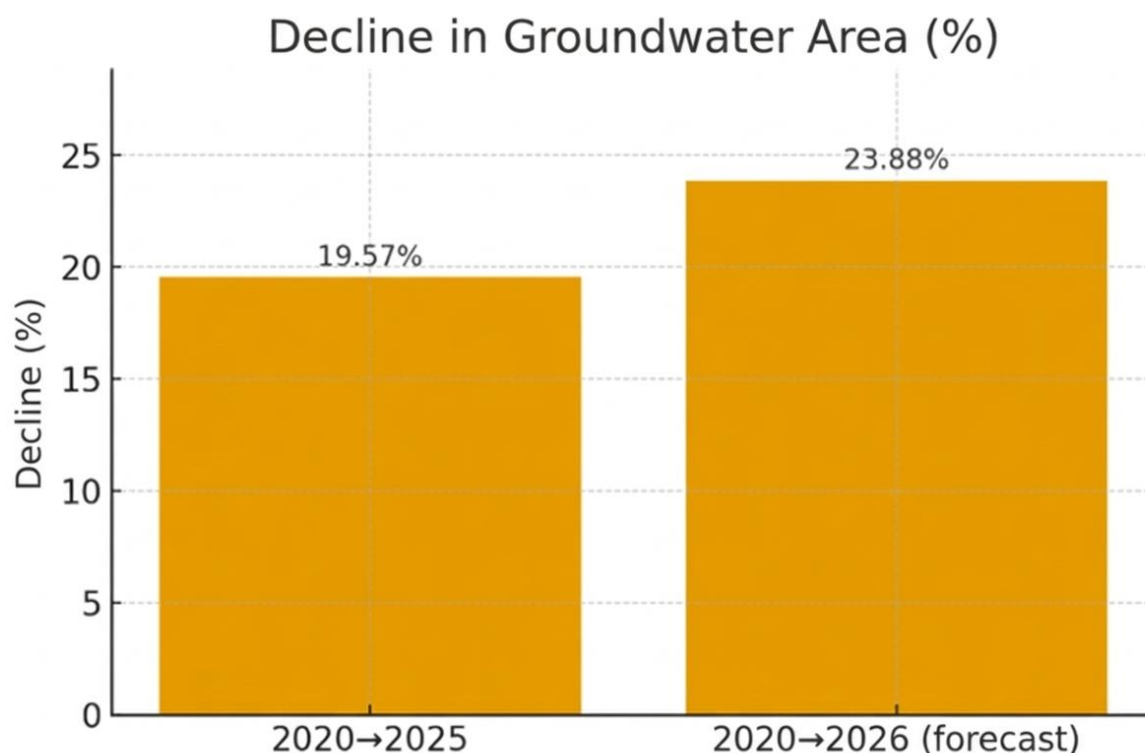


Figure 6. Predicting the decline of groundwater over several years (%)

The following results were achieved through forecasting. In 2022, the water area amounted to 512.4 km², and in 2025, the water area will be 412.1km². Based on these results, we perform a SegFormer-based prediction for the year 2026 for 390.05 km², and calculate the total decrease between 2020 and 2025. In this case, a decrease of 19.57 % can be observed. The total decrease in 2020-2026 is equal to 23.88 %. The average annual decrease might correspond to 3.915 %.

Conclusion

In this research, determining the state of groundwater resources and forecasting for future years was carried out by analyzing images obtained through remote sensing based on the SegFormer model. During the research, images between the years 2020 and 2025 were analyzed, a linear trend of water area changes was determined, and the decrease of groundwater reserves for the year 2026 was predicted. In 2020, the area of the water-covered region amounted to 512.4km², and in 2025, it was 412.1 km². According to the SegFormer model's linear forecast for the year 2026, the area is predicted to decrease to 390.05 km². These results show a decrease of 19.6% between 2020 and 2025, and 23.9% until 2020-2026. The average annual decrease rate is around 3.9%. In them, a significant reduction in water-filled zones was observed in the transition from 2025 to 2026, with an increase in land area. This situation is probably related to the decrease in the amount of precipitation, the increase in temperature, and the disruption of the natural balance of groundwater. The obtained results indicate that

the SegFormer model has high potential for application in geological, hydrological, and hydrogeological monitoring systems.

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LOTIN TILINI O'QITISHDA TEST TIZIMINING SAMARADORLIGI

Annotatsiya: Zamonaviy ta'lim tizimida bilimlarni baholash va nazorat qilish samaradorligini oshirish muhim masalalardan biridir. Lotin tilini o'qitishda test tizimidan foydalanish talabalar bilimini aniqlash, ularni tizimli o'rganishga yo'naltirish va o'quv jarayonini optimallashtirishda muhim ahamiyat kasb etadi. Ushbu maqolada lotin tilini o'qitishda test tizimining pedagogik imkoniyatlari, afzalliklari va samaradorligi tahlil qilinadi. Tadqiqot natijalari shuni ko'rsatadiki, test tizimi talabalar bilimini tez va aniq baholash, xatolarni aniqlash hamda mustaqil ta'limni rivojlantirishga xizmat qiladi.

Kalit so'zlar: lotin tili, test tizimi, baholash, pedagogika, tibbiy ta'lim, o'qitish metodikasi.

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THE EFFECTIVENESS OF THE TEST SYSTEM IN TEACHING LATIN

Abstract: *In the modern education system, improving the effectiveness of knowledge assessment and control is one of the key issues. The use of a test system in teaching Latin plays an important role in determining students' knowledge levels, guiding them toward systematic learning, and optimizing the educational process. This article analyzes the pedagogical potential, advantages, and effectiveness of the test system in teaching Latin. The research results show that the test system contributes to the rapid and objective assessment of students' knowledge, identification of errors, and development of independent learning skills.*

Keywords: *Latin language, test system, assessment, pedagogy, medical education, teaching methodology.*

Kirish

Lotin tili tibbiyot, farmatsiya va biologiya sohalarida asosiy ilmiy til sifatida alohida o'rin egallaydi. Ushbu til orqali tibbiy terminologiyani katta qismi shakllangan bo'lib, u xalqaro ilmiy muloqotda aniqlik va standartlashuvni ta'minlaydi. Shu sababli lotin tilini puxta o'zlashtirish tibbiyot yo'nalishida tahsil

olayotgan talabalar uchun muhim kasbiy kompetensiyalardan biri hisoblanadi. Lotin tilini bilish nafaqat terminlarni to'g'ri tushunish, balki ularni klinik amaliyotda to'g'ri qo'llash imkonini ham beradi.

Biroq lotin tilining grammatik tuzilishi, morfologik xususiyatlari, so'z yasash tizimi va terminologik boyligi uni o'rganish jarayonini murakkablashtiradi. Ayniqsa, prefiks, suffiks va ildizlardan tashkil topgan murakkab terminlarni anglash talabalar uchun qiyinchilik tug'diradi. Ko'pincha talabalar terminlarni mexanik ravishda yodlashga harakat qiladi, bu esa bilimlarning yetarlicha mustahkam bo'lmasligiga olib keladi. Shu sababli lotin tilini o'qitishda samarali pedagogik yondashuvlar va nazorat vositalaridan foydalanish zarurati ortib bormoqda.

Zamonaviy ta'lim tizimida bilimlarni nazorat qilish va baholash jarayoni o'quv faoliyatining ajralmas qismi hisoblanadi. Baholash nafaqat o'quvchilar bilimni aniqlash, balki o'quv jarayonining samaradorligini oshirish, kamchiliklarni aniqlash va ularni bartaraf etishga xizmat qiladi. Shu nuqtai nazardan test tizimi samarali pedagogik vosita sifatida keng qo'llanilmoqda. Testlar yordamida talabalar bilimni tezkor, obyektiv va tizimli ravishda baholash imkoniyati yaratiladi, bu esa o'qituvchi va talaba uchun qulay sharoit yaratadi.

Test tizimining yana bir muhim jihati — uning standartlashtirilgan baholash imkoniyatidir. Test topshiriqlari orqali barcha talabalar bilimni yagona mezon asosida baholash mumkin bo'ladi, bu esa baholash jarayonining adolatli va shaffof bo'lishini ta'minlaydi. Bundan tashqari, testlar talabalarni mustaqil ishlashga undaydi, ularning bilimlarini muntazam ravishda mustahkamlashga yordam beradi hamda o'quv motivatsiyasini oshiradi.

Shu bilan birga, zamonaviy axborot texnologiyalarining rivojlanishi test tizimini yanada takomillashtirish imkonini bermoqda. Elektron testlar, onlayn platformalar va avtomatlashtirilgan baholash tizimlari yordamida bilimlarni baholash jarayoni yanada tez, qulay va samarali amalga oshirilmoqda. Bu esa lotin tilini o'qitishda innovatsion yondashuvlarni joriy etish imkonini kengaytiradi.

Shu nuqtai nazardan, lotin tilini o'qitishda test tizimining samaradorligini ilmiy jihatdan tahlil qilish, uning pedagogik imkoniyatlarini baholash va o'quv jarayonida qo'llash istiqbollari aniqlash dolzarb masala hisoblanadi. Mazkur tadqiqotning asosiy maqsadi — test tizimining lotin tilini o'rganish jarayoniga ta'sirini aniqlash, uning afzallik va kamchiliklarini tahlil qilish hamda ta'lim jarayonida samarali qo'llash bo'yicha ilmiy asoslangan xulosalar ishlab chiqishdan iborat.

Materiallar va metodlar

Mazkur tadqiqot lotin tilini o'qitishda test tizimining samaradorligini aniqlashga qaratilgan bo'lib, unda pedagogika, didaktika, til o'qitish metodikasi hamda baholash nazariyasiga oid ilmiy manbalar kompleks tarzda o'rganildi. Tadqiqot jarayonida mahalliy va xorijiy olimlar tomonidan yaratilgan darsliklar, o'quv qo'llanmalar, ilmiy maqolalar va metodik tavsiyalar asosiy nazariy manba sifatida tanlab olindi. Ushbu manbalar lotin tilini o'qitish metodikasi, test

tizimining nazariy asoslari va uning amaliy qo'llanilishi bo'yicha ilmiy qarashlarni tahlil qilish imkonini berdi.

Tadqiqotni amalga oshirishda bir qator ilmiy-uslubiy metodlardan foydalanildi. Ilmiy adabiyotlarni tahlil qilish metodi orqali lotin tilini o'qitish va baholash tizimlariga oid mavjud ilmiy yondashuvlar, konsepsiyalar va tajribalar o'rganilib, umumlashtirildi. Bu metod test tizimining pedagogik mohiyatini ochib berish va uning samaradorligini nazariy jihatdan asoslashda muhim ahamiyat kasb etdi.

Pedagogik kuzatish metodi yordamida lotin tili darslarida test topshiriqlarining qo'llanilishi, talabalar bilimini o'zlashtirish darajasi hamda ularning o'quv jarayonidagi faolligi tahlil qilindi. Ushbu metod orqali test tizimining real ta'lim jarayonidagi ta'siri va uning amaliy samaradorligi aniqlashtirildi.

Qiyosiy tahlil metodi orqali an'anaviy baholash usullari (og'zaki so'rov, yozma ishlar) bilan test tizimining samaradorligi o'zaro solishtirildi. Bu esa turli baholash shakllarining afzalliklari va kamchiliklarini aniqlash, shuningdek, test tizimining ustun jihatlarini ilmiy asoslash imkonini berdi. Tavsifiy metod esa test topshiriqlarining turlari, ularning tuzilishi va qo'llanilish xususiyatlarini tizimli ravishda bayon etishda qo'llanildi.

Material sifatida lotin tili darsliklari, tibbiy terminologiya lug'atlari, test topshiriqlari to'plamlari, nazorat savollari banklari hamda baholash tizimlariga oid ilmiy manbalar tanlab olindi. Shuningdek, zamonaviy ta'lim jarayonida qo'llanilayotgan elektron test platformalari va avtomatlashtirilgan baholash tizimlari ham tadqiqot doirasida o'rganildi. Ushbu materiallar asosida test tizimining lotin tilini o'rganish jarayoniga ta'siri, uning samaradorligi va o'quv jarayonini optimallashtirishdagi roli chuqur tahlil qilindi.

Bundan tashqari, tadqiqot davomida test tizimining talabalar xotira faoliyati, diqqatni jamlash darajasi, mustaqil ishlash ko'nikmalari va o'quv motivatsiyasiga ta'siri ham baholandi. Bu esa test tizimining nafaqat nazariy, balki amaliy jihatdan ham muhim pedagogik vosita ekanligini asoslashga imkon berdi.

Natijalar

O'tkazilgan tadqiqot natijalari lotin tilini o'qitishda test tizimining samarali baholash va nazorat vositasi ekanligini ko'rsatdi. Tahlillar asosida test tizimining bir qator muhim afzalliklari aniqlanib, ularning o'quv jarayoniga ijobiy ta'siri tasdiqlandi.

1. Bilimlarni tez va obyektiv baholash

Test tizimi yordamida talabalar bilimini qisqa vaqt ichida aniqlash imkoniyati mavjud. An'anaviy baholash usullaridan farqli ravishda, testlar ko'psonli talabalarni bir vaqtning o'zida baholashga imkon beradi. Bundan tashqari, test natijalari inson omiliga kamroq bog'liq bo'lgani sababli baholash jarayoni yanada obyektiv va adolatli amalga oshiriladi. Bu esa o'qituvchi va talabalar uchun aniq va ishonchli natijalarni taqdim etadi.

2. Xatolarni aniqlash va tahlil qilish

Test natijalari talabalar bilim darajasini aniqlash bilan birga, ularning qaysi mavzularni yetarli darajada o'zlashtirmaganini ham ko'rsatadi. Bu esa o'qituvchiga o'quv jarayonidagi kamchiliklarni aniqlash va ularni bartaraf etish uchun zarur choralarni ko'rish imkonini beradi. Talabalar esa o'z xatolarini tahlil qilib, bilimlarini mustahkamlashga yo'naltiriladi.

3. Mustaqil ta'limni rivojlantirish

Test tizimi talabalarni muntazam ravishda mustaqil ishlashga undaydi. O'z bilimini tekshirish istagi talabalarda o'z-o'zini nazorat qilish ko'nikmasini shakllantiradi. Ayniqsa, elektron test tizimlari orqali talabalar istalgan vaqtda o'z bilimini baholash imkoniyatiga ega bo'lib, bu ularning mustaqil ta'lim faoliyatini rivojlantiradi.

4. O'quv motivatsiyasini oshirish

Baholash tizimi sifatida testlardan foydalanish talabalarni faol o'rganishga rag'batlantiradi. Doimiy nazorat va baholash mavjudligi talabalarni muntazam tayyorgarlik ko'rishga undaydi. Shuningdek, test natijalarini tezkor olish imkoniyati talabalar uchun qo'shimcha motivatsiya omili bo'lib xizmat qiladi.

5. Standartlashtirilgan baholash tizimini ta'minlash

Test tizimi bilimlarni yagona mezon asosida baholash imkonini beradi. Bu esa barcha talabalar uchun teng sharoit yaratib, baholash jarayonining shaffofligini ta'minlaydi. Standartlashtirilgan testlar yordamida bilim darajasini solishtirish, tahlil qilish va umumlashtirish osonlashadi.

6. Ta'lim jarayonini optimallashtirish

Test tizimi o'qituvchining vaqtini tejaydi va o'quv jarayonini samarali tashkil etishga yordam beradi. Natijalarni avtomatik qayta ishlash imkoniyati mavjudligi sababli o'qituvchi baholashdan ko'ra ko'proq o'qitish va tushuntirishga e'tibor qaratishi mumkin.

Muhokama

Lotin tilini o'qitishda test tizimidan foydalanish zamonaviy pedagogikaning muhim va dolzarb yo'nalishlaridan biri hisoblanadi. Ushbu tizim bilimlarni baholashning tezkorligi, obyektivligi va qulayligi bilan ajralib turib, ayniqsa tibbiy terminologiya va grammatik tuzilmalarni o'zlashtirish jarayonida samarali nazorat vositasi sifatida xizmat qiladi. Lotin tilining murakkab morfologik tuzilishi, terminologik boyligi va o'ziga xos grammatik qoidalari mavjudligi sababli, talabalar bilimini muntazam nazorat qilish va baholab borish muhim ahamiyat kasb etadi.

Test tizimi yordamida talabalar bilimini qisqa vaqt ichida aniqlash imkoniyati o'quv jarayonini optimallashtirishga xizmat qiladi. Ayniqsa, katta auditoriyalarda dars olib borishda testlar o'qituvchiga samarali nazoratni tashkil etish imkonini beradi. Bundan tashqari, test natijalari asosida olingan ma'lumotlar o'quv jarayonini tahlil qilish, kamchiliklarni aniqlash va metodik yondashuvlarni takomillashtirish uchun muhim manba bo'lib xizmat qiladi. Shu orqali o'qituvchi har bir talabaning bilim darajasini individual tarzda baholash va zarur hollarda qo'shimcha tushuntirishlar berish imkoniyatiga ega bo'ladi.

Shuningdek, test tizimi talabalarni muntazam ravishda bilim olishga undaydi. Doimiy nazorat mavjudligi talabalar o'rtasida mas'uliyat hissini oshiradi va ularni darslarga puxta tayyorlanishga rag'batlantiradi. Bu esa o'quv motivatsiyasining ortishiga va bilimlarning barqaror o'zlashtirilishiga olib keladi. Ayniqsa, oraliq va yakuniy nazorat shakllarida testlardan foydalanish talabalar bilimni tizimli ravishda mustahkamlashga yordam beradi.

Biroq test tizimining ayrim cheklovlari ham mavjudligini e'tiborga olish lozim. Testlar ko'pincha reproduktiv bilimlarni baholashga yo'naltirilgan bo'lib, talabalar ijodiy va tahliliy fikrlash qobiliyatini to'liq namoyon eta olmaydi. Masalan, grammatik konstruksiyalarni qo'llash yoki terminlarning chuqur semantik tahlilini baholashda faqat test usuliga tayanish yetarli emas. Shu sababli test tizimini og'zaki so'rov, yozma ishlar, amaliy mashg'ulotlar va muammoli vaziyatlarni hal qilish kabi boshqa baholash metodlari bilan uyg'unlashtirish maqsadga muvofiqdir.

Yana bir muhim jihat — test topshiriqlarining sifatidir. Test savollarining ilmiy asoslangan, aniq va mantiqan to'g'ri tuzilishi baholash jarayonining ishonchliligini ta'minlaydi. Noto'g'ri yoki noaniq tuzilgan testlar talabalar bilimni noto'g'ri baholashga olib kelishi mumkin. Shu sababli test topshiriqlarini ishlab chiqishda pedagogik va metodik talablar, shuningdek, testologiya tamoyillariga qat'iy amal qilish zarur.

Zamonaviy axborot-kommunikatsiya texnologiyalarining rivojlanishi test tizimini yanada takomillashtirish imkonini bermoqda. Elektron testlar, onlayn platformalar, mobil ilovalar va avtomatlashtirilgan baholash tizimlari yordamida bilimlarni nazorat qilish jarayoni yanada qulay va samarali tashkil etilmoqda. Bunday tizimlar test natijalarini tezkor tahlil qilish, statistik ma'lumotlar olish va individual yondashuvni amalga oshirish imkonini beradi. Shu bilan birga, masofaviy ta'lim sharoitida ham test tizimi muhim baholash vositasi sifatida keng qo'llanilmoqda.

Xulosa

O'tkazilgan tadqiqot natijalari shuni ko'rsatadiki, lotin tilini o'qitishda test tizimi samarali va zamonaviy pedagogik vosita sifatida muhim ahamiyat kasb etadi. Ushbu tizim yordamida talabalar bilimni tezkor, obyektiv va tizimli ravishda baholash imkoniyati yaratiladi. Natijada o'quv jarayoni yanada samarali tashkil etilib, o'qituvchi va talabalar o'rtasida o'zaro tahlil va nazorat jarayoni kuchayadi.

Test tizimi nafaqat bilim darajasini aniqlash, balki o'quv jarayonini optimallashtirishda ham muhim rol o'ynaydi. U orqali o'qituvchi qisqa vaqt ichida katta hajmdagi materialni nazorat qilishi, talabalar esa o'z bilimlarini muntazam ravishda tekshirib borishi mumkin. Bu esa bilimlarning bosqichma-bosqich mustahkamlanishiga xizmat qiladi. Ayniqsa, tibbiy terminologiya va grammatik tuzilmalarni o'zlashtirish jarayonida testlar samarali nazorat vositasi sifatida namoyon bo'ladi.

Shuningdek, test tizimi talabalar motivatsiyasini oshirishda muhim omil hisoblanadi. Doimiy baholash va nazorat mavjudligi talabalarni muntazam

tayyorgarlik ko‘rishga undaydi, ularning mas’uliyat hissini oshiradi va mustaqil ta’lim ko‘nikmalarini rivojlantiradi. Bu esa o‘z navbatida ta’lim sifatining oshishiga olib keladi.

Biroq test tizimidan foydalanishda uning cheklovlarini ham hisobga olish zarur. Faqat testlarga tayanish talabalar bilimining barcha jihatlarini to‘liq baholash imkonini bermaydi. Shu sababli test tizimini boshqa baholash shakllari — og‘zaki so‘rov, yozma ishlar va amaliy mashg‘ulotlar bilan uyg‘unlashtirish maqsadga muvofiqdir.

Umuman olganda, test tizimidan tibbiy ta’lim jarayonida keng foydalanish lotin tilini o‘rganish samaradorligini oshirishga, talabalar bilimini mustahkamlashga va ularning kasbiy tayyorgarligini rivojlantirishga xizmat qiladi. Shu bois ushbu tizimni yanada takomillashtirish va zamonaviy axborot texnologiyalari bilan integratsiya qilish dolzarb vazifa hisoblanadi.

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INFEKSION KASALLIKLAR TERMINOLOGIYASINING KELIB CHIQISHI VA RIVOJLANISHI

Annotatsiya: Infekcion kasalliklar terminologiyasi tibbiyot fanining ajralmas va muhim tarkibiy qismi bo'lib, u ko'p asrlik tarixiy rivojlanish jarayonida turli lingvistik, ilmiy va amaliy omillar ta'sirida shakllangan. Ushbu terminologik tizim insoniyatning infekcion kasalliklar haqidagi bilimlari kengayib borishi bilan birga takomillashib, yangi tushunchalar va atamalar bilan boyib borgan. Mazkur maqolada infekcion kasalliklar terminlarining kelib chiqishi, ularning etimologik manbalari, semantik xususiyatlari hamda zamonaviy tibbiyotdagi ahamiyati kompleks tarzda tahlil qilinadi.

Infekcion kasalliklar terminologiyasi nafaqat ilmiy tadqiqotlarda, balki klinik amaliyotda ham muhim ahamiyat kasb etadi. Terminlarning aniq va to'g'ri qo'llanilishi tashxis qo'yish, davolash jarayonini tashkil etish hamda xalqaro tibbiy muloqotni samarali yo'lga qo'yishda muhim omil hisoblanadi. Shu bois ushbu terminologiyani lingvistik va semantik jihatdan chuqur o'rganish zamonaviy tibbiyot va tibbiy ta'lim uchun dolzarb masalalardan biri hisoblanadi.

Kalit so'zlar: infekcion kasalliklar, tibbiy terminologiya, etimologiya, lotin tili, yunon tili, klinik terminlar.

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THE ORIGIN AND DEVELOPMENT OF INFECTIOUS DISEASE TERMINOLOGY

Abstract: *The terminology of infectious diseases is an integral and essential part of medical science, which has been formed over centuries of historical development under the influence of various linguistic, scientific, and practical factors. This terminological system has evolved alongside the expansion of human knowledge about infectious diseases and has been enriched with new concepts and terms. This article provides a comprehensive analysis of the origin of infectious disease terms, their etymological sources, semantic features, and their significance in modern medicine.*

The terminology of infectious diseases plays an important role not only in scientific research but also in clinical practice. The accurate and correct use of terms is a crucial factor in diagnosis, organization of treatment processes, and effective international medical communication. Therefore, an in-depth study of this terminology from linguistic and semantic perspectives is one of the акmyal issues in modern medicine and medical education.

Keywords: *infectious diseases, medical terminology, etymology, Latin language, Greek language, clinical terms.*

Kirish

Infeksion kasalliklar insoniyat tarixida eng qadimiy va keng tarqalgan kasalliklar qatoriga kiradi. Ular turli davrlarda epidemiyalar va pandemiyalar ko'rinishida namoyon bo'lib, jamiyat rivojiga sezilarli ta'sir ko'rsatgan. Ushbu kasalliklarning kelib chiqishi, tarqalish mexanizmlari va klinik xususiyatlarini o'rganish jarayoni bilan bir qatorda, ularni ifodalovchi tibbiy terminologiya ham

bosqichma-bosqich shakllanib va takomillashib borgan. Natijada infeksiyon kasalliklar terminologiyasi tibbiyot fanining muhim tarkibiy qismiga aylangan.

Tibbiy terminologiyaning ushbu sohasi kasalliklarning etiologiyasi (qo'zg'atuvchisi), patogenez, klinik belgilari, tarqalish yo'llari va profilaktika choralarini aniq va lo'nda ifodalash imkonini beradi. Terminlarning aniq va standartlashtirilgan bo'lishi nafaqat ilmiy tadqiqotlar, balki amaliy tibbiyotda ham muhim ahamiyat kasb etadi. Chunki terminologik aniqlik diagnostika qo'yish, davolash strategiyasini tanlash va mutaxassislar o'rtasidagi samarali muloqotni ta'minlashda asosiy omillardan biri hisoblanadi.

Infeksiyon kasalliklar terminlari asosan lotin va yunon tillariga tayanadi. Bu tillar tarixan tibbiyotning ilmiy asosi sifatida shakllangan bo'lib, terminologik tizimning xalqaro miqyosda yagona va tushunarli bo'lishini ta'minlaydi. Yunon tilidan olingan termin elementlari ko'pincha kasallikning mohiyatini, ya'ni simptomlari va patologik jarayonlarini ifodalasa, lotin tili terminlarni tizimlashtirish va standartlashtirishda muhim rol o'ynaydi. Masalan, *-itis*, *-osis*, *-emia* kabi suffikslar kasallikning turini aniqlashda keng qo'llaniladi.

Zamonaviy tibbiyot rivojlanishi, xususan mikrobiologiya, virusologiya va epidemiologiya sohalaridagi yutuqlar infeksiyon kasalliklar terminologiyasining yanada boyishiga olib keldi. Yangi mikroorganizmlarning aniqlanishi, yangi kasalliklarning paydo bo'lishi hamda global sog'liqni saqlash muammolarining ortib borishi terminologik tizimning doimiy ravishda yangilanib borishini taqozo etmoqda. Shu bilan birga, global tibbiy hamkorlik va xalqaro ilmiy muloqot terminlarning yagona standart asosida qo'llanilishini talab etadi.

Shu sababli infeksiyon kasalliklar terminologiyasining kelib chiqishi, rivojlanish bosqichlari hamda lingvistik xususiyatlarini o'rganish nafaqat nazariy, balki amaliy jihatdan ham dolzarb masala hisoblanadi. Bu esa tibbiy terminlarning to'g'ri qo'llanilishini ta'minlash, diagnostik aniqlikni oshirish va ilmiy muloqotni takomillashtirishga xizmat qiladi.

Natijalar

O'tkazilgan tadqiqot natijalari infeksiyon kasalliklar terminologiyasining shakllanishi va rivojlanishida bir qator muhim lingvistik va ilmiy xususiyatlar mavjudligini ko'rsatdi. Tahlillar natijasida infeksiyon kasalliklar terminlari quyidagi asosiy guruhlariga ajratildi va ularning har biri alohida ilmiy ahamiyatga ega ekanligi aniqlandi.

1. Etimologik manbalar

Tadqiqotlar shuni ko'rsatdiki, infeksiyon kasalliklar terminlarining asosiy qismi lotin va yunon tillaridan kelib chiqqan. Bu holat ushbu tillarning tarixan tibbiyot fanida ilmiy asos sifatida qo'llanilganligi bilan izohlanadi. Masalan:

virus – “zahar” ma'nosini anglatib, dastlab zararli modda sifatida tushunilgan;

bacterium – yunoncha “tayoqcha” ma'nosidan kelib chiqqan bo'lib, mikroorganizmlarning shakliga ishora qiladi;

infectio – “yuqtirish, zararlash” ma'nosini bildiradi.

Bunday etimologik asos terminlarning mazmunini chuqurroq tushunishga yordam beradi hamda ularning ilmiy aniqligini ta'minlaydi.

2. Klinik asoslangan terminlar

Aniqlanishicha, infeksiyon kasalliklarning ko'plab terminlari kasallikning klinik belgilari, simptomlari yoki tashqi ko'rinishiga asoslangan holda shakllangan. Masalan:

tuberculosis – kasallik paytida hosil bo'ladigan tugunchalar (tuberkulalar) bilan bog'liq;

influenza – tarixan "ta'sir" (yulduzlar ta'siri) tushunchasidan kelib chiqqan bo'lib, keyinchalik gripp kasalligini ifodalash uchun qo'llanila boshlagan.

Bunday terminlar kasallikning klinik ko'rinishini ifodalashda muhim rol o'ynaydi va diagnostika jarayonini osonlashtiradi.

3. Etiologik terminlar

Tadqiqot natijalari shuni ham ko'rsatdiki, ko'plab terminlar kasallikni qo'zg'atuvchi mikroorganizmlar nomiga asoslangan holda shakllangan. Bu esa zamonaviy mikrobiologiya va virusologiya fanlarining rivojlanishi bilan bog'liq. Masalan:

salmonellosis – *Salmonella* bakteriyasi bilan bog'liq infeksiya;

staphylococcus infection – *Staphylococcus* turkumiga mansub bakteriyalar sababli yuzaga keladigan kasalliklar.

Bunday terminlar kasallikning sababini aniq ko'rsatib, davolash strategiyasini tanlashda muhim ahamiyat kasb etadi.

4. Zamonaviy terminlar

Zamonaviy tibbiyot rivoji bilan yangi kasalliklar va ularga mos terminlar ham paydo bo'lmoqda. Ayniqsa global pandemiyalar bu jarayonni tezlashtirdi. Masalan:

COVID-19 – yangi koronavirus infeksiyasi bilan bog'liq kasallik;

SARS – og'ir o'tkir respirator sindrom.

Ushbu terminlar qisqartmalar va xalqaro standartlarga asoslangan holda shakllanib, global miqyosda bir xil qo'llanilmoqda. Bu esa ilmiy va klinik muloqotning samaradorligini oshiradi.

Muhokama (Discussion – kengaytirilgan)

Infeksiyon kasalliklar terminologiyasining shakllanishi va rivojlanishi tibbiyot fanining tarixiy taraqqiyoti bilan uzviy bog'liq bo'lib, u lingvistik, ilmiy va ijtimoiy omillar ta'sirida yuzaga kelgan murakkab va ko'p qatlamli tizimni tashkil etadi. Qadimgi davrlarda kasalliklar ko'pincha ularning tashqi belgilari, bemorning umumiy ahvoli yoki xalq orasidagi tasavvurlarga asoslanib nomlangan. Masalan, ayrim kasalliklar rang, og'riq yoki tashqi o'zgarishlarga qarab nomlangan bo'lsa, bu nomlar ko'pincha ilmiy asosga ega bo'lmagan. Keyinchalik ilmiy tibbiyotning shakllanishi, ayniqsa mikrobiologiya, virusologiya va epidemiologiya fanlarining rivojlanishi natijasida kasalliklarni etiologik va patogenetik jihatdan tushuntirish imkoniyati paydo bo'ldi. Bu esa terminologik tizimning tubdan yangilanishiga olib keldi va ilmiy asoslangan terminlar paydo bo'lishiga zamin yaratdi.

Lotin va yunon tillari infeksiyon kasalliklar terminologiyasining asosiy lingvistik manbalari sifatida alohida ahamiyatga ega. Yunon tilidan olingan termin elementlari ko'pincha kasallikning ichki mohiyatini, ya'ni uning patogenezi, simptomlari yoki funksional buzilishlarini ifodalashga xizmat qiladi. Lotin tili esa terminlarni tizimlashtirish, ularni yagona grammatik va morfologik me'yorlar asosida shakllantirishda muhim rol o'ynaydi. Masalan, *-itis* (yallig'lanish), *-osis* (degenerativ yoki surunkali holat), *-emia* (qon bilan bog'liq holat) kabi suffikslar kasallik turini aniqlashda diagnostik jihatdan muhim ahamiyat kasb etadi. Bu elementlar yordamida shifokorlar terminning o'zidan kasallikning mohiyati haqida dastlabki tasavvurga ega bo'lishlari mumkin.

Infeksiyon kasalliklar terminologiyasining rivojlanishida ilmiy kashfiyotlar hal qiluvchi omil bo'lib xizmat qilgan. Xususan, mikroskopning ixtiro qilinishi va mikroorganizmlar — bakteriyalar, viruslar, zamburug'larning aniqlanishi kasalliklarning sababini ilmiy asosda tushuntirish imkonini berdi. Natijada terminologiya ham yangi bosqichga ko'tarildi: kasalliklar faqat simptomlarga asoslanib emas, balki ularning qo'zg'atuvchisi asosida nomlana boshladi. Bu esa diagnostika aniqligini oshirish, differensial tashxis qo'yish va davolash strategiyasini to'g'ri tanlashda muhim ahamiyat kasb etdi.

Shuningdek, global miqyosdagi epidemiyalar va pandemiyalar terminologiyaning rivojlanishiga sezilarli ta'sir ko'rsatgan. Masalan, COVID-19 pandemiyasi nafaqat yangi kasallikni, balki yangi terminlar, qisqartmalar va ilmiy tushunchalarni ham keltirib chiqardi. SARS, MERS kabi terminlar xalqaro miqyosda tezkor ravishda standartlashdi va keng qo'llanila boshlandi. Bu holat terminologiyaning zamonaviy ehtiyojlarga mos ravishda tez o'zgaruvchan va moslashuvchan tizim ekanligini ko'rsatadi.

Biroq terminologiyaning tez rivojlanishi bilan bog'liq ayrim muammolar ham mavjud. Terminlarning ko'pligi, ularning sinonimik variantlari, qisqartmalar va turlicha talqin qilinishi ilmiy va klinik muloqotda noaniqliklarni keltirib chiqarishi mumkin. Ayniqsa, turli mamlakatlarda yoki turli ilmiy maktablarda bir xil tushunchani ifodalash uchun turli terminlarning qo'llanilishi diagnostik va kommunikativ muammolarga olib keladi. Shu sababli terminologiyani standartlashtirish zarurati yuzaga keladi. Xalqaro tasnif tizimlari, xususan ICD (Kasalliklarning xalqaro tasnifi) terminlarning yagona va aniq qo'llanilishini ta'minlab, global tibbiy muloqotni samarali tashkil etishga xizmat qiladi.

Tibbiy ta'lim jarayonida infeksiyon kasalliklar terminologiyasini chuqur o'rganish alohida ahamiyat kasb etadi. Talabalar terminlarning etimologiyasi, morfologik tuzilishi va semantik mazmunini o'zlashtirish orqali ularni ongli ravishda tushunish va amaliyotda to'g'ri qo'llash ko'nikmasiga ega bo'ladilar. Bu esa ularning klinik tafakkurini rivojlantiradi, diagnostik qaror qabul qilish qobiliyatini oshiradi hamda kasbiy kompetensiyasini mustahkamlaydi. Ayniqsa, terminlarning ildiz, prefiks va suffikslarini bilish yangi va murakkab terminlarni tez anglash imkonini beradi.

Bundan tashqari, infeksiyon kasalliklar terminologiyasining rivojlanishi tibbiy lingvistika, bioinformatika va sun'iy intellekt kabi zamonaviy yo'nalishlar

bilan ham chambarchas bog‘liq bo‘lib bormoqda. Elektron sog‘liqni saqlash tizimlari va klinik ma‘lumotlar bazalarida terminlarning standart va aniq bo‘lishi avtomatik tahlil va diagnostika jarayonlarini yengillashtiradi. Bu esa terminologiyaning nafaqat lingvistik, balki texnologik ahamiyatini ham oshiradi.

Xulosa

Infeksion kasalliklar terminologiyasi uzoq tarixiy rivojlanish jarayoni natijasida shakllangan bo‘lib, u tibbiyot fanining evolyutsiyasi, ilmiy kashfiyotlar va amaliy tajribalar bilan uzviy bog‘liq holda takomillashib borgan. Ushbu terminologik tizim kasalliklarning kelib chiqishi, tarqalish mexanizmlari, klinik belgilari va patogenezini haqidagi bilimlarning chuqurlashuvi natijasida boyib, yanada aniq va tizimli shaklga ega bo‘lgan.

Tadqiqot natijalari shuni ko‘rsatadiki, infeksiy kasalliklar terminlari asosan lotin va yunon tillari asosida shakllangan bo‘lib, ular terminologiyaning xalqaro miqyosda yagona va tushunarli bo‘lishini ta‘minlaydi. Bu esa turli mamlakatlar mutaxassislari o‘rtasida samarali ilmiy va klinik muloqotni yo‘lga qo‘yishda muhim ahamiyat kasb etadi. Terminlarning etimologik va semantik asoslarini bilish esa ularni to‘g‘ri talqin qilish va amaliyotda samarali qo‘llash imkonini beradi.

Shu bilan birga, terminologiyaning rivojlanishi jarayonida yangi tushunchalar, kasalliklar va diagnostik yondashuvlarning paydo bo‘lishi terminlar tizimining doimiy yangilanib borishini talab etadi. Bu jarayon terminologiyaning dinamik va moslashuvchan tizim ekanligini ko‘rsatadi. Biroq terminlarning noto‘g‘ri yoki turlicha talqin qilinishi diagnostik xatolarga va ilmiy muloqotdagi noaniqliklarga olib kelishi mumkin.

Shu sababli infeksiy kasalliklar terminologiyasini standartlashtirish, ularning aniq va bir ma‘noli qo‘llanilishini ta‘minlash zamonaviy tibbiyotning muhim vazifalaridan biridir. Xalqaro tasnif tizimlari va ilmiy me‘yorlar bu jarayonda muhim rol o‘ynaydi.

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KLINIK TERMINOLOGIYADA LOTIN VA YUNON ELEMENTLARINING UYG‘UNLASHUVI HAMDA UNING ZAMONAVIY TIBBIYOTDAGI AHAMIYATI

Annotatsiya: Klinik terminologiya tibbiyot fanining asosiy tarkibiy qismlaridan biri bo‘lib, unda lotin va yunon tillari elementlarining o‘zaro integratsiyasi muhim rol o‘ynaydi. Ushbu maqolada klinik terminlarning shakllanishida lotin va yunon tiliga mansub morfemalarning birgalikda qo‘llanishi, ularning lingvistik xususiyatlari hamda tibbiy amaliyotdagi ahamiyati tahlil qilinadi. Tadqiqot natijalari shuni ko‘rsatadiki, yunon ildizlari ko‘pincha kasallik va patologik jarayonlarni ifodalasa, lotin elementlari anatomik va tizimli nomlashda keng qo‘llaniladi. Ushbu integratsiya tibbiy terminologiyaning aniqligi, universalligi va standartlashuvini ta’minlaydi.

Kalit so‘zlar: klinik terminologiya, lotin tili, yunon tili, termin yasash, morfologiya, tibbiy terminlar.

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THE INTEGRATION OF LATIN AND GREEK ELEMENTS IN CLINICAL TERMINOLOGY AND ITS SIGNIFICANCE IN MODERN MEDICINE

Abstract: *Clinical terminology is one of the fundamental components of medical science, in which the integration of Latin and Greek elements plays a significant role. This article analyzes the combined use of morphemes of Latin and Greek origin in the formation of clinical terms, their linguistic features, and their importance in medical practice.*

The results of the study show that Greek roots are more often used to denote diseases and pathological processes, while Latin elements are widely applied in anatomical and systemic naming. This integration ensures the accuracy, universality, and standardization of medical terminology.

Keywords: *clinical terminology, Latin language, Greek language, word formation, morphology, medical terms.*

Kirish

Tibbiy terminologiya tarixan lotin va yunon tillari asosida shakllangan. Lotin tili uzoq vaqt davomida ilm-fanning universal tili bo'lib xizmat qilgan bo'lsa, yunon tili ko'plab klinik va patologik terminlarning asosiy manbasi hisoblanadi.

Zamonaviy klinik terminologiyada ushbu ikki til elementlarining uyg'unlashuvi keng kuzatiladi. Bugungi globallashtirish davrida tibbiyot sohasi mutaxassislaridan nafaqat nazariy bilimlar, balki xalqaro tajriba, xorijiy adabiyotlardan foydalanish ko'nikmalari, muloqotda erkinlik kabi ko'p qirrali kompetensiyalar talab etilmoqda. Bunda til integratsiyasi –ya'ni o'zbek, rus va ingliz tillarini puxta bilish va ularni o'quv jarayonida uyg'unlashtira olish muhim ahamiyat kasb etadi. Ko'p tillilik asosida ta'lim olish, shubhasiz, talabalarning klinik amaliyotga tayyorligi, ilmiy-tadqiqot ishlari bilan shug'ullanishi va kasbiy o'sishini jadallashtiradi. Ammo real sharoitda bu integratsiyani amalga oshirishda turli muammolar va cheklovlar mavjud. Klinik terminlarning shakllanishida lotin va yunon morfemalarining integratsiyasi terminlarning aniq, qisqa va xalqaro miqyosda tushunarli bo'lishini ta'minlaydi. Shu sababli ushbu mavzu tibbiy lingvistika va terminologiya nuqtai nazaridan dolzarb hisoblanadi.

Materiallar va metodlar

Tadqiqot jarayonida klinik terminologiya, tibbiy lingvistika hamda lotin va yunon tiliga mansub termin elementlariga oid ilmiy adabiyotlar batafsil o'rganildi va tizimli ravishda tahlil qilindi. Ushbu jarayonda zamonaviy ilmiy manbalar, o'quv qo'llanmalar va terminologik lug'atlar asosiy axborot manbai sifatida xizmat qildi. O'rganilgan adabiyotlar tibbiy terminlarning shakllanishi, ularning lingvistik xususiyatlari hamda amaliy qo'llanilishiga oid muhim nazariy va amaliy ma'lumotlarni qamrab oldi.

Tadqiqotni amalga oshirishda bir qator ilmiy-uslubiy metodlardan foydalanildi. Jumladan, ilmiy adabiyotlarni tahlil qilish metodi orqali mavjud nazariy qarashlar va ilmiy yondashuvlar umumlashtirildi. Morfologik va etimologik tahlil yordamida klinik terminlarning tarkibiy qismlari — ildiz, prefiks va suffikslar o'rganilib, ularning kelib chiqishi va ma'nosi aniqlashtirildi. Qiyosiy metod orqali lotin va yunon termin elementlarining o'xshash va farqli jihatlari solishtirildi, ularning termin yasashdagi roli tahlil qilindi. Tavsifiy metod esa terminlarning tuzilishi, semantik xususiyatlari va qo'llanilish doirasini izohlashda qo'llanildi.

Tadqiqot materiallari sifatida klinik terminlar lug'atlari, tibbiy darsliklar, farmatsevtik terminologiyaga oid ilmiy manbalar hamda maxsus uslubiy qo'llanmalar tanlab olindi. Ushbu manbalar orqali terminlarning amaliy qo'llanilishi, ularning klinik va ilmiy kontekstdagi ahamiyati hamda terminologik tizimdagi o'rni chuqur tahlil qilindi.

Natijalar:

Tillar integratsiyasi nafaqat ta'lim sifati, balki tibbiy xizmat ko'rsatish darajasiga ham bevosita ta'sir ko'rsatadi. Masalan, xorijiy bemorlar bilan ishlaydigan tibbiyot xodimlarining til bilishi yuqori bo'lsa, diagnostika va davolash sifati sezilarli darajada oshadi. Shu bois tillarni bir vaqtning o'zida va bir-birini to'ldiruvchi tarzda o'rganish tibbiy ta'limning eng dolzarb yo'nalishlaridan biri hisoblanadi. Tillar integratsiyasining ahamiyati: Tillar integratsiyasi –bu o'quv jarayonida bir nechta tillarni maqsadli tarzda qo'llash orqali bilim va ko'nikmalarni chuqurlashtirishga qaratilgan pedagogik

yondashuvdir. Tibbiyotda bu yondashuv ayniqsa dolzarb bo'lib, ko'p tillilik nafaqat kasbiy o'sishga, balki bemor bilan muloqot, xalqaro konferensiyalarda ishtirok etish, ilmiy maqolalar yozish va zamonaviy tibbiy adabiyotlardan foydalanish imkonini beradi. Statistik ma'lumotlarga ko'ra, 2023 yilda O'zbekiston tibbiyot oliygohlarida tahsil olayotgan talabalarning 68% ingliz tilida yozilgan darsliklardan foydalana olmaydi. Bu esa ularning mustaqil ta'lim olish imkoniyatlarini cheklaydi. Shu sababli, tillar integratsiyasi nafaqat xorijiy tillarni o'rganish, balki o'zbek tilidagi ilmiy-tibbiy resurslarni yaratish, tarjima faoliyatini kuchaytirish va terminologik uyg'unlikni ta'minlash orqali amalga oshirilishi lozim. Tillar integratsiyasini samarali tashkil qilish uchun faqat til o'qituvchilari emas, balki mutaxassislik fani o'qituvchilari ham jarayonga jalb qilinishi kerak. Masalan, anatomiya darslari davomida inglizcha asosiy atamalarni qo'shib o'qitish orqali talabalar fan va tilni birgalikda o'zlashtiradilar. Bu interdisiplinar (fanlararo) yondashuv til o'rgatishni sun'iy emas, balki tabiiy jarayon sifatida tashkil qilish imkonini beradi.

Tadqiqot natijalari shuni ko'rsatdiki, klinik terminlarning katta qismi lotin va yunon morfemalarining kombinatsiyasidan tashkil topgan.

1. Yunon elementlarining roli:

Yunon ildizlari ko'pincha kasallik va patologik jarayonlarni bildiradi:

cardio – yurak

neuro – asab

pathos – kasallik

2. Lotin elementlarining roli:

Lotin elementlari anatomik nomlashda keng qo'llaniladi:

cor – yurak

ren – buyrak

pulmo – o'pka

3. Integratsiyalashgan terminlar:

Ko'plab terminlar aralash shaklda qo'llanadi:

cardiologia

neurologia

gastroenteritis

Bu holat terminologiyaning moslashuvchanligini ko'rsatadi.

Muhokama:

Lotin va yunon termin elementlarining o'zaro integratsiyasi klinik terminologiyaning eng muhim xususiyatlaridan biri hisoblanadi. Bu integratsiya tarixiy rivojlanish jarayonida shakllangan bo'lib, bugungi kunda ham o'z ahamiyatini saqlab qolmoqda. Yunon tili qadimiy tibbiyot fanining asosiy tili bo'lganligi sababli ko'plab klinik va patologik terminlar aynan shu tilga borib taqaladi. Lotin tili esa ilm-fan va rasmiy yozuv tili sifatida terminlarni tizimlashtirish va standartlashtirishda muhim rol o'ynagan.

Klinik terminlarda yunon ildizlari ko'pincha kasallikning mohiyatini, uning etiologiyasi yoki patogenezini ifodalaydi. Masalan, -itis, -osis, -algia kabi suffikslar kasallik yoki patologik jarayonni bildiradi. Bu elementlar klinik

terminlarning mazmuniy aniqligini ta'minlaydi. Shu bilan birga, lotin elementlari anatomik tuzilmalarni nomlashda keng qo'llanilib, organizm qismlarini ifodalashda asosiy rolni bajaradi.

Ushbu integratsiyaning muhim jihatlaridan biri — terminlarning xalqaro miqyosda tushunarli bo'lishidir. Lotin va yunon elementlari asosida yaratilgan terminlar turli tillarda deyarli bir xil shaklda qo'llanadi. Bu esa shifokorlar va ilmiy xodimlar o'rtasida samarali kommunikatsiyani ta'minlaydi.

Biroq ayrim hollarda terminlarning aralash shaklda bo'lishi murakkabliklarga olib kelishi mumkin. Masalan, yangi boshlovchi talabalar uchun yunon va lotin elementlarini ajratish qiyin bo'lishi mumkin. Shu sababli tibbiy terminologiyani o'qitishda morfemik va etimologik tahlil metodlaridan foydalanish muhimdir.

Zamonaviy tibbiyotda ingliz tilining roli ortib borayotgan bo'lsa-da, klinik terminologiyaning asosiy qismi hanuz lotin va yunon elementlariga asoslangan. Bu esa ularning ilmiy terminologiyadagi mustahkam o'rnini ko'rsatadi.

Shuningdek, sun'iy intellekt va raqamli texnologiyalar rivojlanishi bilan klinik terminlarni avtomatik tahlil qilish imkoniyatlari kengaymoqda. Bu esa terminologik tizimni yanada chuqurroq o'rganish va standartlashtirish imkonini beradi.

Xulosa

Klinik terminologiyada lotin va yunon elementlarining integratsiyasi terminlarning aniqligi va xalqaro standartlashuvini ta'minlaydi. Ushbu integratsiya tibbiyot sohasida samarali kommunikatsiyani rivojlantirishda muhim rol o'ynaydi. Tibbiy ta'limda tillar integratsiyasi —bu zamon talabi. Bu jarayon faqat xorijiy til o'rganish emas, balki ko'p tillilikda o'quv resurslarini yaratish, ilmiy adabiyotlarni o'zlashtirish, bemor bilan to'g'ri muloqotda bo'lish va kasbiy tayyorgarlikni kuchaytirishdan iboratdir. Amaliy muammolarni tizimli yondashuv bilan hal qilish, xususan, innovatsion texnologiyalar, o'qituvchilar salohiyatini oshirish va tillar bo'yicha resurslar yaratish orqali hal etish mumkin. Kelgusida tibbiy ta'lim muassasalari integratsiyalashgan, raqamli va interaktiv ko'p tilli tizimlarga o'tishi, ushbu sohadagi raqobatbardoshlikni ta'minlaydi.

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KLINIK TERMINOLOGIYANI O‘QITISHDA MULTIMEDIA TEKNOLOGIYALARIDAN FOYDALANISH

Annotatsiya: Zamonaviy ta’lim tizimida multimedia texnologiyalaridan foydalanish o‘quv jarayonining samaradorligini oshirishda muhim omil hisoblanadi. Ayniqsa, klinik terminologiyani o‘qitishda multimedia vositalari murakkab terminlarni vizual, audial va interfaol shaklda tushuntirish imkonini beradi. Mazkur maqolada klinik terminologiyani o‘qitishda multimedia texnologiyalarining pedagogik ahamiyati, ularning afzalliklari hamda amaliy qo‘llanilishi tahlil qilinadi. Tadqiqot natijalari shuni ko‘rsatadiki, multimedia vositalari talabalarning bilimni mustahkamlash, xotirasini rivojlantirish va o‘quv motivatsiyasini oshirishga xizmat qiladi.

Kalit so‘zlar: klinik terminologiya, multimedia texnologiyalar, tibbiy ta’lim, interfaol o‘qitish, vizualizatsiya, pedagogika.

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THE USE OF MULTIMEDIA TECHNOLOGIES IN TEACHING CLINICAL TERMINOLOGY

Abstract: *In the modern education system, the use of multimedia technologies is an important factor in increasing the effectiveness of the learning process. Especially in teaching clinical terminology, multimedia tools make it possible to explain complex terms in visual, auditory, and interactive forms. This article analyzes the pedagogical significance of multimedia technologies in teaching clinical terminology, their advantages, and practical application. The results of the study show that multimedia tools contribute to strengthening students' knowledge, improving memory, and increasing learning motivation.*

Keywords: *clinical terminology, multimedia technologies, medical education, interactive learning, visualization, pedagogy.*

Kirish

Klinik terminologiya tibbiyot fanining ajralmas va muhim tarkibiy qismlaridan biri bo'lib, u tibbiy bilimlarni aniq, izchil va standartlashtirilgan tarzda ifodalashda asosiy vosita sifatida xizmat qiladi. Tibbiy terminlar yordamida shifokorlar, farmatsevtlar va boshqa mutaxassislar o'rtasida samarali ilmiy va amaliy muloqot ta'minlanadi. Shu sababli klinik terminologiyani puxta

o'zlashtirish tibbiyot sohasida ta'lim olayotgan talabalar uchun muhim kasbiy kompetensiya hisoblanadi.

Biroq tibbiy terminlarning murakkabligi, ularning ko'p komponentli lingvistik tuzilishga ega ekanligi, lotin va yunon tillariga asoslanganligi hamda terminlar sonining nihoyatda ko'pligi talabalar uchun ularni o'zlashtirish jarayonini murakkablashtiradi. Ko'plab terminlar prefiks, ildiz va suffikslarning kombinatsiyasidan tashkil topgan bo'lib, ularning semantik va morfologik tuzilishini anglashsiz yodlash samarali natija bermaydi. Natijada talabalar ko'pincha terminlarni mexanik ravishda yodlashga urinadi, bu esa bilimlarning barqaror emasligiga va tez unutilishiga olib keladi.

Zamonaviy ta'lim tizimida ushbu muammolarni hal etish uchun innovatsion pedagogik yondashuvlarni qo'llash muhim ahamiyat kasb etadi. So'nggi yillarda axborot-kommunikatsiya texnologiyalarining jadal rivojlanishi ta'lim jarayonini tubdan o'zgartirib, multimedia vositalarini keng qo'llash imkonini yaratdi. Multimedia texnologiyalari matn, grafik tasvirlar, animatsiya, audio va video elementlarni birlashtirgan holda axborotni kompleks va ko'p kanalli tarzda taqdim etadi. Bu esa o'quv materiallarini yanada tushunarli, qiziqarli va samarali o'zlashtirishga xizmat qiladi.

Ayniqsa, klinik terminologiyani o'qitishda multimedia vositalarining qo'llanilishi murakkab terminlarning mazmunini vizualizatsiya qilish, ularni kontekstda tushuntirish va amaliy misollar orqali mustahkamlash imkonini beradi. Masalan, anatomik tuzilmalarni 3D modellar yordamida ko'rsatish, kasallik jarayonlarini animatsiya orqali tushuntirish yoki terminlarning talaffuzini audio vositalar orqali eshittirish talabalar uchun muhim didaktik ustunliklar yaratadi. Bu esa bilimlarni faqat eslab qolish emas, balki chuqur anglashga xizmat qiladi.

Shuningdek, multimedia texnologiyalari o'quv jarayonini interfaol shaklda tashkil etish imkonini beradi. Talabalar virtual testlar, interaktiv mashqlar va simulyatsiyalar orqali o'z bilimlarini mustaqil ravishda sinab ko'rishlari va mustahkamlashlari mumkin. Bu esa ularning o'quv faolligini oshiradi, mustaqil ta'lim ko'nikmalarini rivojlantiradi va bilimlarni amaliy jihatdan qo'llashga yordam beradi.

Shu nuqtai nazardan, klinik terminologiyani o'qitishda multimedia texnologiyalarining o'rni va samaradorligini ilmiy asosda tahlil qilish dolzarb masala hisoblanadi. Mazkur tadqiqotning asosiy maqsadi — multimedia vositalarining klinik terminologiyani o'zlashtirish jarayoniga ta'sirini aniqlash, ularning pedagogik imkoniyatlarini baholash hamda tibbiy ta'limda qo'llash istiqbollari asoslab berishdan iborat.

Materiallar va metodlar:

Mazkur tadqiqot klinik terminologiyani o'qitishda multimedia texnologiyalarining samaradorligini aniqlashga qaratilgan bo'lib, unda tibbiy terminologiya, pedagogika, didaktika va axborot-kommunikatsiya texnologiyalariga oid ilmiy manbalar kompleks tarzda o'rganildi. Tadqiqot jarayonida mahalliy va xorijiy mualliflar tomonidan yaratilgan darsliklar, o'quv qo'llanmalar, elektron ta'lim resurslari hamda multimedia texnologiyalarining

ta'limdagi qo'llanilishiga bag'ishlangan ilmiy maqolalar asosiy nazariy manba sifatida tanlab olindi.

Tadqiqotni amalga oshirishda bir qator ilmiy-uslubiy metodlardan foydalanildi. Ilmiy adabiyotlarni tahlil qilish metodi yordamida mavzuga oid mavjud nazariy yondashuvlar, ilmiy qarashlar va konsepsiyalar tizimli ravishda o'rganilib, umumlashtirildi. Bu usul multimedia texnologiyalarining ta'lim jarayonidagi o'rni va ularning klinik terminologiyani o'rganishga ta'sirini aniqlashga imkon berdi.

Pedagogik kuzatish metodi orqali tibbiyot oliy ta'lim muassasalarida klinik terminologiyani o'qitish jarayonida multimedia vositalarining qo'llanilishi va ularning talabalarining bilimni o'zlashtirish darajasiga ta'siri tahlil qilindi. Ushbu metod o'quv jarayonida talabalar faolligi, qiziqishi va o'zlashtirish samaradorligini baholash imkonini berdi.

Qiyosiy tahlil metodi orqali an'anaviy o'qitish usullari bilan multimedia asosidagi yondashuvlarning samaradorligi solishtirildi. Natijada turli pedagogik metodlarning afzalliklari va kamchiliklari aniqlanib, multimedia texnologiyalarining ustun jihatlari asoslab berildi. Tavsifiy metod esa multimedia vositalarining turlari, ularning funksional imkoniyatlari hamda klinik terminologiyani o'qitishdagi amaliy qo'llanilish shakllarini batafsil bayon qilishda qo'llanildi.

Material sifatida tibbiy terminologiya darsliklari, lotin va yunon asosli terminlar lug'atlari, elektron o'quv platformalari (masalan, masofaviy ta'lim tizimlari), multimedia dasturlari, shuningdek, tibbiy ta'limda raqamli texnologiyalarni qo'llashga oid ilmiy maqolalar tanlab olindi. Ushbu materiallar asosida klinik terminlarni o'rganishda multimedia texnologiyalarining roli, ularning kognitiv jarayonlarga ta'siri hamda o'quv samaradorligini oshirishdagi imkoniyatlari chuqur tahlil qilindi.

Shuningdek, tadqiqot davomida multimedia vositalarining talabalar xotirasi, diqqatni jamlash darajasi va mustaqil o'rganish ko'nikmalariga ta'siri ham baholandi. Bu esa multimedia texnologiyalarining nafaqat nazariy, balki amaliy jihatdan ham samarali pedagogik vosita ekanligini asoslashga imkon berdi.

Natijalar:

O'tkazilgan tadqiqot natijalari klinik terminologiyani o'qitishda multimedia texnologiyalarining samarali pedagogik vosita ekanligini ko'rsatdi. Tahlillar multimedia vositalari orqali o'qitish an'anaviy metodlarga nisbatan bir qator ustunliklarga ega ekanligini aniqladi. Ushbu afzalliklar quyidagi yo'nalishlarda namoyon bo'ldi:

1. Vizualizatsiya orqali tushunishni osonlashtirish

Multimedia texnologiyalari yordamida klinik terminlar turli vizual vositalar — diagrammalar, grafik tasvirlar, animatsiyalar va 3D modellar orqali tushuntiriladi. Bu esa murakkab anatomik va fiziologik jarayonlarni ko'z bilan ko'rish imkonini yaratadi. Natijada talabalar terminlarning mazmunini yaxshiroq anglab, ularni amaliy kontekstda tasavvur qila oladilar. Vizualizatsiya ayniqsa abstrakt tushunchalarni konkretlashtirishda muhim ahamiyat kasb etadi.

2. Axborotni tez va samarali o'zlashtirish

Audio va video materiallardan foydalanish o'quv materialini tezroq qabul qilishga yordam beradi. Tadqiqot natijalari shuni ko'rsatdiki, multimodal (ko'rish va eshitish) taqdimot orqali berilgan ma'lumotlar an'anaviy matnli materiallarga nisbatan tezroq o'zlashtiriladi. Bu esa vaqtni tejashga va o'quv jarayonining intensivligini oshirishga xizmat qiladi.

3. Uzoq muddatli xotirani mustahkamlash

Multimedia vositalari orqali olingan bilimlar uzoq muddatli xotirada mustahkam saqlanadi. Vizual obrazlar, ovozli tushuntirishlar va interfaol elementlar o'rtasidagi bog'lanishlar axborotni eslab qolishni osonlashtiradi. Tadqiqot davomida aniqlanishicha, multimedia asosida o'rganilgan terminlar talabalar tomonidan uzoq vaqt o'tgandan keyin ham aniq eslab qolingan.

4. Interfaollik va faollikni oshirish

Multimedia texnologiyalari o'quv jarayonini interfaol shaklga keltiradi. Talabalar virtual testlar, interaktiv mashqlar, simulyatsiyalar va elektron platformalar orqali faol ishtirok etadilar. Bu esa ularning darsga jalb etilish darajasini oshiradi va bilimlarni mustaqil ravishda mustahkamlash imkonini beradi. Interfaollik talabalarni passiv tinglovchidan faol ishtirokchiga aylantiradi.

5. O'quv motivatsiyasini oshirish

Multimedia asosidagi darslar o'zining qiziqarli va dinamikligi bilan talabalar e'tiborini jalb qiladi. Rang-barang vizual materiallar, animatsiyalar va video kontent o'quv jarayonini jonlantiradi. Bu esa talabalar motivatsiyasining oshishiga, ularning o'qishga bo'lgan qiziqishining kuchayishiga olib keladi.

6. Individual o'rganish imkoniyatlarini kengaytirish

Multimedia vositalari yordamida talabalar o'z tezligida o'rganish imkoniyatiga ega bo'ladi. Elektron resurslar va platformalar orqali materiallarni qayta ko'rib chiqish, mustaqil ishlash va bilimlarni mustahkamlash mumkin. Bu esa individual ta'limni rivojlantirishga xizmat qiladi.

Umuman olganda, olingan natijalar multimedia texnologiyalari klinik terminologiyani o'qitishda samarali, innovatsion va istiqbolli pedagogik vosita ekanligini tasdiqlaydi. Ular o'quv jarayonini yanada samarali tashkil etishga va talabalarning bilimni chuqurroq o'zlashtirishiga imkon yaratadi.

Muhokama:

Klinik terminologiyani o'qitishda multimedia texnologiyalarining qo'llanilishi zamonaviy ta'lim tizimining muhim yo'nalishlaridan biri hisoblanadi. Tibbiy terminlarning murakkabligi va ko'p komponentli tuzilishi talabalar uchun ularni an'anaviy usullar orqali o'zlashtirishni qiyinlashtiradi. Shu sababli multimedia vositalari yordamida o'qitish ushbu muammoni hal etishda samarali yechim sifatida namoyon bo'lmoqda.

Multimedia texnologiyalarining asosiy ustunligi — axborotni ko'p kanalli tarzda yetkazish imkoniyatidir. Ya'ni, talaba bir vaqtning o'zida ko'rish, eshitish va interfaol faoliyat orqali bilimni qabul qiladi. Bu esa kognitiv jarayonlarni faollashtirib, ma'lumotni chuqurroq o'zlashtirishga yordam beradi. Masalan,

anatomik terminlarni 3D modellarda ko'rsatish yoki klinik jarayonlarni video orqali tushuntirish terminlarning mazmunini yaxshiroq anglash imkonini beradi.

Shuningdek, multimedia vositalari individual o'rganish imkoniyatlarini kengaytiradi. Talabalar o'z tezligida o'rganishi, materiallarni qayta ko'rib chiqishi va mustaqil ravishda bilimni mustahkamlashi mumkin. Bu esa differensial ta'limni tashkil etishda muhim ahamiyat kasb etadi.

Biroq multimedia texnologiyalarini qo'llashda ayrim cheklovlar ham mavjud. Texnik vositalarning yetishmasligi, internet resurslariga bog'liqlik yoki o'qituvchilarning raqamli kompetensiyasi past bo'lishi ta'lim jarayoniga salbiy ta'sir ko'rsatishi mumkin. Shu sababli multimedia vositalaridan samarali foydalanish uchun o'qituvchilarning malakasini oshirish va texnik bazani mustahkamlash zarur.

Shu bilan birga, multimedia texnologiyalarini an'anaviy o'qitish metodlari bilan uyg'unlashtirish muhimdir. Faqat texnologiyaga tayanish emas, balki lingvistik tahlil, klinik misollar va amaliy mashg'ulotlar bilan integratsiya qilish yuqori natija beradi.

Umuman olganda, multimedia texnologiyalari klinik terminologiyani o'qitishda samarali pedagogik vosita bo'lib, u ta'lim sifatini sezilarli darajada oshiradi.

Xulosa:

O'tkazilgan tadqiqot natijalari shuni ko'rsatadiki, multimedia texnologiyalari klinik terminologiyani o'qitishda samarali va zamonaviy pedagogik vosita sifatida alohida ahamiyat kasb etadi. Ushbu texnologiyalar murakkab tibbiy terminlarni tushuntirishni yengillashtirib, ularni vizual, audial va interfaol shaklda o'zlashtirish imkonini yaratadi. Natijada bilimlar nafaqat tezroq egallanadi, balki chuqurroq anglanadi va uzoq muddatli xotirada mustahkam saqlanadi.

Multimedia vositalari yordamida tashkil etilgan o'quv jarayoni talabalarni faol ishtirok etishga undaydi, ularning diqqatini jalb qiladi va o'qishga bo'lgan qiziqishini oshiradi. Bu esa o'quv motivatsiyasining ortishiga, mustaqil ta'lim ko'nikmalarining shakllanishiga hamda klinik terminologiyani amaliy jihatdan to'g'ri qo'llash imkoniyatining kengayishiga olib keladi. Ayniqsa, interfaol mashg'ulotlar, virtual simulyatsiyalar va multimedia kontentlardan foydalanish talabalar bilimni mustahkamlashda yuqori samaradorlikni ta'minlaydi.

Shu bilan birga, multimedia texnologiyalarini samarali qo'llash ularni an'anaviy o'qitish metodlari bilan uyg'unlashtirishni talab etadi. Lingvistik tahlil, klinik misollar va amaliy mashg'ulotlar bilan birgalikda qo'llanilganda multimedia vositalari yanada yuqori natijalarni beradi. Bu esa tibbiy ta'limda kompleks va integratsiyalashgan yondashuvni shakllantirishga imkon yaratadi.

Bundan tashqari, multimedia texnologiyalarini keng joriy etish uchun ta'lim muassasalarining texnik bazasini mustahkamlash, zamonaviy raqamli resurslardan samarali foydalanish hamda o'qituvchilarning axborot-kommunikatsiya texnologiyalari bo'yicha malakasini oshirish muhim ahamiyatga ega.

Umuman olganda, multimedia texnologiyalarini tibbiy ta'lim jarayoniga keng joriy etish klinik terminologiyani o'rganish samaradorligini oshirish, bo'lajak tibbiyot mutaxassislarining kasbiy kompetensiyasini rivojlantirish va ilmiy muloqot sifatini yaxshilashga xizmat qiladi. Shu sababli ushbu texnologiyalardan foydalanish zamonaviy tibbiy ta'limning ustuvor yo'nalishlaridan biri sifatida qaralishi lozim.

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KLINIK TERMINOLOGIYANI SAMARALI O'RGANISHDA MNEMONIK USULLARNING O'RNI

Annotatsiya: *Klinik terminologiyani o'zlashtirish tibbiy ta'lim jarayonining muhim bosqichlaridan biri hisoblanadi. Ushbu maqolada klinik terminlarni o'rganishda mnemonik usullarning samaradorligi, ularning lingvistik va pedagogik asoslari hamda amaliy qo'llanilishi tahlil qilinadi. Tadqiqot natijalari shuni ko'rsatadiki, mnemonik metodlar talabalar xotirasini faollashtirib, murakkab terminlarni tez va samarali o'zlashtirishga yordam beradi. Ushbu usullar tibbiy terminologiyani o'rganishda bilimlarning mustahkamlanishiga va uzoq muddatli eslab qolinishiga xizmat qiladi.*

Kalit so'zlar: *klinik terminologiya, mnemonika, tibbiy ta'lim, xotira, pedagogik metodlar, o'qitish samaradorligi.*

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THE ROLE OF MNEMONIC METHODS IN EFFECTIVE LEARNING OF CLINICAL TERMINOLOGY

Abstract: *Mastering clinical terminology is one of the essential stages in medical education. This article analyzes the effectiveness of mnemonic methods in learning clinical terms, their linguistic and pedagogical foundations, as well as their practical application. The results of the study show that mnemonic methods activate students' memory and help them quickly and effectively master complex terms. These methods contribute to the consolidation of knowledge and its long-term retention in the study of medical terminology.*

Keywords: *clinical terminology, mnemonics, medical education, memory, pedagogical methods, learning effectiveness.*

Kirish

Klinik terminologiya tibbiyot fanining ajralmas tarkibiy qismi bo'lib, u shifokorlar, farmatsevtlar va boshqa tibbiyot mutaxassislari o'rtasida aniq, izchil va samarali ilmiy hamda amaliy muloqotni ta'minlaydi. Tibbiy terminlar nafaqat kasalliklar, anatomik tuzilmalar va fiziologik jarayonlarni ifodalash, balki diagnostika, davolash va ilmiy tadqiqotlarda ham muhim kommunikativ vosita

sifatida xizmat qiladi. Shu sababli tibbiy terminologiyani puxta o'zlashtirish bo'lajak mutaxassislarning kasbiy tayyorgarligida muhim bosqich hisoblanadi.

Biroq tibbiy terminlarning murakkabligi, ularning ko'p qirrali lingvistik tuzilishga ega ekanligi, lotin va yunon tillaridan kelib chiqqanligi hamda terminlar sonining nihoyatda ko'pligi talabalar uchun ularni o'zlashtirish jarayonini murakkablashtiradi. Ko'plab terminlar prefiks, suffiks va ildizlardan tashkil topgan bo'lib, ularning semantik va morfologik tahlilini tushunmasdan turib samarali o'zlashtirish qiyin kechadi. Natijada talabalar ko'pincha terminlarni mexanik yodlashga majbur bo'ladilar, bu esa bilimlarning mustahkam emasligiga olib keladi.

Zamonaviy ta'lim tizimida bunday muammolarni hal etish uchun innovatsion pedagogik yondashuvlardan foydalanish zarur hisoblanadi. So'nggi yillarda o'qitish jarayonida interfaol metodlar, axborot-kommunikatsiya texnologiyalari va kognitiv yondashuvlar keng qo'llanilmoqda. Shular qatorida mnemonik usullar alohida ahamiyat kasb etadi. Mnemonika – bu axborotni eslab qolishni osonlashtiruvchi, uni tizimli va mantiqiy bog'lanishlar orqali mustahkamlovchi metodlar majmuasidir.

Mnemonik usullar yordamida murakkab klinik terminlar oddiy assotsiatsiyalar, obrazlar, qisqartmalar yoki mantiqiy bog'lanishlar orqali eslab qolinadi. Bu esa nafaqat terminlarni tezroq o'zlashtirishga, balki ularning ma'nosini chuqurroq anglashga ham yordam beradi. Ayniqsa, tibbiy terminologiya kabi katta hajmdagi axborotni o'zlashtirish zarur bo'lgan ta'lim yo'nalishlarida mnemonik metodlar samarali vosita sifatida namoyon bo'ladi.

Shu nuqtai nazardan, klinik terminologiyani o'rganishda mnemonik usullarning o'rni va samaradorligini ilmiy jihatdan tahlil qilish muhim ahamiyat kasb etadi. Ushbu tadqiqotning asosiy maqsadi – mnemonik metodlarning tibbiy terminlarni o'zlashtirishdagi pedagogik va amaliy imkoniyatlarini aniqlash, ularning o'quv jarayonidagi samaradorligini baholash hamda klinik terminologiyani o'qitishda qo'llash istiqbollari asoslab berishdan iborat.

Materiallar va metodlar:

Mazkur tadqiqotda klinik terminologiyani o'rganishda mnemonik usullarning samaradorligini aniqlash maqsadida tibbiy lingvistika, pedagogika va kognitiv psixologiya sohalariga oid ilmiy manbalar kompleks tarzda tahlil qilindi. Tadqiqot jarayonida mahalliy va xorijiy mualliflar tomonidan yaratilgan darsliklar, o'quv qo'llanmalar, ilmiy maqolalar hamda metodik tavsiyalar asosiy nazariy manba sifatida tanlab olindi. Ushbu manbalar klinik terminologiyaning lingvistik xususiyatlari, uni o'qitish metodikasi va mnemonik texnikalarning nazariy asoslarini o'rganishga xizmat qildi.

Tadqiqotni amalga oshirishda bir qator ilmiy-uslubiy metodlardan foydalanildi. Ilmiy adabiyotlarni tahlil qilish metodi orqali mavzuga oid mavjud nazariy qarashlar, yondashuvlar va ilmiy konsepsiyalar tizimli ravishda o'rganilib, umumlashtirildi. Pedagogik kuzatish metodi yordamida tibbiy terminologiyani o'qitish jarayonida mnemonik usullarning qo'llanilishi va ularning talabalar bilimini o'zlashtirishga ta'siri tahlil qilindi.

Qiyosiy tahlil metodi orqali an'anaviy o'qitish usullari bilan mnemonik yondashuvlarning samaradorligi o'zaro solishtirildi. Bu esa turli metodlarning afzallik va kamchiliklarini aniqlash, shuningdek, o'quv jarayonida qaysi yondashuv samaraliroq ekanligini baholash imkonini berdi. Tavsifiy metod yordamida esa mnemonik usullarning qo'llanilish shakllari, ularning turlari va o'quv jarayonidagi amaliy ahamiyati batafsil izohlandi.

Material sifatida tibbiy terminologiya bo'yicha darsliklar, lotin va yunon asosli terminlar lug'atlari, pedagogik texnologiyalar va innovatsion o'qitish metodlariga oid ilmiy manbalar, shuningdek, mnemonik texnikalar bo'yicha ilmiy maqolalar tanlab olindi. Ushbu materiallar asosida klinik terminlarni o'zlashtirish jarayonida mnemonik usullarning roli, ularning kognitiv mexanizmlarga ta'siri hamda o'quv samaradorligini oshirishdagi o'rni chuqur tahlil qilindi.

Shuningdek, tadqiqot davomida mnemonik usullarning talabalarning xotira faoliyati, diqqatni jamlash darajasi va mustaqil fikrlash ko'nikmalariga ta'siri ham ko'rib chiqildi. Bu esa ushbu metodlarning nafaqat nazariy, balki amaliy jihatdan ham samarali ekanligini asoslashga imkon berdi.

Natijalar:

O'tkazilgan tadqiqot natijalari klinik terminologiyani o'rganishda mnemonik usullarning yuqori samaradorligini ko'rsatdi. Tahlillar asosida ushbu metodlarning bir qator muhim afzalliklari aniqlandi:

1. Xotirani faollashtirish

Mnemonik usullar yordamida murakkab va ko'p komponentli klinik terminlar oddiy assotsiatsiyalar, obrazlar yoki mantiqiy bog'lanishlar orqali oson eslab qolinadi. Ayniqsa, vizual va semantik assotsiatsiyalarga asoslangan mnemonik texnikalar talabalar xotirasini faol holatga keltirib, ma'lumotni tezroq qabul qilish va qayta tiklash imkonini beradi. Natijada, terminlarni yodlash jarayoni mexanik emas, balki ongli va mazmunli tarzda amalga oshadi.

2. Terminlarni tez o'zlashtirish

Tadqiqot natijalari shuni ko'rsatdiki, mnemonik yondashuvlar qo'llanilganda talabalar yangi terminlarni an'anaviy usullarga nisbatan tezroq o'zlashtira boshlaydilar. Bunda terminlarning tarkibiy qismlarini (prefiks, ildiz, suffiks) assotsiativ tarzda tushuntirish ularni qisqa vaqt ichida anglash va eslab qolishni osonlashtiradi. Bu esa o'quv jarayonining samaradorligini oshiradi va vaqtni tejashga yordam beradi.

3. Uzoq muddatli xotirani shakllantirish

Mnemonik metodlarning eng muhim afzalliklaridan biri — bilimlarning uzoq muddatli xotirada saqlanishini ta'minlashidir. Assotsiativ bog'lanishlar orqali o'zlashtirilgan terminlar oddiy yodlangan ma'lumotlarga qaraganda ancha mustahkam esda qoladi. Tadqiqot davomida aniqlanishicha, mnemonik usullar orqali o'rganilgan terminlar uzoq vaqt o'tgandan keyin ham talabalar tomonidan aniq eslab qolingan.

4. O'quv motivatsiyasini oshirish

Mnemonik usullar o'quv jarayonini qiziqarli va interfaol holga keltiradi. Turli obrazli ifodalar, qisqartmalar, hikoya va analogiyalardan foydalanish

talabalar faolligini oshiradi, ularning darsga bo'lgan qiziqishini kuchaytiradi. Bu esa o'quv motivatsiyasining ortishiga va bilimlarni faol o'zlashtirishga olib keladi.

5. Terminlarning mazmunini chuqur anglash

Tahlillar shuni ko'rsatdiki, mnemonik usullar faqat yodlashga emas, balki terminlarning semantik mazmunini tushunishga ham yordam beradi. Talabalar terminlarni tarkibiy qismlariga ajratib, ularning ma'nosini anglash orqali klinik tushunchalarni yaxshiroq o'zlashtiradilar. Bu esa kelajakdagi klinik faoliyatda terminlardan to'g'ri foydalanish imkonini oshiradi.

6. Kognitiv faoliyatni rivojlantirish

Mnemonik metodlar talabalar fikrlash faoliyatini faollashtirib, mantiqiy va assotsiativ tafakkurni rivojlantiradi. Bu esa nafaqat terminologiyani o'rganishda, balki umumiy kasbiy tayyorgarlikda ham muhim ahamiyat kasb etadi.

Muhokama:

Klinik terminologiyani o'rganishda mnemonik usullarni qo'llash zamonaviy pedagogik yondashuvlar orasida samarali vositalardan biri sifatida qaraladi. Tibbiy terminlarning murakkab tuzilishi, ko'pincha lotin va yunon ildizlariga asoslanganligi hamda ularning ko'pligi talabalar uchun muayyan qiyinchiliklar tug'diradi. Shu nuqtai nazardan mnemonik metodlar axborotni soddalashtirish va tizimlashtirish orqali bilimlarni samarali o'zlashtirishga yordam beradi.

Mnemonik usullar asosida assotsiativ fikrlash yotadi. Talabalar murakkab terminlarni ma'lum obrazlar, qisqartmalar yoki hikoyalar bilan bog'lash orqali ularni tezroq eslab qoladilar. Masalan, anatomiya yoki farmakologiyaga oid terminlar ma'lum vizual tasvirlar yoki analogiyalar orqali tushuntirilganda, ularning mazmuni yaxshiroq anglanadi. Bu esa faqat yodlash emas, balki tushunishga asoslangan bilimlarni shakllantiradi.

Shuningdek, mnemonik metodlar kognitiv jarayonlarga ijobiy ta'sir ko'rsatadi. Ular diqqatni jamlash, axborotni qayta ishlash va uzoq muddatli xotirada saqlash jarayonlarini faollashtiradi. Bu esa tibbiy ta'limda muhim ahamiyatga ega, chunki klinik terminlarni nafaqat eslab qolish, balki ularni amaliyotda to'g'ri qo'llash zarur.

Biroq mnemonik usullarni qo'llashda ayrim cheklovlar ham mavjud. Agar terminlar faqat assotsiatsiya orqali yodlansa, ularning chuqur ilmiy mazmuni yetarlicha anglanmasligi mumkin. Shu sababli mnemonik metodlarni boshqa o'qitish usullari bilan uyg'unlashtirish muhim hisoblanadi. Eng samarali natijaga erishish uchun mnemonik yondashuvlar lingvistik tahlil, klinik misollar va amaliy mashg'ulotlar bilan birgalikda qo'llanilishi lozim.

Zamonaviy axborot texnologiyalari mnemonik usullarning imkoniyatlarini yanada kengaytirmoqda. Multimedia vositalari, mobil ilovalar va interaktiv platformalar orqali terminlarni vizual va eshitish asosida o'rganish imkoniyati yaratilmoqda. Bu esa o'quv jarayonining samaradorligini oshiradi va talabalar uchun yanada qulay muhit yaratadi.

Umuman olganda, mnemonik usullar klinik terminologiyani o'rganishda samarali pedagogik vosita bo'lib, u bilimlarni tez va mustahkam o'zlashtirishga

yordam beradi. Shu bilan birga, ushbu metodlarni to'g'ri va maqsadga muvofiq qo'llash tibbiy ta'lim sifatini oshirishda muhim ahamiyat kasb etadi.

Xulosa

O'tkazilgan tadqiqot natijalari shuni ko'rsatadiki, mnemonik usullar klinik terminologiyani samarali o'rganishda muhim pedagogik vosita sifatida namoyon bo'ladi. Ushbu metodlar murakkab va ko'p komponentli tibbiy terminlarni o'zlashtirish jarayonini sezilarli darajada yengillashtirib, ularni ongli ravishda tushunish va eslab qolishga yordam beradi. Ayniqsa, assotsiativ fikrlash, vizual obrazlar va mantiqiy bog'lanishlarga asoslangan mnemonik yondashuvlar bilimlarni tez o'zlashtirish va uzoq muddatli xotirada mustahkamlashda yuqori samaradorlikni ta'minlaydi.

Shuningdek, mnemonik usullar o'quv jarayonining faolligini oshirib, talabalarni mustaqil fikrlashga, tahlil qilishga va terminlarning ichki tuzilishini anglashga undaydi. Bu esa nafaqat terminlarni yodlash, balki ularning semantik va klinik mazmunini chuqur tushunishga imkon yaratadi. Natijada talabalar klinik terminologiyadan amaliy faoliyatda to'g'ri va samarali foydalanish ko'nikmalariga ega bo'ladilar.

Bundan tashqari, mnemonik metodlar o'quv motivatsiyasini oshirishda ham muhim rol o'ynaydi. Interfaol va ijodiy yondashuvlar orqali tashkil etilgan darslar talabalar uchun qiziqarli bo'lib, ularning bilim olishga bo'lgan qiziqishini kuchaytiradi. Bu esa o'z navbatida ta'lim jarayonining umumiy samaradorligini oshirishga xizmat qiladi.

Shu bilan birga, mnemonik usullarni qo'llashda ularni boshqa o'qitish metodlari bilan uyg'unlashtirish muhim ahamiyatga ega. Lingvistik tahlil, klinik misollar va amaliy mashg'ulotlar bilan birgalikda qo'llanilganda mnemonik yondashuvlar yanada yuqori natijalarni beradi. Bu esa tibbiy ta'limda kompleks va samarali o'qitish modelini shakllantirish imkonini yaratadi.

Umuman olganda, mnemonik usullar klinik terminologiyani o'rganishda samarali, zamonaviy va istiqbolli pedagogik vosita bo'lib, ularni tibbiy ta'lim tizimida keng joriy etish maqsadga muvofiqdir. Ushbu metodlarning qo'llanilishi bo'lajak tibbiyot mutaxassislarining kasbiy kompetensiyasini oshirishga, ilmiy tafakkurini rivojlantirishga va klinik faoliyatda aniqlikni ta'minlashga xizmat qiladi.

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PANDEMIYA SHAROITIDA YANGI TIBBIY TERMINLARNING SHAKLLANISHI VA LINGVISTIK TAHLILI

Annotatsiya: Pandemiya sharoitida, xususan COVID-19 davrida tibbiy terminologiya tizimi sezilarli darajada boyidi va yangilandi. Ushbu maqolada pandemiya davrida shakllangan yangi tibbiy terminlarning kelib chiqishi, lingvistik xususiyatlari hamda ularning ilmiy va amaliy ahamiyati tahlil qilinadi. Tadqiqot natijalari shuni ko'rsatadiki, yangi terminlar asosan lotin, yunon va ingliz tillari asosida shakllanib, qisqartmalar, neologizmlar va semantik kengayishlar orqali yuzaga kelgan. Ushbu terminlar global tibbiy muloqotda muhim o'rin egallab, diagnostika va epidemiologik nazorat jarayonida muhim vosita sifatida xizmat qiladi.

Kalit so'zlar: pandemiya, COVID-19, tibbiy terminologiya, neologizm, lingvistik tahlil, global sog'liqni saqlash.

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FORMATION OF NEW MEDICAL TERMS DURING THE PANDEMIC AND THEIR LINGUISTIC ANALYSIS

Abstract: *During the pandemic, particularly in the period of COVID-19, the system of medical terminology has been significantly enriched and updated. This article analyzes the origin of new medical terms formed during the pandemic, their linguistic features, as well as their scientific and practical significance. The results of the study show that new terms are mainly formed based on Latin, Greek, and English languages and emerge through abbreviations, neologisms, and semantic expansion. These terms occupy an important place in global medical communication and serve as essential tools in diagnostics and epidemiological control.*

Keywords: *pandemic, COVID-19, medical terminology, neologism, linguistic analysis, global health.*

Kirish

Pandemiyalar insoniyat tarixida katta ijtimoiy, iqtisodiy va ilmiy o'zgarishlarga sabab bo'lib kelgan murakkab global hodisalardan biridir. Ular nafaqat aholi salomatligiga, balki davlatlar iqtisodiyoti, ijtimoiy hayoti va ilmiy taraqqiyotiga ham sezilarli ta'sir ko'rsatadi. Tarixiy manbalarda qayd etilgan yirik pandemiyalar, jumladan, o'lat, ispan grippi va boshqa yuqumli kasalliklar

insoniyat taraqqiyotiga katta ta'sir ko'rsatgan. Zamonaviy davrda esa COVID-19 pandemiyasi global miqyosda keng tarqalib, sog'liqni saqlash tizimi faoliyatini tubdan o'zgartirdi va tibbiyot fanining yangi yo'nalishlarda rivojlanishiga turtki berdi.

COVID-19 pandemiyasi nafaqat yangi kasallikni o'rganish, balki uni ifodalovchi terminologik tizimning ham jadal rivojlanishiga olib keldi. Qisqa vaqt ichida yangi tibbiy tushunchalar, atamalar va qisqartmalar paydo bo'lib, ular ilmiy va amaliy tibbiyotda keng qo'llanila boshladi. Ushbu jarayon tibbiy terminologiyaning dinamik va moslashuvchan tizim ekanligini yaqqol namoyon etdi. Yangi terminlar asosan ingliz tili asosida shakllanib, global ilmiy muloqot vositasiga aylandi hamda boshqa tillarga tez sur'atda kirib bordi.

Pandemiya davrida yuzaga kelgan terminlar ko'pincha tezkor ravishda shakllanib, qisqa muddat ichida xalqaro miqyosda standartlashdi. Bunday terminlar nafaqat ilmiy maqolalarda, balki ommaviy axborot vositalari, rasmiy hujjatlar va kundalik nutqda ham keng qo'llanila boshladi. Bu esa tibbiy terminologiyaning nafaqat ilmiy, balki ijtimoiy kommunikatsiyadagi ahamiyatini ham oshirdi. Shu bilan birga, yangi terminlarning tez tarqalishi ayrim hollarda ularning noto'g'ri talqin qilinishi yoki turlicha tushunilishiga ham sabab bo'lishi mumkin.

Zamonaviy tibbiyotda terminlarning aniq va standartlashtirilgan shaklda qo'llanilishi alohida ahamiyat kasb etadi. Chunki terminologik aniqlik diagnostika jarayonining samaradorligini oshiradi, ilmiy muloqotni yengillashtiradi hamda epidemiologik monitoring va statistik ma'lumotlarni to'g'ri yuritish imkonini beradi. Xalqaro tashkilotlar, xususan, Jahon sog'liqni saqlash tashkiloti (WHO) tomonidan ishlab chiqilgan terminologik standartlar bu jarayonda muhim rol o'ynaydi.

Shu sababli pandemiya sharoitida yangi tibbiy terminlarning shakllanishi, ularning lingvistik xususiyatlari va qo'llanilish mexanizmlarini o'rganish nafaqat nazariy, balki amaliy jihatdan ham dolzarb masala hisoblanadi. Bu esa zamonaviy tibbiyot va lingvistika kesishgan nuqtada muhim ilmiy yo'nalish sifatida qaraladi.

Materiallar va metodlar

Mazkur tadqiqot davomida pandemiya davrida shakllangan tibbiy terminologiyani o'rganishga qaratilgan ilmiy manbalar kompleks ravishda tahlil qilindi. Xususan, COVID-19 pandemiyasi bilan bog'liq bo'lgan terminologik birliklar, Jahon sog'liqni saqlash tashkiloti (WHO) tomonidan e'lon qilingan rasmiy hisobotlar, zamonaviy tibbiy lug'atlar, ilmiy maqolalar hamda epidemiologik ma'lumotlar asosiy manba sifatida tanlab olindi. Ushbu manbalar pandemiya davrida yuzaga kelgan terminlarning shakllanishi, qo'llanilishi va lingvistik xususiyatlarini o'rganishda muhim ilmiy asos bo'lib xizmat qildi.

Tadqiqotni amalga oshirishda bir qator ilmiy-uslubiy metodlardan foydalanildi. Ilmiy adabiyotlarni tahlil qilish metodi yordamida mavjud nazariy qarashlar, terminologik yondashuvlar va ilmiy konsepsiyalar umumlashtirildi hamda pandemiya davrida terminologiyaning rivojlanish tendensiyalari aniqlashtirildi. Lingvistik tahlil doirasida esa semantik va morfologik

yondashuvlar qoʻllanildi. Semantik tahlil orqali terminlarning maʼno oʻzgarishlari, ularning kontekstual qoʻllanilishi va kommunikativ funksiyalari oʻrganildi. Morfologik tahlil yordamida esa terminlarning tuzilishi, yaʼni prefiks, suffiks va ildiz elementlari asosida shakllanish xususiyatlari tahlil qilindi.

Qiyosiy metod yordamida pandemiyadan oldingi va pandemiya davridagi terminologik birliklar oʻzaro solishtirilib, ularning oʻxshash va farqli jihatlari aniqlab berildi. Bu esa yangi terminlarning paydo boʻlish sabablari va rivojlanish tendensiyalarini tushunishga imkon berdi. Tavsifiy metod esa terminlarning qoʻllanish doirasi, ularning ilmiy va amaliy tibbiyotdagi oʻrni hamda kommunikativ ahamiyatini izohlashda qoʻllanildi.

Tadqiqot materiali sifatida COVID-19 pandemiyasi bilan bogʻliq terminlar majmuasi, ilmiy jurnallarda chop etilgan maqolalar, rasmiy sogʻliqni saqlash tashkilotlari tomonidan eʼlon qilingan hujjatlar hamda xalqaro terminologik manbalar tanlab olindi. Ushbu materiallar asosida terminlarning shakllanish mexanizmlari, ularning lingvistik xususiyatlari va global miqyosda qoʻllanilish jarayoni chuqur tahlil qilindi.

Shuningdek, tadqiqot davomida pandemiya terminologiyasining zamonaviy holati, uning xalqaro standartlarga mosligi va amaliy tibbiyotdagi ahamiyati ham inobatga olindi. Bu esa tadqiqot natijalarining ilmiy asoslanganligi va amaliy qiymatini yanada oshirishga xizmat qildi.

Natijalar

Oʻtkazilgan tadqiqot natijalari pandemiya davrida shakllangan tibbiy terminologiya tizimi sezilarli darajada boyiganini va yangi lingvistik birliklar bilan toʻldirilganini koʻrsatdi. Tahlil natijasida pandemiya davrida paydo boʻlgan terminlar bir necha asosiy guruhlariga ajratildi hamda ularning shakllanish xususiyatlari aniqlashtirildi.

1. Neologizmlar (yangi terminlar)

Pandemiya davrida mutlaqo yangi tushunchalarni ifodalash zarurati natijasida yangi terminlar — neologizmlar paydo boʻldi. Ushbu terminlar kasallikning oʻziga xos xususiyatlari, epidemiologik holati yoki ijtimoiy jarayonlarni ifodalash uchun yaratilgan. Masalan:

COVID-19 — yangi koronavirus infeksiyasiga berilgan rasmiy nom boʻlib, kasallikni aniq va qisqa ifodalashga xizmat qiladi;

lockdown — karantin choralarining qatʼiy shaklini ifodalovchi termin;

infodemic — pandemiya bilan birga notoʻgʻri yoki ortiqcha axborotlarning tez tarqalishini bildiradi.

Bunday neologizmlar pandemiya sharoitida yangi ijtimoiy va tibbiy reallikni aks ettiradi hamda terminologik tizimning moslashuvchanligini namoyon qiladi.

2. Qisqartmalar (abbreviations)

Tadqiqot natijalari shuni koʻrsatdiki, pandemiya davrida qisqartmalar keng qoʻllanilgan boʻlib, ular murakkab ilmiy tushunchalarni ixcham va tez ifodalash imkonini beradi. Masalan:

SARS-CoV-2 — kasallikni qoʻzgʻatuvchi virusning ilmiy nomi;

PPE (Personal Protective Equipment) — shaxsiy himoya vositalari majmuasi.

Qisqartmalar ilmiy va klinik muloqotni yengillashtiradi, biroq ularning haddan tashqari ko'pligi ayrim hollarda tushunmovchiliklarga ham olib kelishi mumkin.

3. Semantik kengayish (semantic extension)

Pandemiya davrida mavjud terminlar yangi kontekstda qo'llanilib, ularning ma'nosi kengaygani kuzatildi. Masalan:

quarantine — ilgari faqat yuqumli kasallik bilan bog'liq shaxslarni ajratishni bildirgan bo'lsa, pandemiya davrida keng ijtimoiy cheklov choralari ham ifodalay boshladi;

isolation — individual darajadagi ajratishdan tashqari, jamoaviy epidemiologik choralarni ham anglatadigan bo'ldi.

Bu holat terminologiyani moslashuvchanligini ko'rsatadi hamda yangi sharoitga tez moslashishini tasdiqlaydi.

4. Ingliz tilining ustunligi

Tadqiqot shuni ko'rsatdiki, pandemiya davrida ingliz tili global ilmiy til sifatida ustun mavqega ega bo'ldi. Ko'plab yangi terminlar aynan ingliz tilida shakllanib, boshqa tillarga to'g'ridan-to'g'ri o'zlashtirildi yoki minimal o'zgarish bilan qabul qilindi. Bu holat xalqaro ilmiy muloqotni yengillashtirdi, biroq ayrim hollarda milliy tillarda terminologik moslashuv muammolarini keltirib chiqardi.

Umuman olganda, olingan natijalar pandemiya davrida tibbiy terminologiya tizimi jadal rivojlanganini, yangi terminlar, qisqartmalar va semantik o'zgarishlar orqali boyiganini ko'rsatadi. Bu jarayon terminologiyani dinamik va moslashuvchan tizim ekanligini yana bir bor tasdiqlaydi hamda uning zamonaviy tibbiyotdagi ahamiyatini yanada oshiradi.

Muhokama

Pandemiya sharoitida tibbiy terminologiyani shakllanishi va rivojlanishi zamonaviy ilm-fan va global kommunikatsiya jarayonlari bilan chambarchas bog'liq bo'lib, u tilshunoslik va tibbiyot kesishgan muhim ilmiy yo'nalishlardan biri hisoblanadi. COVID-19 pandemiyasi bu jarayonni keskin tezlashtirib, terminologik tizimning dinamik xususiyatlarini yaqqol namoyon etdi.

Yangi terminlarning shakllanishida birinchi navbatda neologizmlar muhim rol o'ynadi. Pandemiya bilan bog'liq yangi tushunchalarni ifodalash zarurati natijasida mutlaqo yangi terminlar paydo bo'ldi. Masalan, "COVID-19" termini kasallik nomini qisqa va aniq ifodalash uchun yaratilgan bo'lsa, "infodemic" termini esa noto'g'ri axborotlarning tez tarqalishini ifodalovchi yangi lingvistik birlik sifatida shakllandi. Bu holat terminologiyani ijtimoiy va axborot omillari bilan ham bog'liqligini ko'rsatadi.

Shuningdek, qisqartmalar pandemiya davrida keng qo'llanildi. Ular murakkab ilmiy tushunchalarni ixcham va tez ifodalash imkonini berdi. Masalan, SARS-CoV-2 virusi nomining qisqartirilgan shakli bo'lib, ilmiy muloqotda keng qo'llaniladi. Biroq qisqartmalar haddan tashqari ko'payib ketishi ayrim hollarda tushunmovchiliklarga olib kelishi mumkin.

Semantik o'zgarishlar ham pandemiya davrida muhim o'rin tutdi. Oldindan mavjud bo'lgan "karantin" va "izolyatsiya" kabi terminlar yangi kontekstda kengroq ma'noda qo'llanila boshladi. Bu esa terminologiyani moslashuvchanligini ko'rsatadi.

Pandemiya davrida ingliz tilining global ilmiy til sifatidagi ustunligi yanada kuchaydi. Ko'plab terminlar ingliz tilida shakllanib, boshqa tillarga tarjima qilinmasdan qo'llanila boshlandi. Bu holat xalqaro muloqotni yengillashtirsa-da, ayrim tillarda terminologik muvofiqlik muammolarini ham keltirib chiqardi.

Shuningdek, pandemiya terminologiyasi nafaqat tibbiyot, balki ijtimoiy hayotga ham kirib bordi. "Maska rejimi", "ijtimoiy masofa" kabi terminlar kundalik nutqning bir qismiga aylandi. Bu esa terminologiyani ijtimoiy funksiyasini ham ko'rsatadi.

Umuman olganda, pandemiya davrida terminologiyani tez rivojlanishi ilmiy kommunikatsiya uchun muhim imkoniyatlar yaratdi, biroq uni standartlashtirish va tizimlashtirish zarurati ham ortdi.

Xulosa

Pandemiya sharoitida tibbiy terminologiya tizimi sezilarli darajada rivojlanib, yangi tushunchalar va atamalar bilan boyidi. COVID-19 pandemiyasi bu jarayonni keskin tezlashtirib, terminologiyani dinamik va moslashuvchan tizim ekanligini yaqqol namoyon etdi. Yangi terminlar ilmiy va amaliy ehtiyojlar asosida shakllanib, qisqa vaqt ichida global miqyosda keng qo'llanila boshladi. Bu esa tibbiy terminologiyani zamonaviy sog'liqni saqlash tizimidagi muhim o'rnini yana bir bor tasdiqlaydi.

Tadqiqot natijalari shuni ko'rsatadiki, pandemiya davrida yuzaga kelgan terminlar nafaqat yangi kasalliklarni ifodalash, balki epidemiologik jarayonlarni, profilaktika choralarini va ijtimoiy o'zgarishlarni tasvirlashda ham muhim vosita bo'lib xizmat qildi. Neologizmlar, qisqartmalar va semantik kengayishlar terminologik tizimning boyishiga olib keldi hamda ilmiy kommunikatsiyaning tezkorligini oshirdi.

Shu bilan birga, terminlarning tez shakllanishi va keng tarqalishi ularning turlicha talqin qilinishiga yoki noto'g'ri qo'llanilishiga olib kelishi mumkin. Bu esa ilmiy muloqotda noaniqliklarni yuzaga keltirib, ayrim hollarda diagnostik xatolarga sabab bo'lish ehtimolini oshiradi. Ayniqsa, turli tillarda terminlarning bir xil darajada moslashtirilmasligi global kommunikatsiyada muayyan qiyinchiliklarni keltirib chiqaradi.

Shu sababli pandemiya davrida va undan keyingi davrda tibbiy terminologiyani standartlashtirish, ularni aniq va bir ma'noli shaklda qo'llash muhim vazifalardan biri hisoblanadi. Xalqaro tashkilotlar tomonidan ishlab chiqilgan terminologik me'yorlar va tasnif tizimlari bu jarayonda muhim rol o'ynaydi hamda global sog'liqni saqlash tizimida yagona tushuncha va yondashuvni ta'minlaydi.

Umuman olganda, pandemiya sharoitida shakllangan tibbiy terminologiya zamonaviy tibbiyotning rivojlanishini aks ettiruvchi muhim omil bo'lib, u ilmiy tadqiqotlar, klinik amaliyot va xalqaro muloqotda yuqori aniqlik va

samaradorlikni ta'minlashga xizmat qiladi. Shu bois ushbu terminologiyani chuqur o'rganish, tizimlashtirish va to'g'ri qo'llash zamonaviy tibbiyot va tibbiy ta'lim uchun dolzarb ahamiyat kasb etadi.

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**QADIMGI TIBBIY TERMINLARNING ZAMONAVIY KLINIK
AMALIYOTDAGI FUNKSIONAL AHAMIYATI VA HIPPOCRATES
HAMDA GALEN ASARLARIDA TERMINOLOGIK TIZIMNING
SHAKLLANISHI**

Annotatsiya: Qadimgi tibbiy terminologiya zamonaviy tibbiyot fanining shakllanishida muhim asos bo'lib xizmat qiladi. Ushbu maqolada qadimgi yunon va rim tibbiyotida qo'llanilgan terminlarning kelib chiqishi, ularning lingvistik xususiyatlari hamda zamonaviy klinik amaliyotdagi funksional ahamiyati tahlil qilinadi. Ayniqsa, Hippocrates va Galen asarlarida terminologik tizimning shakllanish jarayoni alohida o'rganiladi. Tadqiqot natijalari shuni ko'rsatadiki, qadimgi terminlar bugungi kunda ham tibbiy terminologiya asosini tashkil etib, diagnostika va ilmiy muloqotda muhim rol o'ynaydi.

Kalit so'zlar: qadimgi tibbiyot, terminologiya, yunon tili, lotin tili, klinik amaliyot, Hippocrates, Galen.

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THE FUNCTIONAL SIGNIFICANCE OF ANCIENT MEDICAL TERMS IN MODERN CLINICAL PRACTICE AND THE FORMATION OF TERMINOLOGICAL SYSTEMS IN THE WORKS OF HIPPOCRATES AND GALEN

Abstract: *Ancient medical terminology serves as an important foundation for the formation of modern medical science. This article analyzes the origin of terms used in ancient Greek and Roman medicine, their linguistic features, and their functional significance in modern clinical practice. Particular attention is paid to the formation of the terminological system in the works of Hippocrates and Galen. The results of the study show that ancient terms still form the basis of medical terminology today and play an important role in diagnostics and scientific communication.*

Keywords: *ancient medicine, terminology, Greek language, Latin language, clinical practice, Hippocrates, Galen.*

Kirish

Tibbiy terminologiya zamonaviy tibbiyot fanining ajralmas va muhim tarkibiy qismi bo'lib, u ilmiy bilimlarni aniq, tizimli va izchil ifodalashga xizmat qiladi. Tibbiyot sohasida terminlarning to'g'ri va standartlashtirilgan qo'llanilishi diagnostika qo'yish, davolash strategiyasini ishlab chiqish hamda mutaxassislar o'rtasida samarali ilmiy muloqotni ta'minlashda muhim ahamiyat kasb etadi. Shu bois tibbiy terminologiya nafaqat lingvistik tizim, balki amaliy tibbiyotning asosiy vositalaridan biri sifatida qaraladi.

Mazkur terminologik tizimning shakllanishi qadimgi yunon va rim tibbiyotiga borib taqaladi. Antik davrda tibbiyot ilm-fan sifatida shakllana boshlagan va aynan shu davrda tibbiy tushunchalarni ifodalovchi terminlar tizimi

yuzaga kelgan. Ayniqsa, Hippocrates va Galen tomonidan yaratilgan ilmiy meros tibbiy terminologiyaning nazariy va amaliy asoslarini shakllantirishda hal qiluvchi rol o'ynagan. Ular kasalliklarni tasniflash, anatomik tuzilmalarni tavsiflash va fiziologik jarayonlarni izohlashda aniq va tizimli terminlardan foydalanib, tibbiy tilning ilmiy asoslarini yaratganlar.

Qadimgi davrda shakllangan terminlar bugungi kunda ham o'z ahamiyatini yo'qotmagan bo'lib, ular zamonaviy klinik amaliyotda keng qo'llanilmoqda. Ko'plab anatomik, klinik va farmatsevtik terminlar o'z ildizini aynan yunon va lotin tillaridan olgan bo'lib, bu holat terminologik tizimning barqarorligi va universalligini ta'minlaydi. Bunday terminlar turli mamlakatlar va tillarda faoliyat yuritayotgan mutaxassislar o'rtasida yagona ilmiy tilni shakllantirishga xizmat qiladi.

Zamonaviy tibbiyot rivojlanishi bilan birga terminologiya tizimi ham takomillashib bormoqda. Yangi ilmiy kashfiyotlar, innovatsion diagnostika va davolash usullarining paydo bo'lishi yangi terminlarning yaratilishiga olib kelmoqda. Biroq ushbu yangi terminlarning aksariyati qadimgi yunon va lotin ildizlariga asoslanadi, bu esa tibbiy terminologiyaning uzluksizligini va tarixiy izchilligini ko'rsatadi.

Shu sababli qadimgi tibbiy terminlarning kelib chiqishi, ularning lingvistik xususiyatlari hamda zamonaviy klinik amaliyotdagi funksional ahamiyatini o'rganish nafaqat nazariy, balki amaliy jihatdan ham dolzarb ilmiy masala hisoblanadi. Bu esa tibbiy terminologiyaning chuqur anglanishiga, diagnostik aniqlikning oshishiga va tibbiy ta'lim sifatining yaxshilanishiga xizmat qiladi.

Materiallar va metodlar

Mazkur tadqiqotda qadimgi tibbiy terminologiyaning shakllanishi va rivojlanish jarayonini o'rganishga qaratilgan ilmiy va tarixiy manbalar kompleks tarzda tahlil qilindi. Tadqiqot jarayonida qadimgi yunon va rim tibbiyotiga oid ilmiy adabiyotlar, klassik tibbiy asarlar, terminologik lug'atlar hamda zamonaviy ilmiy maqolalar asosiy axborot manbalari sifatida tanlab olindi. Ushbu manbalar tibbiy terminlarning kelib chiqishi, ularning lingvistik xususiyatlari va zamonaviy klinik amaliyotdagi qo'llanilishiga oid muhim nazariy va amaliy ma'lumotlarni qamrab oldi.

Tadqiqotni amalga oshirishda bir qator ilmiy-uslubiy metodlardan foydalanildi. Ilmiy adabiyotlarni tahlil qilish metodi orqali mavjud nazariy qarashlar, ilmiy yondashuvlar va terminologik tizimga oid konsepsiyalar umumlashtirildi. Tarixiy-lingvistik tahlil yordamida qadimgi davrda shakllangan terminlarning rivojlanish bosqichlari, ularning tarixiy kontekstdagi o'rni va zamonaviy terminologiyaga ta'siri o'rganildi. Etimologik tahlil metodi orqali terminlarning kelib chiqishi, ularning ildizlari va dastlabki ma'nolari aniqlashtirilib, semantik evolyutsiyasi tahlil qilindi.

Shuningdek, qiyosiy metod yordamida qadimgi tibbiy terminlar bilan zamonaviy klinik terminologiya o'rtasidagi o'xshashlik va farqlar solishtirildi. Bu esa terminologik tizimning uzluksizligi, barqarorligi va evolyutsion rivojlanish xususiyatlarini aniqlash imkonini berdi. Tadqiqotda tavsifiy yondashuv ham

qo'llanilib, terminlarning qo'llanish doirasi, ularning ilmiy va amaliy ahamiyati hamda klinik kontekstdagi funksional roli izohlandi.

Material sifatida Hippocrates va Galen asarlari, qadimgi va zamonaviy tibbiy lug'atlar, shuningdek, tibbiy terminologiyaga oid ilmiy maqolalar tanlab olindi. Ushbu manbalar asosida terminlarning shakllanish mexanizmlari, ularning lingvistik tuzilishi va zamonaviy tibbiyotdagi qo'llanilishi chuqur tahlil qilindi.

Shuningdek, tadqiqot davomida qadimgi terminologiyaning zamonaviy klinik amaliyotdagi funksional ahamiyati, uning xalqaro terminologik tizimdagi o'rni va tibbiy muloqotdagi roli ham alohida e'tiborga olindi. Bu esa tadqiqot natijalarining ilmiy asoslanganligi va amaliy ahamiyatini yanada oshirishga xizmat qildi.

Natijalar

O'tkazilgan tadqiqot natijalari qadimgi tibbiy terminologiyaning shakllanishi va rivojlanishi zamonaviy tibbiyot tizimi bilan uzviy bog'liqligini ko'rsatdi. Tahlil jarayonida terminologik tizimning tarixiy ildizlari, uning lingvistik xususiyatlari hamda klinik amaliyotdagi ahamiyati aniqlashtirildi. Natijalar quyidagi asosiy yo'nalishlarda umumlashtirildi:

1. Terminologik tizimning shakllanishi

Aniqlanishicha, qadimgi tibbiyotda terminlar asosan yunon tilida shakllanib, keyinchalik rim tibbiyotining rivojlanishi bilan lotin tiliga moslashtirilgan va keng qo'llanila boshlagan. Bu jarayon tibbiy terminologiyaning xalqaro tus olishiga va turli hududlarda yagona ilmiy til sifatida shakllanishiga zamin yaratdi. Yunon tilidagi terminlar ko'pincha kasallikning mohiyatini va fiziologik jarayonlarni ifodalagan bo'lsa, lotin tili ushbu terminlarni tizimlashtirish va normativ shaklga keltirishda muhim rol o'ynagan. Natijada tibbiy terminologiya barqaror va universal tizimga aylangan.

2. Anatomik va klinik terminlar

Tadqiqot natijalari shuni ko'rsatdiki, ko'plab anatomik va klinik terminlar aynan qadimgi davrda shakllangan bo'lib, ular hozirgi kunda ham faol qo'llanilmoqda. Masalan:

cardia — yurak faoliyati bilan bog'liq tushunchalarni ifodalaydi;

hepar — jigar bilan bog'liq anatomik va klinik terminlarning asosini tashkil etadi;

nephros — buyrak bilan bog'liq terminlarning ildizi sifatida ishlatiladi.

Ushbu terminlar asosida zamonaviy tibbiyotda ko'plab hosila terminlar (masalan, *cardiology*, *hepatitis*, *nephrology*) shakllangan bo'lib, bu holat qadimgi terminlarning davomiyligini va mahsuldorligini ko'rsatadi.

3. Funksional ahamiyat

Qadimgi tibbiy terminlarning zamonaviy klinik amaliyotdagi funksional ahamiyati juda yuqori ekanligi aniqlanadi. Ushbu terminlar diagnostika, klinik tasniflash, ilmiy tadqiqotlar va tibbiy hujjatlarni rasmiylashtirish jarayonlarida keng qo'llaniladi. Ular shifokorlar o'rtasida aniq va qisqa muloqotni ta'minlab, kasalliklarni to'g'ri tushunish va davolash strategiyasini belgilashda muhim vosita

sifatida xizmat qiladi. Shu bilan birga, terminlarning standartlashganligi xalqaro tibbiy hamkorlikni rivojlantirishda ham muhim omil hisoblanadi.

4. Terminlarning barqarorligi

Tadqiqot natijalari qadimgi tibbiy terminlarning asrlar davomida deyarli o'zgarmagan holda saqlanib qolganligini ko'rsatdi. Bu ularning lingvistik barqarorligi, ilmiy aniqligi va universalligi bilan izohlanadi. Qadimgi terminlar zamonaviy terminologiya tizimining asosini tashkil etib, yangi terminlarning yaratilishida ham asos sifatida xizmat qilmoqda. Bu esa tibbiy terminologiyaning uzluksiz rivojlanishini va tarixiy izchilligini ta'minlaydi.

Umuman olganda, olingan natijalar qadimgi tibbiy terminologiya zamonaviy tibbiyotning ilmiy va amaliy asoslaridan biri ekanligini ko'rsatadi. Ushbu terminlar o'zining aniqligi, barqarorligi va universalligi bilan bugungi kunda ham tibbiyotda muhim o'rin tutadi.

Muhokama

Qadimgi tibbiy terminologiyaning shakllanishi insoniyatning tibbiy bilimlarni tizimlashtirishga bo'lgan ilk urinishlari bilan bog'liq bo'lib, bu jarayon ilmiy tafakkurning rivojlanishida muhim bosqich hisoblanadi. Ayniqsa, Hippocrates va Galen tomonidan yaratilgan ilmiy meros terminologik tizimning shakllanishida hal qiluvchi rol o'ynagan.

Hippocrates o'z asarlarida kasalliklarni tizimli tasniflashga harakat qilgan va bu jarayonda aniq va lo'nda terminlardan foydalanishga e'tibor qaratgan. U kasalliklarni tashqi belgilar, simptomlar va klinik kuzatuvlar asosida tavsiflagan. Bu esa terminologiyaning klinik asosga ega bo'lishiga olib keldi. Uning ishlari tibbiy terminlarning ilmiy asosda qo'llanilishiga zamin yaratdi.

Galen esa tibbiy terminologiyani yanada rivojlantirib, uni anatomik va fiziologik bilimlar bilan boyitdi. U organizm tuzilishi va funksiyalarini chuqur o'rganib, terminlarni ilmiy asosda tizimlashtirdi. Galen terminologiyasi keyingi asrlar davomida Yevropa tibbiyotida asosiy manba bo'lib xizmat qildi.

Qadimgi terminlarning zamonaviy klinik amaliyotdagi ahamiyati ularning universalligi va barqarorligi bilan izohlanadi. Bu terminlar turli mamlakatlarda bir xil tushuniladi va ilmiy muloqotda aniqlikni ta'minlaydi. Masalan, yurak, jigar yoki buyrak bilan bog'liq terminlar butun dunyoda bir xil ildiz asosida qo'llaniladi.

Shu bilan birga, qadimgi terminologiya zamonaviy tibbiyot rivojlanishi bilan boyib bormoqda. Yangi ilmiy tushunchalar paydo bo'lishi bilan yangi terminlar yaratilmoqda, biroq ularning asosiy qismi qadimgi yunon va lotin ildizlariga tayanadi. Bu esa terminologik tizimning uzluksizligini ko'rsatadi.

Biroq ayrim muammolar ham mavjud. Qadimgi terminlarning murakkabligi yoki ko'p ma'noliligi ayrim hollarda ularni tushunishni qiyinlashtirishi mumkin. Shu sababli zamonaviy tibbiy ta'limda terminlarning etimologik va semantik jihatlarini o'rganish muhim ahamiyatga ega.

Xulosa:

Qadimgi tibbiy terminologiya zamonaviy klinik amaliyotda muhim va barqaror o'rin egallab, tibbiyot fanining rivojlanishida asosiy tayanchlardan biri sifatida xizmat qilmoqda. Ushbu terminologik tizim qadimgi yunon va rim tibbiy

maktablari tomonidan shakllantirilgan bo‘lib, uning ilmiy asoslari bugungi kunda ham o‘z dolzarbligini saqlab qolgan. Ayniqsa, Hippocrates va Galen asarlari tibbiy terminologiyaning shakllanishi va tizimlashtirilishida muhim manba bo‘lib xizmat qilgan.

Tadqiqot natijalari shuni ko‘rsatadiki, qadimgi terminlar o‘zining aniqligi, ixchamligi va universalligi bilan ajralib turadi. Ushbu terminlar zamonaviy tibbiyotda, xususan, diagnostika, klinik tasniflash, ilmiy tadqiqotlar va tibbiy hujjatlarni rasmiylashtirish jarayonlarida keng qo‘llanilmoqda. Bu esa ularning funksional ahamiyati yuqori ekanligini va amaliy tibbiyotda muhim vosita sifatida xizmat qilishini tasdiqlaydi.

Shuningdek, qadimgi tibbiy terminlarning zamonaviy terminologiyadagi davomiyligi ularning lingvistik barqarorligi va ilmiy asoslanganligi bilan izohlanadi. Yangi tibbiy terminlarning aksariyati aynan qadimgi yunon va lotin ildizlariga tayanib shakllanadi, bu esa terminologik tizimning uzluksiz rivojlanishini va tarixiy izchilligini ta‘minlaydi. Shu bilan birga, bunday yondashuv tibbiy terminologiyaning xalqaro miqyosda yagona va tushunarli bo‘lishiga xizmat qiladi.

Biroq zamonaviy tibbiyot rivojlanishi bilan bir qatorda terminologik tizimni takomillashtirish, uni standartlashtirish va yangi ilmiy tushunchalarga moslashtirish zarurati ham ortib bormoqda. Shu sababli qadimgi terminlarning ma‘nosini chuqur anglash, ularning etimologik va semantik xususiyatlarini o‘rganish tibbiy ta‘lim va ilmiy tadqiqotlar uchun muhim ahamiyat kasb etadi.

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SUN'IY INTELLEKT YORDAMIDA KLINIK TERMINLARNI AVTOMATIK TAHLIL QILISH

Annotatsiya: Zamonaviy tibbiyotda katta hajmdagi klinik ma'lumotlarni tezkor va aniq tahlil qilish muhim ahamiyat kasb etmoqda. Ushbu maqolada sun'iy intellekt texnologiyalari yordamida klinik terminlarni avtomatik tahlil qilish imkoniyatlari o'rganiladi. Tabiiy tilni qayta ishlash (NLP) va mashinaviy o'rganish metodlari orqali tibbiy matnlardan terminlarni ajratish, ularni klassifikatsiya qilish hamda semantik tahlil qilish jarayonlari yoritilgan. Tadqiqot natijalari shuni ko'rsatadiki, sun'iy intellekt klinik terminologiyani tahlil qilishda aniqlikni oshiradi, diagnostika va ilmiy tadqiqotlarda samaradorlikni ta'minlaydi.

Kalit so'zlar: sun'iy intellekt, klinik terminlar, NLP, mashinaviy o'rganish, tibbiy axborot, avtomatik tahlil.

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AUTOMATED ANALYSIS OF CLINICAL TERMINOLOGY USING ARTIFICIAL INTELLIGENCE

Abstract: *In modern medicine, the rapid and accurate processing of large volumes of clinical data is of great importance. This article explores the possibilities of automatic analysis of clinical terminology using artificial intelligence technologies. The processes of term extraction, classification, and semantic analysis using natural language processing (NLP) and machine learning methods are described. The results show that artificial intelligence improves the accuracy of clinical terminology analysis and enhances the efficiency of diagnosis and research.*

Keywords: *artificial intelligence, clinical terms, NLP, machine learning, medical data, automated analysis.*

Kirish

So‘nggi yillarda tibbiyot sohasida raqamlashtirish jarayonlari jadal rivojlanmoqda. Klinik ma’lumotlarning hajmi ortib borishi ularni tezkor va samarali tahlil qilish zaruratini yuzaga keltirdi. Shu nuqtai nazardan, sun’iy intellekt texnologiyalari tibbiy terminologiyani avtomatik tahlil qilishda muhim vosita sifatida qaralmoqda. Ayniqsa, klinik hujjatlar, elektron tibbiy kartalar va ilmiy maqolalardagi terminlarni aniqlash va qayta ishlash dolzarb masala hisoblanadi. Hozirda ayrim xususiy klinikalar va davlat shifoxonalarida tashxislash, bemor kuzatuv va rehabilitatsiya jarayonlariga sun’iy intellekt sinov tariqasida tatbiq etilmoqda. Bu yangi texnologiyaning mahalliy sharoitga

moslashuvi, bemor ma'lumotlarini himoya qilish va javobgarlik masalalarini kun tartibiga chiqaradi.

Sun'iy intellekt — informatikaning alohida sohasi bo'lib, odatda inson ongi bilan bog'liq imkoniyatlar: tilni tushunish, o'rgatish, muhokama qilish, masalani yechish, tarjima va shu kabi imkoniyatlarga ega kompyuter tizimlarini yaratish bilan shug'ullanadi. Sun'iy intellekt kompyuterlarga o'zlarining tajribalarini o'rganish, berilgan parametrlarga moslashish va ilgari faqat odamlar uchun mumkin bo'lgan vazifalarni bajarish imkonini beradi. Sun'iy intellektni amalga oshirishning ko'p holatlarida - kompyuter shaxmatchilaridan tortib uchuvchisiz transport vositalarigacha - chuqur o'rganish va tabiiy tillarni qayta ishlash imkoniyati juda muhimdir. Ushbu texnologiyalar tufayli kompyuterlarga katta miqdordagi ma'lumotlarni qayta ishlash va ulardagi naqshlarni aniqlash orqali muayyan vazifalarni bajarishga "o'rgatish" mumkin.

Materiallar va metodlar

Tadqiqot davomida sun'iy intellekt va tibbiy terminologiya sohasiga oid ilmiy manbalar tahlil qilindi. NLP algoritmlari, mashinaviy o'rganish modellari va terminlarni aniqlash usullari o'rganildi.

Quyidagi metodlardan foydalanildi:

- ilmiy adabiyotlarni tahlil qilish;
- kompyuter lingvistikasi metodlari;
- qiyosiy tahlil;
- tavsifiy va statistik metodlar.

Material sifatida klinik matnlar, elektron tibbiy yozuvlar va tibbiy terminlar bazalari ishlatildi.

Sun'iy intellektning eng faol ishlab chiqilgan usullari va usullari quyida keltirilgan

- sun'iy neyron tarmoqlari;
- evolyutsion hisoblash;
- loyqa mantiq va loyqa to'plam nazariyasi;
- ekspert tizimlari;
- uyali avtomatika;
- ko'p agent tizimlari.

Natijalar

Sun'iy intellekt (SI) tibbiyot va texnologiya rivojlangan mamlakatlarda kasalliklarni prognoz qilish, retsept yozish va hatto dori vositalarini ishlab chiqishda qo'llanyapti. Sog'liqni saqlash vazirligi bergan ma'lumotlarga ko'ra, 2025 yil boshidan Dermatovenerologiya va kosmetologiya markazida kasalliklarni SI yordamida tashxislash yo'lga qo'yilgan. Sun'iy intellekt tibbiyotda eng ko'p foyda berayotgan yo'nalishlardan biri bu — tashxis qo'yish. Negaki aqlli texnologiya minglab ma'lumotlarni bir zumda tahlil qilib, inson ko'zi ilg'amaydigan kasallik belgilarini aniqlay oladi. Masalan, u rentgen yoki MRT suratlaridagi juda kichik o'zgarishlarni ham topish qobiliyatiga ega. Mazkur jihat shifokorlarga kasallikni erta bosqichda bilish va davolashni o'z vaqtida boshlash

imkonini beradi. Natijada bemorlarning sogʻayish ehtimoli oshadi, davolanish muddati esa qisqaradi.

Yana bir katta afzalligi xatoliklarni kamaytirishda koʻzga tashlanadi. Har qancha tajribali boʻlmasin, shifokor – inson: demak, u charchaydi yoki eʼtiborsizlik qilib ayrim jihatlarni shunchaki ilgʻamay qolishi mumkin. Sunʼiy intellekt esa maʼlumotlarga asoslanib ish koʻradi va hissiyotlarga berilmaydi. Shu bois, u tahlilni barqaror va aniq bajaradi.

Bundan tashqari, sunʼiy intellekt tibbiyotda faqat tashxis bilan cheklanmayapti. U kasallik xavfini oldindan prognoz qilish, bemorga mos retsept tuzish, hatto yangi dorilar ishlab chiqishda ham faol ishtirok etmoqda. Ilgari laboratoriyalarda yillab davom etgan tajribalar endi bir necha oy, hatto haftalar ichida amalga oshirilishiga erishilyapti.

Bemorni kuzatish va reabilitatsiya bosqichida ham sunʼiy intellekt texnologiyalari muhim ahamiyatga ega. Masalan, aqlli bilaguzuklar yoki mobil ilovalar yordamida bemorning yurak urishi, qon bosimi, qand miqdori, uyqu sifati kabi koʻrsatkichlarini doimiy ravishda oʻlchab borish imkoniyati mavjud. Bu qurilmalarda toʻplagan maʼlumotlar sunʼiy intellekt orqali tahlil qilinadi va agar oʻzgarish yoki xavfli belgi aniqlansa, shifokorga avtomatik signal yuboriladi. Shu yoʻl bilan yurak xurujlari, insult yoki boshqa ogʻir holatlarning oldini olish mumkin boʻladi. Bunday tizimlar, ayniqsa, surunkali kasalliklarga chalingan, uyda davolanayotgan yoki reabilitatsiya bosqichida boʻlgan bemorlar uchun juda foydali.

Yana bir muhim yoʻnalish — tibbiy hujjatlarni avtomatlashtirish. Sunʼiy intellekt bu borada shifokorlarga katta yordam bermoqda. U tovushni matnga aylantiradi, bemorning tarixini tartiblaydi, tahlil natijalarini joylashtiradi va statistik maʼlumotlarni avtomatik tayyorlaydi. Shifokor endi har bir tashxisni qoʻlda yozib chiqishga vaqt sarflamaydi: tizim hammasini oʻzi toʻldiradi, mutaxassis esa faqat tekshirib, tasdiqlaydi. Bu tibbiyot xodimiga bemor bilan koʻproq vaqt oʻtkazish, muloqotni yaxshilash va insoniy yondashuvni kuchaytirish imkonini beradi.

Tadqiqot natijalari shuni koʻrsatdiki, sunʼiy intellekt yordamida klinik terminlarni avtomatik aniqlash yuqori samaradorlikka ega. NLP algoritmlari orqali matndan terminlarni ajratish va ularni kategoriyalarga ajratish imkoniyati mavjud.

Mashina oʻrganish modellari terminlarning semantik maʼnosini aniqlashda yuqori aniqlikni koʻrsatdi. Shuningdek, avtomatik tahlil tizimlari klinik maʼlumotlarni tezkor qayta ishlash imkonini beradi.

Muhokama

Mazkur texnologiyaning ishonchliligi, ayniqsa, oʻzbek tili kabi raqamli resursi cheklangan tillarda hali ham muhokamada. Boisi sunʼiy intellektning “aql” darajasi bevosita unga yuklangan maʼlumotlar bazasiga bogʻliq, qanchalik koʻp, toʻliq va sifatli manba boʻlsa, natija shunchalik aniq chiqadi.

Bugungi kunda ingliz, xitoy yoki ispan tillarida tibbiy maʼlumotlar bazasi nihoyatda boy, shuning uchun sunʼiy intellekt ushbu tillarda bemor belgilarini aniqroq tahlil qiladi, statistik xulosalar chiqaradi va ehtimoliy tashxislarni

yaxshiroq beradi. Ammo o'zbek tilida bu imkoniyat hali to'liq shakllanmagan. Ma'lumotlar bazasining cheklanganligi, terminologik nomuvofiqliklar, tibbiy hujjatlarning yagona elektron tizimda saqlanmasligi kabi omillar natijaga bevosita ta'sir ko'rsatadi.

Agar texnologiyani o'qitishda ishlatilgan ma'lumotlar inglizcha yoki boshqa tillarga asoslangan bo'lsa, o'zbekcha tibbiy so'rov(prompt) kiritilganda sun'iy intellekt mahalliy atamalar, klinik yozuv uslubi yoki madaniy kontekstni noto'g'ri tushinishi mumkin. Tizim avtomatik tarjima orqali ishlasa, klinik ma'no yo'qoladi. Masalan, "qand" va "glyukoza" kabi so'zlar aralashib, noaniq javob chiqishi ehtimoli mavjud. Oqibatda, u tibbiy yozuvlarni noto'g'ri tarjima yoki talqin qiladi. Belgilarni yanglish baholab, xato tavsiya berishi ehtimoli oshadi. Mahalliy kasalliklar, diagnostika protokollari yoki dori nomlarini tanimasligi mumkin.

Texnik jihatdan qaraganda, SI ishonchliligi bir necha omillarga bog'liq: ma'lumotlar to'plamining sifati va hajmi, modelni o'rgatishdagi tarafkashlik (bias), natijani izohlash qobiliyati, shuningdek yangi virus yoki genetik o'zgarishlarga moslashish darajasi. Agar model eski ma'lumotlar asosida ishlasa, u yangi holatlarda xatoga yo'l qo'yadi.

Shuning uchun shifokorlar orasida ham bu tizimdan faqat yordamchi vosita sifatida foydalanish fikri kuchli, ya'ni sun'iy intellekt tashxis qo'yishda emas, balki mavjud ma'lumotlarni tahlil qilish, o'xshash holatlar bilan solishtirish va ehtimoliy tavsiyalar berishda ishonchliroq natija ko'rsatadi. O'zbek tilida ham tibbiy ma'lumotlar bazasini boyitish, terminlarni yagona standartga keltirish va sun'iy intellekt modellarini shu tilga moslashtirish ustida ish olib borilsa, natijalar sifat jihatidan yuqoriga ko'tariladi. Hozircha tibbiyotda u bergan ma'lumotlarga to'liq tayanib bo'lmaydi.

— SI tibbiy tasvirlarni tahlil qilishda ya'ni rentgen, KT, MRT, dermatoskopiya va oftalmologik suratlarda yaxshiroq natija ko'rsatadi. Chunki bu sohada raqamli, aniq va bir xil formatdagi ma'lumotlar ko'p. Sun'iy intellekt yuz minglab suratlarni solishtirib, inson ko'zi ilg'amaydigan darajada kichik o'zgarishlarni aniqlay oladi. Misol uchun, o'pka nodullari, mammogrammada boshlang'ich o'simtalar, diabetik retinopatiyaning dastlabki belgilarini erta bosqichda topa oladi. Shu bilan bir qatorda, patologik slaydlarni tahlil qilishda ham SI mikroskop ostidagi mikroorganizmlarni o'rganib, saraton hujayralari mavjudligi va ularning bosqichini aniqlashda yordam beradi.

XX asr O'tgan asrning 30-yillari o'rtalaridan boshlab, turli xil murakkab muammolarni mustaqil hal qilishga qodir qurilmalarni yaratish muammolari muhokama qilingan Turing asarlari nashr etilgandan beri, sun'iy intellekt muammosi jahon ilmiy hamjamiyatida diqqat bilan ko'rib chiqila boshlandi. Turing mashinani intellektual vosita sifatida ko'rib chiqishni taklif qildi, uni tester uni o'zi bilan aloqa qilish jarayonida odamdan ajratib turolmaydi.

Sun'iy intellekt texnologiyalarining tibbiyot sohasida qo'llanilishi, ayniqsa klinik terminologiyani avtomatik tahlil qilish jarayonida, muhim ilmiy va amaliy ahamiyat kasb etadi. An'anaviy usullarda klinik matnlarni tahlil qilish ko'p vaqt

talab qiladi va inson omiliga bog'liq xatolar yuzaga kelishi mumkin. Sun'iy intellekt esa bu jarayonni avtomatlashtirib, tezkorlik va aniqlikni ta'minlaydi.

NLP texnologiyalari tibbiy matnlarni semantik jihatdan tahlil qilish imkonini beradi. Masalan, bir xil terminning turli kontekstlarda turlicha ma'noga ega bo'lishi mumkin. Sun'iy intellekt bu farqlarni aniqlab, to'g'ri interpretatsiya qilish imkoniyatiga ega. Bu esa klinik qaror qabul qilish jarayonini sezilarli darajada yaxshilaydi.

Shuningdek, sun'iy intellekt yordamida katta hajmdagi ma'lumotlarni tahlil qilish orqali yangi ilmiy xulosalar chiqarish mumkin. Masalan, kasalliklar o'rtasidagi bog'liqlikni aniqlash, yangi diagnostik yondashuvlarni ishlab chiqish yoki davolash usullarini takomillashtirish mumkin.

Biroq ushbu texnologiyalarning ayrim cheklovlari ham mavjud. Masalan, tibbiy terminlarning murakkabligi va ko'p ma'noliligi ba'zan noto'g'ri tahlilga olib kelishi mumkin. Shuningdek, sifatli ma'lumotlar bazasining yetishmasligi sun'iy intellekt tizimlarining samaradorligini pasaytiradi. Shu sababli, sun'iy intellekt tizimlarini takomillashtirish va ularni real klinik amaliyotga moslashtirish muhim vazifa hisoblanadi.

Umuman olganda, sun'iy intellekt klinik terminologiyani avtomatik tahlil qilishda katta istiqbolga ega bo'lib, kelajakda tibbiyot sohasining ajralmas qismiga aylanishi kutilmoqda.

Sababi hozir bilasiz butun Yer yuziga "koronavirus" infeksiyasi tarqalgan. Yurtimizda hali ham bu virus avj olib bormoqda. Qanchadan-qancha shifokorlarimiz bu virus bilan kasallangan bemorlarimizni davolash maqsadida o'zlari ham shu kasalga chalinishmoqda. Lekin buni yechimi bor. Hozir texnologiya asri. Biz bu virusga qarshi zamonaviy texnologiyalardan foydalanishimiz kerak. Ya'ni "Sun'iy intellekt"dan. G'oya shundan iboratki, biz o'z shifokorlarimizni bu bema'ni virusdan omon saqlashimiz uchun ularning o'rniga sun'iy intellekt kiritilgan robotni bemorlarga qarash uchun har bitta kasalxonaga bittadan qo'yish kerak. Ular tezlik bilan har bir kasalning oldiga borib uning issig'ini o'lchab, kerakli dori-darmonlar berib, boshqa kasalning oldiga yetib borishi kerak. Shifokorlarning o'rniga robot qo'yishning asosiy sabablari: 1. Virus yuqush xavfi tug'ilmaydi(sababi u robot)Robot o'z nomi bilan robot, u tezlik bilan bir bemorga qarab ikkinchi bemor tomon tez harakatlanadi 2. Ish haqi olmaydi Lekin bunday robotlardan hech qayerda yo'q deb aytolmaymiz. Sababi, ko'plab rivojlangan davlatlarda shu sun'iy intellektga asoslangan robotlar kasalxonalarda bemorlarga g'amxo'lik qilmoqdalar.

Yuqoridagilardan tashqari, aksa-riyat iste'molchilarning robotlarga ishonch bildirmayotganligi SIning ommalashishiga halal berayotgan to'siqlardan biridir. Odamlar o'ziyurar mashina yoki samolyotlar xizmatini qabul qilishlari uchun biroz vaqt kerak, albatta. Biroq, zamonaviy texnologiya-lar qurshovida o'sib-unayotgan yosh avlodda buning aksi bo'lib, ularni bu jarayon u qadar havotirga solayotgani yo'q. Har qancha e'tiroz va tanqidlarga qaramay SI rivojlanishdan odamlarga yordam berishdan to'xtamayapti. Ayniqsa, tibbiyotda uning ahamiyati tobora oshib bormoqda. Endilikda robotlar nisbatan

murakkab jarrohlik amaliyotlarini ham uddasidan chiqishyapti. Robot-shifokorlarning tibbiyot hodimlari bilan o'ziga xos hamkorligi samaradorlikni ancha oshirdi. Medtronis kompaniyasi esa IBM bilan hamkorlikda qandli diabet kasalligi bilan og'rikan bemorlar uchun maxsus dastur ishlab chiqmoqda. Mazkur dasturiy ta'minot qon tarkibidagi qand miqdorining favqulodda tushib ketishini 3 soat avval aniqlash imkoniyatiga ega bo'ladi. Buning uchun shu kasallika chalingan 600 ta anonim bemorlarning tibbiy ma'lumotlari o'rganib chiqildi. Bu endi odamlar o'z salomatliklarini mobil qurilmalardagi maxsus dasturlar orqali muntazam nazorat qilib borish imkoniga ega bo'lishadi deganidir. Ko'rib turganingizdek, SI ning hayotimizdagi o'rni kundan-kunga chuqurlashib bormoqda. Ular insoniyatning yutug'imi yoki mag'lubiyati, degan savol ustidagi bahslar hali uzoq davom etadi. Eng muhimi, fantastik yozuvchi Ishoq Azimov ta'biri bilan aytganda, robotlarni yaratishda odamlarga zarar yetkazmaslik shior qilib olinishi kerak. Hozirgi paytda ham sun'iy aqlning yagona va umume'tirof etilgan ta'rifi mavjud emas. Bu ajablanarli emas. Inson aqlining ham universal ta'rifi yo'qligini eslash kifoya. Bugungi kunda sun'iy intellekt sohasidagi tadqiqotlar turli yo'nalishlarda olib borilmoqda: bilimlarni namoyish etish, mantiqiy modellashtirish, bilimlarni yig'ish, mashinalarni o'rganish va avtomatik gipotezalarni yaratish, ma'lumotlarni yig'ish va ma'lumotni majmuaviy qayta ishlash, qarorlarni qo'llab-quvvatlash, jarayon va tizimni boshqarish, dinamik intellektual tizimlar, rejalashtirish va boshqalar.

Xulosa

Sun'iy intellekt texnologiyalari klinik terminlarni avtomatik tahlil qilishda yuqori samaradorlikka ega. Ushbu texnologiyalar tibbiy ma'lumotlarni tezkor va aniq qayta ishlash imkonini beradi. Kelajakda sun'iy intellekt asosidagi tizimlar tibbiyot sohasida keng qo'llanilishi kutilmoqda.

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TIBBIY TERMINLARNING MA'NO O'ZGARISHLARI VA ULARNING DIAGNOSTIK AHAMIYATI

Annotatsiya: *Tibbiy terminologiya tizimi ko'p asrlik tarixiy rivojlanish jarayonida shakllanib, turli lingvistik va semantik o'zgarishlarga uchrab kelgan. Tibbiyot fanining taraqqiyoti, yangi kasalliklar va diagnostik usullar paydo bo'lishi natijasida mavjud terminlarning ma'nosi kengayib, torayib yoki qayta talqin qilinishi kuzatiladi. Ushbu maqolada tibbiy terminlarning ma'no o'zgarishlari, ularning lingvistik xususiyatlari, semantik transformatsiya turlari hamda diagnostik jarayondagi amaliy ahamiyati atroflicha tahlil qilinadi.*

Tadqiqot natijalari shuni ko'rsatadiki, semantik o'zgarishlar terminologik tizimning rivojlanishida muhim omil bo'lib xizmat qiladi va tibbiy tushunchalarning yanada aniqlashtirilishiga yordam beradi. Shu bilan birga, ayrim terminlarning ko'p ma'noliligi yoki noto'g'ri talqin qilinishi diagnostik jarayonda chalkashliklarga olib kelishi ehtimoli mavjud. Ayniqsa, klinik amaliyotda terminlarning noaniq qo'llanilishi noto'g'ri tashxis qo'yish xavfini oshiradi.

Kalit so'zlar: *tibbiy terminologiya, semantika, ma'no o'zgarishi, diagnostika, terminlar, lingvistika.*

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SEMANTIC CHANGES IN MEDICAL TERMINOLOGY AND THEIR DIAGNOSTIC SIGNIFICANCE

Abstract: *The system of medical terminology has been formed over centuries of historical development and has undergone various linguistic and semantic changes. Due to the advancement of medical science, the emergence of new diseases, and the development of diagnostic methods, existing terms have experienced expansion, narrowing, or reinterpretation of their meanings. This article provides a comprehensive analysis of semantic changes in medical terminology, their linguistic features, types of semantic transformation, and their practical significance in the diagnostic process.*

The results of the study show that semantic changes serve as an important factor in the development of the terminological system and contribute to a more precise understanding of medical concepts. At the same time, the polysemy or incorrect interpretation of certain terms may lead to misunderstandings in the diagnostic process. In particular, the ambiguous use of terms in clinical practice increases the risk of misdiagnosis.

Keywords: *medical terminology, semantics, semantic change, diagnostics, terms, linguistics.*

Kirish

Tibbiy terminologiya ilmiy tilning eng muhim tarkibiy qismlaridan biri bo'lib, u tibbiyot sohasida aniq, izchil va tizimli mulohazani ta'minlaydi. Tibbiy terminlar yordamida inson organizmidagi anatomik tuzilmalar, fiziologik

jarayonlar, kasalliklar, diagnostika usullari va davolash choralarini qisqa va lo'nda ifodalash imkoniyati yaratiladi. Shu sababli terminologiyani aniq va barqarorligi tibbiyot amaliyotida alohida ahamiyatga ega.

Biroq tibbiy terminologiya statik tizim emas, balki doimiy rivojlanib boruvchi dinamik tizim hisoblanadi. Fan va texnologiyani taraqqiyoti, yangi kasalliklarning aniqlanishi, diagnostika va davolash usullarining takomillashuvi natijasida terminlarning mazmuni va qo'llanish doirasi o'zgarib boradi. Ushbu jarayon lingvistik nuqtai nazardan semantik o'zgarishlar sifatida tavsiflanadi. Semantik o'zgarishlar terminlarning ma'nosini kengaytirish, toraytirish yoki qayta talqin qilish orqali yuzaga keladi.

Semantik transformatsiyalar natijasida ayrim terminlar yangi ilmiy tushunchalarni ifodalash uchun moslashtiriladi yoki mavjud terminlarga qo'shimcha ma'no yuklanadi. Bu holat tibbiy bilimlarning chuqurlashuvi va kengayishini aks ettiradi. Masalan, ayrim terminlar dastlab faqat anatomik yoki fiziologik ma'noda qo'llanilgan bo'lsa, keyinchalik ular klinik yoki funksional holatlarni ham ifodalash uchun ishlatila boshlaydi. Bu esa terminologiyani moslashuvchanligini va ilmiy rivojlanishga uyg'unlashuvini ko'rsatadi.

Shu bilan birga, semantik o'zgarishlar ayrim hollarda terminlarning ko'p ma'noliligiga olib kelishi mumkin. Bu esa ilmiy muloqotda noaniqliklar va chalkashliklarning yuzaga kelishiga sabab bo'ladi. Ayniqsa, klinik amaliyotda terminlarning noto'g'ri talqin qilinishi diagnostik xatolarga olib kelishi ehtimoli mavjud. Shu sababli terminlarning semantik xususiyatlarini chuqur o'rganish va ularni standartlashtirish muhim vazifa hisoblanadi.

Tibbiy terminlarning semantik jihatdan tahlil qilinishi nafaqat lingvistik tadqiqotlar uchun, balki amaliy tibbiyot uchun ham katta ahamiyatga ega. Bu jarayon shifokorlar va talabalar uchun terminlarning mazmunini to'g'ri anglash, ularni amaliy faoliyatda aniq qo'llash hamda diagnostik qarorlarni to'g'ri qabul qilishda muhim rol o'ynaydi. Shu bois tibbiy terminologiyani semantik xususiyatlarini o'rganish zamonaviy tibbiyot va lingvistika kesishgan dolzarb ilmiy yo'nalishlardan biri hisoblanadi.

Materiallar va metodlar

Tadqiqot jarayonida tibbiy terminologiya va lingvistika sohasiga oid ilmiy adabiyotlar kompleks ravishda o'rganildi hamda tizimli tahlil qilindi. Ushbu bosqichda zamonaviy ilmiy maqolalar, o'quv qo'llanmalar, terminologik lug'atlar va monografiyalar asosiy manba sifatida tanlab olindi. O'rganilgan adabiyotlar tibbiy terminlarning semantik xususiyatlari, ularning tarixiy rivojlanishi hamda klinik amaliyotdagi qo'llanilishiga oid muhim nazariy va amaliy ma'lumotlarni qamrab oldi.

Tadqiqotni amalga oshirishda bir nechta ilmiy-uslubiy metodlardan foydalanildi. Jumladan, ilmiy adabiyotlarni tahlil qilish metodi yordamida mavjud ilmiy qarashlar, yondashuvlar va nazariy konsepsiyalar umimlashtirildi. Semantik tahlil metodi orqali tibbiy terminlarning ma'no o'zgarishlari, ularning ko'p ma'noliligi hamda kontekstual qo'llanilishi chuqur o'rganildi. Qiyosiy metod yordamida turli davrlarda yoki turli manbalarda qo'llanilgan terminlarning

ma'nosi o'zaro solishtirilib, ularning semantik farqlari va o'xshashliklari aniqlashtirildi. Tavsifiy metod esa terminlarning tuzilishi, qo'llanish doirasi va lingvistik xususiyatlarini izohlashda qo'llanildi.

Tadqiqot materiallari sifatida tibbiy lug'atlar, klinik terminologiyaga oid ilmiy manbalar, tibbiyotga ixtisoslashgan darsliklar hamda ilmiy maqolalar tanlab olindi. Ushbu materiallar asosida terminlarning amaliy qo'llanilishi, ularning diagnostik jarayondagi ahamiyati hamda ilmiy muloqotdagi o'rni tahlil qilindi.

Shuningdek, tadqiqot davomida tibbiy terminologiyaning zamonaviy holati, uning xalqaro standartlarga mosligi va amaliy tibbiyotdagi qo'llanish xususiyatlari ham inobatga olindi. Bu esa tadqiqot natijalarining ilmiy asoslanganligi va amaliy ahamiyatini oshirishga xizmat qildi.

Natijalar

O'tkazilgan tadqiqot natijalari tibbiy terminologiya tizimida semantik o'zgarishlar keng tarqalganligini va ular terminlarning shakllanishi hamda rivojlanishida muhim o'rin egallashini ko'rsatdi. Tahlil jarayonida tibbiy terminlarda uchraydigan asosiy semantik transformatsiya turlari aniqlanib, ularning lingvistik va amaliy xususiyatlari o'rganildi.

1. Ma'no kengayishi (semantic broadening)

Aniqlanishicha, ayrim tibbiy terminlar dastlab tor, aniq bir ma'noda qo'llanilgan bo'lsa, vaqt o'tishi bilan ularning qo'llanish doirasi kengayib, umumiyroq tushunchalarni ham ifodalay boshlagan. Bunday o'zgarishlar ko'pincha yangi ilmiy bilimlarning paydo bo'lishi bilan bog'liq bo'lib, terminlarning funksional imkoniyatlarini kengaytiradi. Natijada bitta termin turli klinik holatlar yoki jarayonlarni ifodalashda qo'llanilishi mumkin bo'ladi.

2. Ma'no torayishi (semantic narrowing)

Tahlillar shuni ko'rsatdiki, ayrim terminlar dastlab keng ma'noga ega bo'lgan bo'lsa-da, ilmiy rivojlanish jarayonida ularning ma'nosi aniq bir kasallik, simptom yoki klinik holat bilan chegaralanadi. Bu jarayon terminologik aniqlikni oshiradi va diagnostik jarayonda muhim ahamiyat kasb etadi. Natijada terminning qo'llanish sohasi torayadi, biroq uning mazmuni yanada aniqroq bo'ladi.

3. Metaforik o'zgarish (metaphorical shift)

Tadqiqot davomida tibbiy terminlarda metaforik o'zgarishlar ham keng uchrashi aniqlandi. Bunday terminlar ko'pincha tashqi o'xshashlik, shakl, rang yoki funksional analogiya asosida shakllanadi. Masalan, ayrim anatomik yoki patologik atamalar boshqa obyektlarga o'xshashligi sababli metaforik nomlanadi. Bu holat terminlarni eslab qolishni osonlashtiradi, biroq ba'zan ularning noto'g'ri talqin qilinishiga ham olib kelishi mumkin.

4. Terminologik qayta talqin (re-interpretation)

Shuningdek, tibbiy terminlarda terminologik qayta talqin jarayoni ham kuzatiladi. Bu holatda eski terminlar yangi ilmiy ma'lumotlar, zamonaviy diagnostika usullari va tibbiyotdagi yutuqlar asosida qayta izohlanadi. Natijada terminning dastlabki ma'nosi saqlangan holda, unga yangi ilmiy mazmun yuklanadi yoki u butunlay yangi tushunchani ifodalash uchun ishlatiladi.

Olingan natijalar shuni ko'rsatadiki, semantik o'zgarishlar tibbiy terminologiyaning tabiiy rivojlanish jarayonining ajralmas qismi hisoblanadi. Ular terminlarning moslashuvchanligini oshiradi, ilmiy bilimlarning kengayishini aks ettiradi hamda yangi tushunchalarni ifodalash imkonini beradi. Shu bilan birga, bunday o'zgarishlar terminlarning qo'llanishida aniqlikni talab qiladi va ularni to'g'ri talqin qilish zaruratini yuzaga keltiradi.

Tibbiy terminlarning semantik o'zgarishi tibbiyot fanining rivojlanishi bilan chambarchas bog'liq. Ilmiy bilimlar kengaygani sari terminlarning mazmuni ham o'zgaradi. Bu jarayon tabiiy bo'lib, u ilmiy tilning dinamik rivojlanishini aks ettiradi.

Semantik o'zgarishlarning ijobiy tomoni shundaki, ular terminologiyaning moslashuvchanligini ta'minlaydi. Masalan, yangi kasalliklar yoki sindromlar paydo bo'lganda mavjud terminlar kengaytirilgan ma'noda qo'llanilishi mumkin. Bu esa yangi terminlar yaratish zaruratini kamaytiradi.

Biroq semantik o'zgarishlarning ayrim salbiy jihatlari ham mavjud. Terminlarning ma'nosi o'zgarishi natijasida turli mutaxassislar ularni turlicha talqin qilishi mumkin. Bu esa diagnostik xatolarga olib kelishi ehtimolini oshiradi. Ayniqsa, klinik amaliyotda terminlarning noto'g'ri talqin qilinishi bemor hayoti uchun xavf tug'dirishi mumkin.

Metaforik terminlarning qo'llanilishi ham muhim masalalardan biridir. Masalan, "yurak yetishmovchiligi" kabi terminlar real anatomik o'zgarishdan tashqari funksional holatni ham ifodalaydi. Bu esa terminning ko'p ma'noliligini yuzaga keltiradi.

Shu sababli zamonaviy tibbiyotda terminlarni standartlashtirish muhim vazifa hisoblanadi. Xalqaro tasnif tizimlari (masalan, ICD) terminlarning yagona ma'noda qo'llanilishini ta'minlaydi. Bu esa diagnostika jarayonida aniqlikni oshiradi.

Tibbiy ta'limda ham semantik tahlil muhim ahamiyatga ega. Talabalar terminlarning kelib chiqishi va ma'nosini chuqur o'rganish orqali ularni to'g'ri tushunish va qo'llash ko'nikmasiga ega bo'ladilar. Bu esa ularning kasbiy kompetensiyasini oshiradi.

Tibbiy terminlarning semantik o'zgarishi tibbiyot fanining uzluksiz rivojlanishi bilan bevosita bog'liq bo'lib, bu jarayon ilmiy bilimlarning kengayishi va chuqurlashuvi natijasida yuzaga keladi. Yangi kasalliklar aniqlanishi, diagnostika va davolash usullarining takomillashuvi, shuningdek, ilmiy tushunchalarning yangilanishi terminlarning mazmuniga ham ta'sir ko'rsatadi. Shu sababli semantik transformatsiyalar ilmiy tilning dinamik xarakterini aks ettiruvchi tabiiy lingvistik hodisa sifatida qaraladi. Bu jarayon orqali terminologiya tizimi zamon talablariga moslashadi va yangi ilmiy ehtiyojlarni qondirishga xizmat qiladi.

Semantik o'zgarishlarning ijobiy jihatlardan biri shundaki, ular terminologiyaning moslashuvchanligini ta'minlaydi va ilmiy ifoda imkoniyatlarini kengaytiradi. Masalan, yangi kasalliklar, sindromlar yoki klinik holatlar aniqlanganda mavjud terminlar kengaytirilgan yoki yangi kontekstda qo'llanilishi

mumkin. Bu esa terminologik tizimni ortiqcha murakkablashtirmasdan, mavjud leksik resurslardan samarali foydalanish imkonini beradi. Natijada terminlar tizimi ixcham, lekin mazmunan boy bo‘lib qoladi.

Shu bilan birga, semantik o‘zgarishlarning ayrim salbiy jihatlari ham mavjud. Terminlarning ma’nosi vaqt o‘tishi bilan o‘zgarishi yoki kengayishi natijasida ularning talqini turli mutaxassislar tomonidan bir xil bo‘lmasligi mumkin. Bu esa ilmiy muloqotda noaniqliklarni keltirib chiqaradi va ayrim hollarda diagnostik xatolarga olib kelishi ehtimolini oshiradi. Ayniqsa, klinik amaliyotda terminlarning noto‘g‘ri yoki turlicha talqin qilinishi bemor salomatligi uchun jiddiy xavf tug‘dirishi mumkin. Shu bois terminlarning aniq, bir ma’noli va standartlashtirilgan shaklda qo‘llanilishi alohida ahamiyat kasb etadi.

Metaforik terminlarning qo‘llanilishi ham tibbiy terminologiyada muhim o‘rin tutadi. Ko‘pincha bunday terminlar tashqi o‘xshashlik, shakl yoki funksional analogiya asosida shakllanadi. Masalan, “yurak yetishmovchiligi” atamasi nafaqat anatomik o‘zgarishni, balki funksional buzilish holatini ham ifodalaydi. Bu esa terminning semantik ko‘p qirrali bo‘lishiga olib keladi. Bunday terminlar eslab qolish va tushunishni osonlashtirsa-da, ularning noto‘g‘ri talqin qilinishi ehtimolini ham oshiradi. Shu sababli metaforik terminlarni qo‘llashda ehtiyotkorlik va aniqlik zarur.

Zamonaviy tibbiyotda terminologiyani standartlashtirish masalasi alohida dolzarblik kasb etmoqda. Xalqaro tasnif tizimlari, jumladan, ICD (International Classification of Diseases) kabi standartlar terminlarning yagona va aniq ma’noda qo‘llanilishini ta’minlashga xizmat qiladi. Bu esa turli mamlakatlarda faoliyat yuritayotgan mutaxassislar o‘rtasida samarali ilmiy va klinik muloqotni yo‘lga qo‘yish imkonini beradi hamda diagnostika jarayonida aniqlikni oshiradi.

Tibbiy ta’lim tizimida ham semantik tahlil muhim ahamiyatga ega. Talabalar terminlarning kelib chiqishi, ularning morfologik va semantik xususiyatlarini chuqur o‘rganish orqali terminlarni ongli ravishda o‘zlashtiradilar. Bu esa ularning klinik tafakkurini rivojlantiradi, kasbiy kompetensiyasini oshiradi va amaliy faoliyatda terminlardan to‘g‘ri foydalanish ko‘nikmasini shakllantiradi. Ayniqsa, terminlarning etimologiyasi va semantik evolyutsiyasini bilish ularni tez va samarali tushunishga yordam beradi.

Xulosa

Tibbiy terminlarning semantik o‘zgarishlari tibbiyot fanining uzluksiz rivojlanishi va ilmiy bilimlarning kengayishi bilan bevosita bog‘liq bo‘lgan tabiiy jarayon hisoblanadi. Ushbu o‘zgarishlar terminologik tizimning boyishiga, yangi tushunchalarning ifodalanishiga hamda mavjud terminlarning mazmunan takomillashuviga xizmat qiladi. Natijada tibbiy terminologiya zamonaviy ilmiy talablar va klinik ehtiyojlarga moslashib boradi.

Shu bilan birga, semantik transformatsiyalar ayrim hollarda terminlarning ko‘p ma’noliligini yuzaga keltirib, ularning turlicha talqin qilinishiga sabab bo‘lishi mumkin. Bu esa, ayniqsa, klinik amaliyotda diagnostik xatolarga olib kelish ehtimolini oshiradi. Tibbiyot sohasida terminlarning noto‘g‘ri tushunilishi

bemor salomatligiga salbiy ta'sir ko'rsatishi mumkinligi sababli, terminologik aniqlik va izchillik alohida ahamiyat kasb etadi.

Shu bois tibbiy terminlarning standartlashtirilgan, aniq va bir ma'noli shaklda qo'llanilishi zamonaviy tibbiyotning muhim talablaridan biri hisoblanadi. Xalqaro tasnif tizimlari va terminologik standartlar bu jarayonda muhim rol o'ynaydi hamda ilmiy va klinik muloqotning samaradorligini ta'minlaydi.

Bundan tashqari, tibbiy terminologiyaning semantik xususiyatlarini chuqur o'rganish tibbiy ta'lim jarayonida ham katta ahamiyatga ega. Talabalar va mutaxassislar terminlarning kelib chiqishi, ma'nosi va qo'llanilish doirasini anglash orqali ularni amaliy faoliyatda to'g'ri va samarali qo'llash ko'nikmasini rivojlantiradilar.

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TIBBIY TERMINLARNING MORFEMIK TUZILISHI: PREFIKS, SUFFIKS VA ILDIZLARNING FUNKSIONAL TAHLILI

Annotatsiya: Tibbiy terminologiya tizimi murakkab morfemik tuzilishga ega bo'lib, u ko'pincha ildiz, prefiks va suffikslardan tashkil topadi. Ushbu maqolada tibbiy terminlarning morfemik tuzilishi, ularning lingvistik va funksional xususiyatlari hamda klinik amaliyotdagi ahamiyati tahlil qilinadi. Tadqiqot natijalari shuni ko'rsatadiki, prefikslar kasallikning joylashuvi yoki darajasini, suffikslar patologik jarayonni, ildizlar esa asosiy ma'noni ifodalaydi. Bu esa tibbiy terminologiyani aniqligi va tizimlilikini ta'minlaydi.

Kalit so'zlar: tibbiy terminologiya, morfema, prefiks, suffiks, ildiz, lingvistika, termin yasash.

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MORPHEMIC STRUCTURE OF MEDICAL TERMS: FUNCTIONAL ANALYSIS OF PREFIXES, SUFFIXES, AND ROOTS

Abstract: *The system of medical terminology has a complex morphemic structure and usually consists of roots, prefixes, and suffixes. This article analyzes the morphemic structure of medical terms, their linguistic and functional features, as well as their significance in clinical practice.*

The results of the study show that prefixes indicate the location or degree of a disease, suffixes reflect pathological processes, and roots convey the core meaning of the term. This ensures the accuracy and systematic nature of medical terminology.

Keywords: *medical terminology, morpheme, prefix, suffix, root, linguistics, word formation.*

Kirish

Tibbiy terminologiya ilmiy tilning muhim tarkibiy qismi bo'lib, unda lotin va yunon tillarining ta'siri kuchli. Tibbiy terminlarning aksariyati morfemik birliklardan – prefiks, ildiz va suffikslardan tashkil topadi. Bu birliklar terminlarning ma'nosini aniqlashtirish va ularni tizimlashtirishda muhim rol o'ynaydi.

Zamonaviy tibbiyotda terminlarni to'g'ri tushunish diagnostika va davolash jarayonida muhim ahamiyatga ega. Shu sababli tibbiy terminlarning morfemik tuzilishini o'rganish dolzarb masala hisoblanadi.

Ushbudagi tibbiy terminlarning yasalihi va xulosa morfologik tahlili tahlili. Terminlarning tarkibi va qismlari – asos (negiz), prefikslar suffikslardan iboratligi ko'rsatilib, ular yangi atamalarni tez va amaliyotda to'g'ri qo'llash ta'kidlanadi. Misollar va tahlil yordamida prefikslar, suiqslari va asoslar bilan tibbiy terminlarni qilish ko'rsatildi. Shu bilan birga, xalqaro standartlar (Terminologia Anatomica) orqali terminologiyani yagona va aniq belgilash muhimligi ta'kidlandi.

Materiallar va metodlar

Tibbiy terminologiya xalqaro standartlarga muvofiq bo'lishi shart. Xalqaro Terminologia Anatomicakabi standartlar terminlarni bir xilda ishlatishga imkon beradi, sinonimlar va chalkashliklarni kamaytiradi. Bu, ayniqsa, turli mamlakatlarda o'qiyotgan talabalar va xorijiy mutaxassislar bilan muloqotda muhimdir. Shu nuqtai nazardan, tibbiy terminlarning yasalihi va ularni morfologik tahlil qilish nafaqat akademik bilimlarni oshirish, balki klinik amaliyotda xatoliklarni kamaytirish va ilmiy tadqiqotlar samaradorligini oshirishga xizmat qiladi. Ushbu maqola tibbiy atamalarning tarkibiy qismlari – asos (o'zak qismi), prefikslar va suffikslarga e'tibor qaratgan holda ularning morfologik tahlilini ko'rsatadi hamda keng qo'llaniladigan misollar bilan tushuntiradi. Tibbiy terminlarning yasalihi turlari. Atamalarning asos qismidan hosil bo'lgan terminlarni terminning negiz qismiorgan, tizim yoki kasallik nomini bildiradi va uning asosiy ma'nosini belgilaydi. *cardi* – yurak (*cardiologia* – yurak kasalliklarini o'rganadiga va davolaydigan soha) *nephro* – buyrak (*nephritis* –

buyrakningyallig‘lanishi)oste—suyak (osteoporosis —suyaklarning zaiflashishi)Prefikslar so‘z boshida qo‘shilib, ma‘noni kengaytiradi yoki o‘zgartiradi:hyper—ortiqcha (hypertensio —yuqori qon bosimi)hypo—yetishmovchilik (hypoglycemia —qondashaker miqdorining kamayishi)sub—ostida (subcutaneous —teri ostida).Suffikslar so‘z oxirida qo‘shilib, jarayon, kasallik yoki tadqiqot ma‘nosini bildiradi:-itis—yallig‘lanish (hepatitis —jigarningyallig‘lanishi), -ectomy—jarrohlik yo‘li bilan olib tashlash (appendectomy —appenditsitni olib tashlash), -logia—ilmiy tadqiqot (neurologia—asab tizimini o‘rganadigan soha).Ba‘zi tibbiy atamalar bir nechta ildiz yoki morfemalardan hosil bo‘ladi:gastroenterologia—oshqozon (gastro-) va ichak (enter-) ilmiy tadqiqoti (-logia), rhinoplastica—burun (rhino-) shaklini tuzatish (-plastica).Tibbiy terminlarning morfologik tahlili.Morfologik tahlil termin tarkibini —ildiz, prefiks va suffikslarni aniqlashga yordam beradi. Bu yondashuv yangi terminlarni tushunish va eslab qolishni osonlashtiradi.Atamaning asos qismiorgan, tizim yoki jarayon nomini bildiradi.oste—suyak (osteoporosis)cardi—yurak (cardiomyopathia)derm—teri (dermatitis)Prefikslar so‘zning ma‘nosini aniqlashtiradi:tachy—tez (tachycardia —yurakning tez urishi), brady—sekin(bradycardia —yurakning sekin urishi), poly—ko‘p (polyneuritis —ko‘plab nervlarningyallig‘lanishi).Suffikslar tibbiy jarayon yoki holatni ko‘rsatadi:-pathia—kasallik (neuropathia—asab kasalligi), -scopia—asbob yordamida tekshirish (endoscopia—ichki organlarni asbob yordamida tekshirish), -ectomy—olib tashlash (tonsillectomy—bodomsimon bezniolib tashlash).

Tadqiqot davomida tibbiy terminologiya va lingvistika sohasiga oid ilmiy adabiyotlar tahlil qilindi.

Qo‘llanilgan metodlar:

ilmiy adabiyotlarni tahlil qilish;

morfologik tahlil;

qiyosiy tahlil;

tavsifiy metod.

Material sifatida tibbiy terminlar lug‘atlari, farmatsevtik va klinik terminologiya manbalari hamda o‘quv qo‘llanmalar tanlab olindi.

Natijalar

Tahlillar shuni ko‘rsatdiki, tibbiy terminlarning asosiy qismi uchta morfemik komponentdan tashkil topadi:

1. Ildiz (root)

Ildiz terminning asosiy ma‘nosini ifodalaydi. Masalan:

cardio — yurak

neuro — asab

hepat — jigar

2. Prefiks (prefix)

Prefiks termin boshida kelib, qo‘shimcha ma‘no beradi:

hyper- — ortiqcha (hypertonia)

hypo- — kam (hypoglycemia)

sub- — osti

3. Suffiks (suffix)

Suffiks termin oxirida kelib, kasallik yoki holatni bildiradi:

-itis – yallig‘lanish

-osis – kasallik

-algia – og‘riq

Natijalar shuni ko‘rsatdiki, bu morfemik birliklar orqali terminlar tizimli va aniq shakllanadi.

Muhokama

Tibbiy terminlarning morfemik tuzilishini o‘rganish nafaqat lingvistik, balki amaliy jihatdan ham muhim ahamiyatga ega. Morfemik tahlil yordamida murakkab terminlarning ma’nosini tez va aniq tushunish mumkin. Bu esa tibbiyot xodimlari uchun muhim kompetensiya hisoblanadi.

Prefikslar tibbiy terminlarda asosan miqdor, daraja yoki joylashuvni bildiradi. Masalan, hyper- va hypo- prefikslari organizmdagi jarayonlarning ortiqcha yoki kamligini ifodalaydi. Bu esa diagnostika jarayonida muhim rol o‘ynaydi. Shuningdek, intra-, extra- kabi prefikslar anatomik joylashuvni aniqlashga yordam beradi.

Suffikslar esa terminning klinik mazmunini belgilaydi. Masalan, -itis suffiksi yallig‘lanishni bildirs, -oma o‘simtani ifodalaydi. Bu esa shifokorlarga kasallik turini tez aniqlash imkonini beradi. Shu jihatdan suffikslar klinik terminologiyada asosiy diagnostik indikator sifatida xizmat qiladi.

Ildizlar esa terminning asosiy semantik yadrosini tashkil etadi. Masalan, cardio- ildizi yurak bilan bog‘liq barcha terminlarda uchraydi. Bu esa terminlarni tizimlashtirish va guruhlash imkonini beradi.

Morfemik tuzilishning yana bir muhim jihat – uning universalligi. Lotin va yunon morfemalari xalqaro tibbiy terminologiyada bir xil ma’noni ifodalaydi. Bu esa turli mamlakatlarda ishlovchi shifokorlar o‘rtasida samarali kommunikatsiyani ta’minlaydi.

Biroq ayrim hollarda terminlarning murakkabligi yoki ko‘p komponentli bo‘lishi ularni tushunishda qiyinchilik tug‘dirishi mumkin. Ayniqsa yangi boshlovchi talabalar uchun terminlarning uzun va murakkab shakllari muammoli bo‘lishi mumkin. Shu sababli tibbiy terminologiyani o‘qitishda morfemik tahlil metodidan foydalanish muhimdir.

Zamonaviy ta’limda innovatsion metodlar yordamida terminlarning morfemik tuzilishini o‘rgatish yanada samarali bo‘lmoqda. Masalan, interfaol metodlar, vizual materiallar va elektron lug‘atlar terminlarni oson o‘zlashtirishga yordam beradi.

Umuman olganda, morfemik tahlil tibbiy terminologiyani chuqur tushunish va amaliyotda to‘g‘ri qo‘llash uchun zaruriy asos hisoblanadi.

Standartlashtirilgan terminologiya shifokorlar, farmatsevtlar va ilmiy xodimlar o‘rtasidagi muloqotda chalkashliklarning oldini oladi hamda klinik va ilmiy axborotning to‘g‘ri talqin qilinishiga xizmat qiladi. Ayniqsa, anatomik tuzilmalar, fiziologik jarayonlar va patologik holatlarni ifodalovchi terminlarning yagona tizim asosida qo‘llanilishi tibbiy amaliyotda muhim ahamiyat kasb etadi.

Bu esa turli mamlakatlarda faoliyat yuritayotgan mutaxassislar uchun ham terminlarning bir xil tushunilishini ta'minlaydi.

Shu nuqtai nazardan, tibbiy terminlarning yasaliş jarayonini o'rganish va ularni morfologik tahlil qilish tibbiyot ta'limi va ilmiy izlanishlar uchun zarur vosita hisoblanadi. Terminlarning tarkibiy qismlarini — ya'ni ildiz, prefiks va suffikslarni tahlil qilish orqali ularning mazmunini chuqurroq anglash mumkin bo'ladi. Bu jarayon talabalarning nafaqat terminlarni yodlab olishiga, balki ularning ma'nosini mantiqiy tushunishiga yordam beradi. Natijada ular klinik amaliyotda, diagnostika jarayonida va ilmiy faoliyatda terminlardan to'g'ri foydalanish ko'nikmasiga ega bo'ladilar.

Xulosa

Tibbiy terminlarning morfemik tuzilishi ularning aniqligi va tizimlilikini ta'minlaydi. Prefiks, ildiz va suffikslarning funksional ahamiyati terminlarning ma'nosini to'g'ri tushunishga yordam beradi. Morfemik tahlil tibbiyot mutaxassislari uchun muhim bilim hisoblanadi. Tibbiy terminlarni xalqaro standartlarga muvofiq ravishda qo'llash tibbiyot sohasida aniqlik va izchillikni ta'minlovchi muhim omillardan biri hisoblanadi.

Tibbiy terminlar asosan lotin va yunon tillari ildizlariga asoslanib shakllangan bo'lib, ular prefiks va suffikslar yordamida kengaytiriladi. Prefikslar terminning umumiy ma'nosiga qo'shimcha aniqlik kiritib, kasallikning darajasi, joylashuvi yoki xususiyatini ifodalaydi. Suffikslar esa, odatda, patologik holat, jarayon yoki kasallik turini bildiradi. Ildiz esa terminning asosiy semantik mazmunini tashkil etadi. Ushbu morfemik elementlarning uyg'unlashuvi natijasida murakkab, lekin aniq va tizimli tibbiy terminlar hosil bo'ladi.

Morfologik tahlil usulining yana bir afzalligi shundaki, u terminlarni o'zlashtirish jarayonini yengillashtiradi va ularni uzoq muddat xotirada saqlashga yordam beradi. Jadval, sxema va amaliy misollar asosida terminlarning tarkibiy qismlarini ko'rsatish ularning tuzilishi va ma'nosini vizual tarzda anglash imkonini yaratadi. Bu esa o'quv jarayonining samaradorligini oshiradi hamda talabalar bilimini mustahkamlaydi.

Bundan tashqari, standartlashtirilgan tibbiy terminologiya tibbiyot sohasida yagona ilmiy tilni shakllantiradi. Bu esa xalqaro ilmiy hamkorlikni rivojlantirish, klinik ma'lumotlar almashinuvi va ilmiy tadqiqotlar natijalarini taqdim etishda muhim rol o'ynaydi. Natijada tibbiy terminlardan to'g'ri va izchil foydalanish nafaqat ilmiy aniqlikni ta'minlaydi, balki tibbiy xizmat sifatini oshirishga ham xizmat qiladi.

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THE CONCEPT OF POPULATION LIVING STANDARDS AND THE SCIENTIFIC BASIS FOR ITS ECONOMIC GEOGRAPHICAL STUDY

Abstract. *This article examines the theoretical essence of the concept of population living standards and highlights the scientific foundations for studying it from an economic geographical perspective. This research, the standard of living is considered as an important indicator reflecting the level of socio-economic development of society. In addition, the system of economic, demographic, and social indicators used to assess the population's living standards, as well as their territorial differences, are examined. The results of the study indicate that examining living standards based on an economic geographical approach plays an important role in identifying regional disparities in development, improving socio-economic policy, and drawing scientifically grounded conclusions aimed at enhancing the welfare of the population.*

Keywords: *population living standards, quality of life, social welfare, economic geography, regional development, income level, social infrastructure, demographic factors, regional disparities, socio-economic development.*

Introduction

The standard of living of the population is one of the socio-economic categories that is important in assessing the development of society. This concept encompasses a set of factors that characterize the material well-being of the population, access to social services, and living conditions. The standard of living is an important indicator that reflects how the results of economic development are distributed among members of society, and provides an idea of the overall socio-economic development of the country. Therefore, this issue is widely studied within various scientific disciplines, such as economics, sociology, demography, and economic geography. In order to improve social well-being and ensure sustainable development, in-depth study of the theoretical and methodological foundations of living standards is emerging as one of the urgent scientific tasks.

The economic geographical approach allows us to analyze the standard of living of the population in close connection with regional development processes. The natural resource potential of regions, the territorial location of production, transport and communication links, and the level of development of social infrastructure have a significant impact on the living conditions of the population. As a result, living standards indicators will have certain differences across regions.

Identifying the causes of these differences and scientifically analyzing the factors that form them is one of the important areas of economic geographical research. Spatially studying the standard of living of the population is important for assessing disparities in regional development, improving social policy, and developing scientifically based conclusions aimed at the effective use of economic resources.

Literature analysis

The issue of the standard of living of the population is one of the most widely studied scientific areas within the framework of economic and social sciences. In scientific literature, this concept is interpreted as a complex socio-economic category that reflects the material well-being of the population, consumption opportunities, income levels, and conditions for using social services. In his work *“Development as Freedom,”* renowned economist Amartya Sen analyzes living standards as inextricably linked to human freedoms, economic opportunities, and social conditions. In his opinion, the main goal of the economic development process is to increase the well-being of society's members and expand their opportunities [1].

The issue of assessing the standard of living is also of particular importance in modern economic research. The study *“Report by the Commission on the Measurement of Economic Performance and Social Progress”* prepared by J.E. Stiglitz, A. Sen, and J.P. Fitoussi substantiates the need to take into account indicators of population well-being, social equality, and quality of life in addition to gross domestic product indicators when assessing economic development [2]. Also, M. Todaro and S. Smith, in their work *“Economic Development”*, emphasize that economic development processes are directly related to the standard of living of the population, noting that income growth, employment levels, and the development of social infrastructure are important factors in increasing well-being [3].

The connection between regional development processes and living standards has also been widely covered in economic geography research. For example, P. Krugman, in his work *“Geography and Trade”*, emphasizes that the territorial location of production, transport links, and the formation of economic centers have a significant impact on the level of regional economic development [4]. At the same time, R. Florida, who studied the problems of modern urbanization and regional economics, notes in his work *“The Rise of the Creative Class”* the increasing importance of human capital, innovation, and the creative economy in the process of economic development [5].

The issue of the population's standard of living has also been examined in national economic studies. In particular, in the textbook *“Demography”* by Q. Abdurahmonov and X. Abduramanov, the influence of demographic processes, population growth, age structure, and migration on socio-economic development and the standard of living of the population is explained [6]. Furthermore, in his textbook *“Labor Economics: Theory and Practice”*, K. Abdurahmonov highlights population income, employment level, and labor market development as important

economic factors influencing living standards [7]. In addition, the work "*World Economy and International Economic Relations*" by A. Vahobov and Sh. Xajibakiyev emphasizes that global economic processes, international integration, and economic cooperation have a significant impact on the socio-economic development of countries, including the standard of living and welfare of the population [8]. In recent years, several studies have also paid particular attention to examining the standard of living of the population from an economic-geographical perspective, identifying its territorial characteristics, and assessing its relationship with economic development processes [9, 10].

Thus, the analysis of scientific research shows that the standard of living of the population is a complex socio-economic process that is inextricably linked to economic development, the use of regional resources, the level of employment, and the development of social infrastructure. Therefore, studying living standards based on an economic geographic approach is of significant scientific importance in identifying disparities in regional development and improving socio-economic policy.

Research methodology

This study used a comprehensive scientific approach to study the living standards of the population from an economic geographical perspective. The theoretical basis of the research methodology is systematic analysis, economic and statistical methods, and regional comparison methods. This methodological approach allows us to determine the essence of the standard of living, analyze the economic and social factors that influence its formation, and assess its relationship with socio-economic processes. During the research, indicators such as population income, consumer spending, employment rate, and level of social infrastructure were analyzed and considered important indicators for assessing living standards.

During the scientific research, methods of statistical data generalization, comparative analysis, and regional analysis were used. Comparative analysis identifies the characteristics of the formation of living standards in different regions and the degree of their differentiation. Territorial analysis serves to study factors related to the level of use of economic resources, the territorial location of production, and the level of development of social infrastructure. At the same time, comprehensive scientific conclusions were formed by identifying the interrelationships between economic, demographic, and social indicators in assessing living standards. This methodological approach allows for an in-depth analysis of the regional characteristics of the standard of living of the population and a scientific assessment of socio-economic development processes.

Results and their analysis

The results of the study showed that the standard of living of the population is a complex and multifaceted socio-economic category. This concept is not limited to income alone, but is determined by a complex of many socio-economic factors, such as the population's access to education, level of access to the healthcare system, housing conditions, transportation, and access to public utilities. Therefore, it is necessary to conduct a comprehensive analysis of

economic, demographic, and social indicators when assessing living standards. Modern economic research also emphasizes the need to assess the well-being of the population not only by income indicators, but also by taking into account indicators of quality of life, social equality, and human development. In particular, according to the concept of human capabilities developed by Amartya Sen, in the process of assessing the well-being of a society, along with a person's economic capabilities, his social freedoms and living conditions are also of great importance [1, 2].

Economic and geographical studies show that economic, demographic, social, and infrastructural factors have a complex impact on the formation of the standard of living of the population. The relationship between these factors is reflected in the following model (Figure 1).

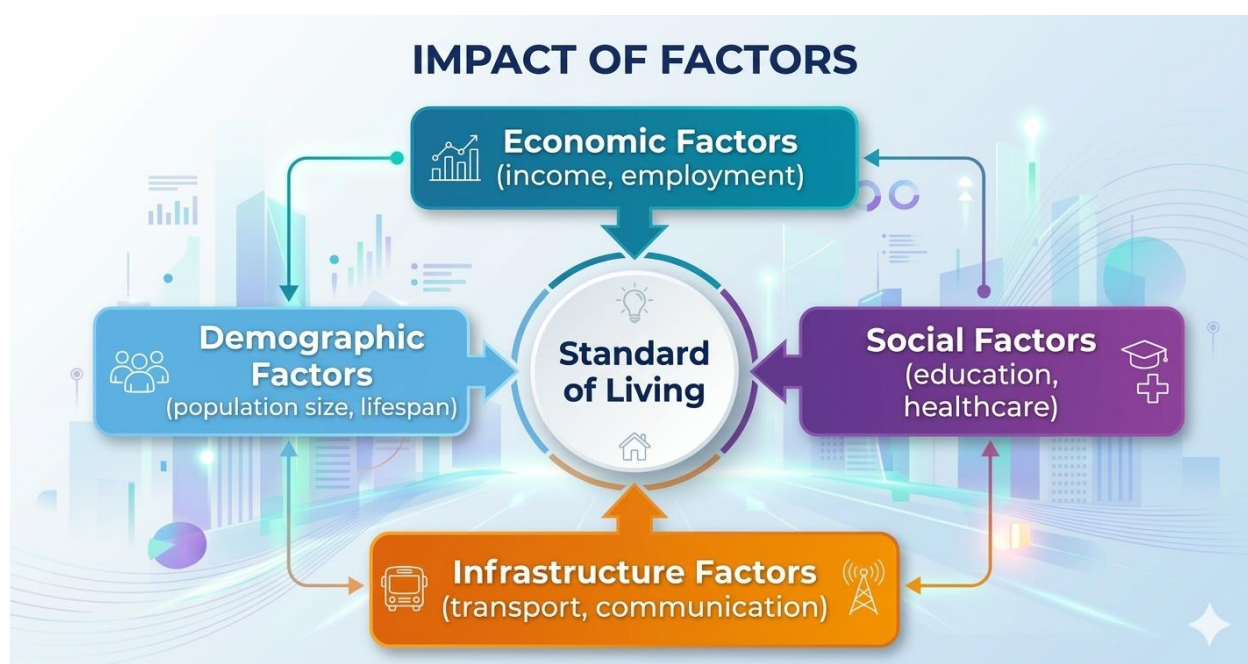


Figure 1. Model of factors influencing the formation of the standard of living of the population

Source: compiled by the author.

This model represents a system of key factors influencing the formation of the standard of living of the population. It reflects the interdependence of economic factors (income and employment), demographic factors (population size and life expectancy), social factors (education and healthcare), and infrastructure factors (transport and communications) that influence the formation of living standards.

Analyses show that real incomes, employment rates, and access to social services are important factors in shaping living standards. In particular, in the processes of economic development, an increase in employment levels, an increase in sources of income, as well as an expansion of production potential have a positive impact on increasing the well-being of the population. This process is also considered an important factor in economic development theories, and the

effective distribution of the results of economic growth among members of society is recognized as an important condition for increasing living standards. According to Todaro and Smith's research, in the process of economic development, income growth, expansion of employment opportunities, and development of social infrastructure are among the main factors that increase the standard of living of the population [3].

Analyses conducted from an economic geographical perspective made it possible to identify regional characteristics of living standards. Due to the different levels of economic resources, production potential, and infrastructure development in different regions, the living conditions of the population also vary significantly across regions. In regions with highly developed economic activity, employment opportunities are wide, income sources are more numerous, and social infrastructure is relatively developed. As a result, a higher standard of living is formed in such areas. Conversely, in regions with low economic activity, income sources are limited and access to social services may be lower. This confirms that differences in the level of regional economic development directly affect the standard of living of the population. According to the theory of regional economics developed by P. Krugman, the territorial concentration of production and the development of transport links lead to the formation of centers of economic activity, and this process has a significant impact on the level of regional well-being [4].

Urbanization processes also have a significant impact on the formation of the standard of living of the population. Employment opportunities will be wider due to the highly developed economic activity, service sectors, and innovative infrastructure in large cities and industrial centers. As a result, income levels and access to social services in urban areas may be higher than in rural areas. According to the concept of the creative economy put forward by R. Florida, regions with developed innovative activities, human capital, and modern economic infrastructure become important centers of economic development and population well-being [5].

The results of the study confirmed that the development of transport and communication infrastructure also has a significant impact on the standard of living of the population. In regions with developed transport networks, economic ties expand, manufacturing and service sectors actively develop, and labor market opportunities expand. As a result, there is an increase in the population's income and improvement in living conditions. At the same time, the development of the education and healthcare systems is also an important factor in improving the quality of life.

In general, the conducted analyses showed that the formation of the standard of living of the population occurs as a result of the interaction of the level of economic development, the development of social infrastructure, demographic processes, and territorial factors. Therefore, taking into account regional development factors when developing socio-economic policies aimed at improving living standards is of significant scientific and practical importance. A

balanced organization of regional economic policy, development of social infrastructure, and efficient use of economic resources are important conditions for increasing the well-being of the population.

Conclusion

The results of the study confirmed that the standard of living of the population is one of the important indicators characterizing the level of socio-economic development of society. The standard of living is a complex socio-economic category that is inextricably linked to the population's income, employment rate, access to social services, and living conditions. During the study, the theoretical foundations of this concept were analyzed and the need to use a set of economic, demographic, and social indicators to assess living standards was scientifically substantiated. Modern economic research also shows the need for a comprehensive analysis of quality of life, social equality, and human development indicators when assessing the well-being of a society.

The conducted analyses showed that the standard of living of the population is directly related to the level of regional development. It has been found that the standard of living is relatively high in regions with developed economic activity, a well-developed infrastructure system, and widely developed social services. Conversely, in regions with limited access to economic resources, socio-economic indicators may be lower. This confirms that differences in the level of regional economic development have a significant impact on the well-being of the population.

Therefore, it is important to take into account regional development factors when developing socio-economic policies aimed at improving the living standards of the population. Developing social infrastructure, improving the transport and communication system, expanding employment opportunities, as well as a balanced distribution of economic activity across regions are important conditions for increasing the well-being of the population. Consistent measures implemented in these areas will serve as an important factor in strengthening social stability and achieving sustainable development goals.

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XIVA TUMANI AHOLISI VA JOYLASHUVNING HUDUDIIY XUSUSIYATLARI

Annotatsiya: Tadqiqot ishida Xiva tumanining aholisi va uning joylashuvining hududiy jihatlari statistik ma'lumotlar hamda geografik axborot tizimalari (GAT) texnologiyalari asosida geofazoviy ma'lumotlar bazasidan foydalanib tahlil qilingan.

Kalit so'zlar: Xiva tumani, aholi soni, aholi manzilgohlari morfologiyasi, geofazoviy ma'lumot, GAT texnologiyalari, urbanizatsiya, avtomobil yo'llari, qishloq xo'jaligi yerlari, yer uchastkasi.

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POPULATION OF KHIVA DISTRICT AND TERRITORIAL FEATURES OF ITS SPATIAL DISTRIBUTION

Abstract: This study analyzes the population of Khiva District and the territorial aspects of its spatial distribution based on statistical data and geospatial database using Geographic Information Systems (GIS) technologies.

Keywords: Khiva District, population size, morphology of settlements, geospatial data, GIS technologies, urbanization, roads, agricultural lands, land parcel.

Kirish

Qadimiy aholi maznilgohlaridan biri hisoblangan Xiva tumani Xorazm viloyatining tarixiy madaniy hududlaridan biri bo'lib, uning rivojlanishi bevosita Xiva shahri va Xorazm vohasi bilan chambarchas bog'liqdir. Ushbu hudud qadimdan sug'orma dehqonchilik, hunarmandchilik va savdo yo'llari kesishgan maskan sifatida shakllangan. Ayniqsa, Buyuk Ipak yo'li davrida Xiva va uning atrof hududlari iqtisodiy va madaniy markaz sifatida muhim o'rin tutgan. Tumanning tarixiy rivojlanishi tabiiy-geografik sharoitlar, Amudaryo deltasi landshaftlari va irrigatsiya tizimlari bilan uzviy bog'liq bo'lib, bu holat hududiy joylashuvning o'ziga xos xususiyatlarini belgilab bergan.

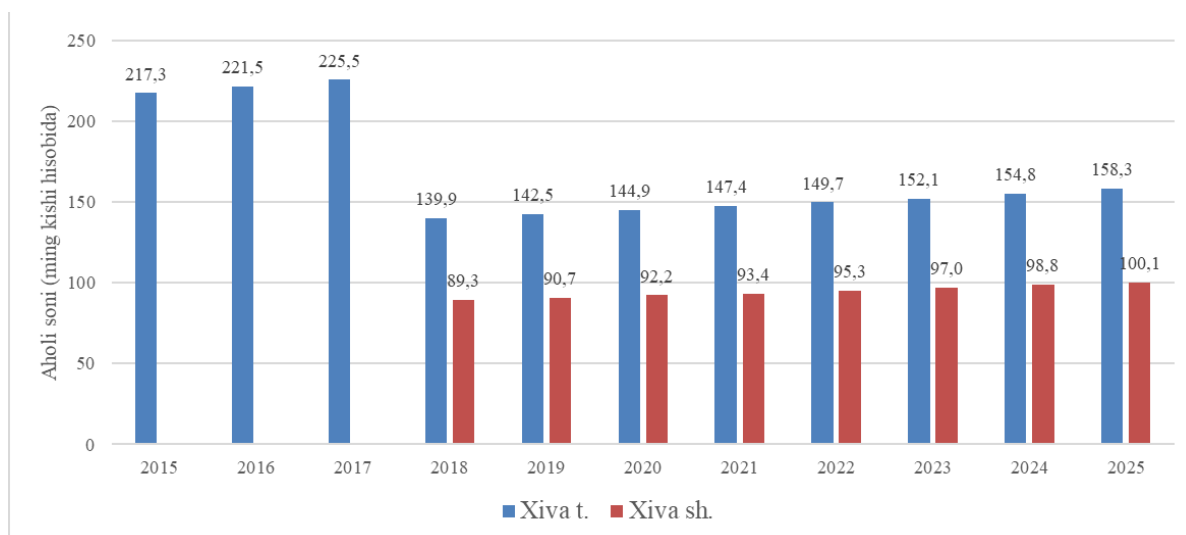
Bugungi kunda Xiva tumani aholisi soni, joylashuvi va demografik tarkibi mintaqaning ijtimoiy-iqtisodiy rivojlanishida muhim omil hisoblanadi. Aholining asosiy qismi qishloq joylarda istiqomat qilib, dehqonchilik, chorvachilik va xizmat ko'rsatish sohalarida band. So'nggi yillarda urbanizatsiya jarayonlari, infratuzilmaning rivojlanishi va turizm salohiyatining ortishi (ayniqsa Ichon qal'a bilan bog'liq holda) hudud aholisining joylashuvi va iqtisodiy faolligiga sezilarli ta'sir ko'rsatmoqda. Shu jihatdan, Xiva tumani aholisi va uning hududiy xususiyatlarini o'rganish geografik, demografik va iqtisodiy tahlillar uchun dolzarb ahamiyat kasb etadi.

Asosiy qism.

Xiva tumani 1925-yil 29-sentabrda tashkil topgan. Shimoli-g'arbdan Qo'shko'pir, shimoldan Urganch, shimoli-sharqdan Yangiariq tumanlari, janubi-g'arbdan esa Turkmaniston respublikasi bilan chegaradosh. Maydoni 432,2 kv. km. aholisi 2025-yil 1-yanvar holatiga 158,3 ming kishini tashkil etadi. (Xiva shahri aholisi esa 100,2 ming kishidan ortiq) (1-rasm). Tuman hududi Amudaryo quyi oqimining chap sohilida joylashgan. Dengiz sathidan o'rtacha. balandligi 97 m. G'arbiy qismida Qoraqum cho'lining Unguzorti hududlari bilan chegaralanadi.

Xiva tumanida Gandimyon, Dashyon, Juryon, Sayyot, Chinobod, Oqyop. kabi o'ndan ortiq qadimiy qishloqlar joylashgan. Akasriyat aholi manzilgohlari boy qadimiy tarixga ega bo'lib, ko'plab tarixiy obidalar bugungi kungacha saqlanib qolgan.

Xususan O'rta Osiyodagi ilk davlatchilik markazlaridan biri sifatida Xiva shaxrining shakllanganligi tuman aholi mazilgohlari joylashuviga muhim ta'siri ko'rsatgan. Qadimiy Xorazm vohasida aholi azaldan sug'orma dehqonchilik hududlarida zich joylashib kelgan. Xususan, Xiva nafaqat mamlakatimizdagi, balki dunyo miqyosidagi muhim tarixiy-madaniy meros obyekti hamda shaharsozlik nuqtai nazaridan mo'jizaviy qal'a sifatida e'tirof etiladi.



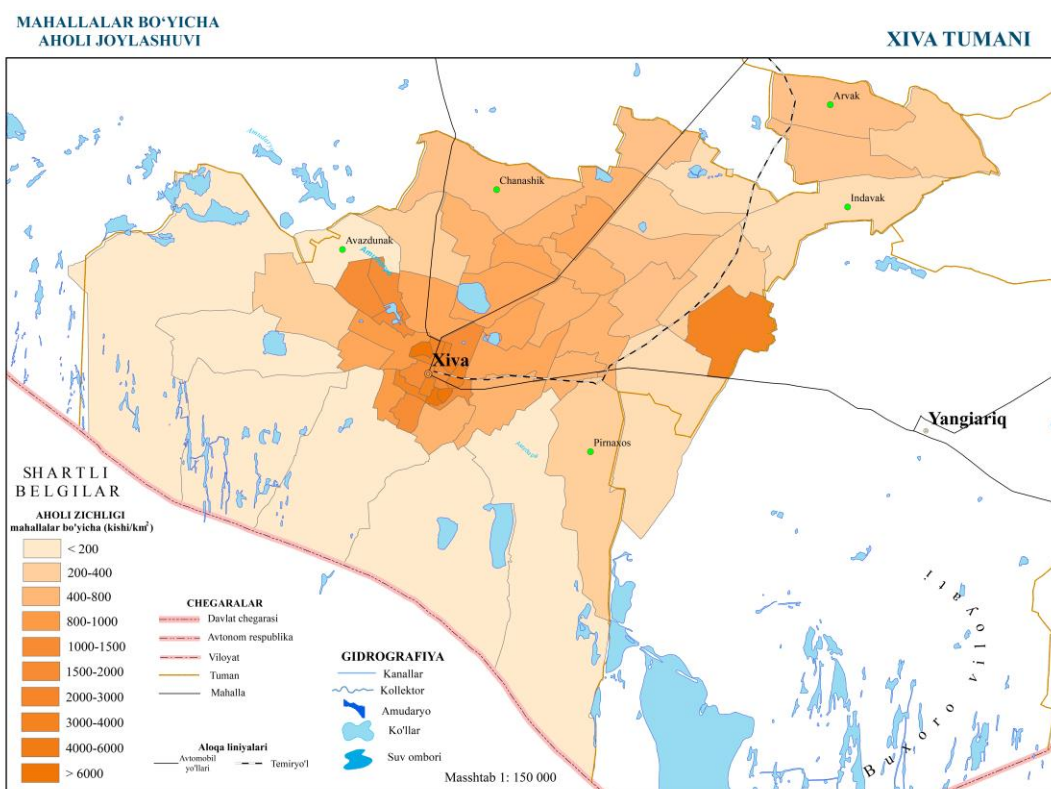
1-rasm. Xiva tumani va shahari aholi soni dinamikasi

Uning mo'jizasi o'z bag'rida qadimiy shaharsozlik qiyofasini bugungi kungacha saqlab kelayotganligida va o'ziga xos shaharsozlik qurilishi, ko'rinishida namoyon bo'ladi. Shaharning qadimiyligi ko'plab yozma manbalarda bitilgan. X asrda yashab o'tgan arab sayyohi Istaxriy "Xiva - nafaqat Xorazmdagi, balki Sharqdagi qal'a ichida qal'a barpo etish asosida tiklangan ilk shaharlardan biri" deb yozadi. Arxeologik tadqiqotlarning ko'rsatishicha, shahar tarixi 2500 yildan ortiq va 1997-yilda "yubileyi" xalqaro miqyosda nishonlandi. Shahar 1990-yildayoq YUNESKO ning "Butun Jahon merosi yodgorliklari" ro'yhatiga kiritilgan [1].

Islom hamkorlik tashkilotining XI sessiyasi doirasida ilk bor O'zbekiston shaharlaridan biri – Xiva 2024-yil "Islom dunyosining turizm poytaxti" deya e'lon qilindi. Bu esa o'z navbatida shaharning tarixiy qiyofasini tiklanishi, sayyohlarning katta oqimini qabul qilish uchun yaratilgan sharoitlar, infratuzilmaning yaxshilanishiga katta turtki bo'lmoqda.

Xiva tumani aholisi asosan qadimiy sug'orma dehqonchilik markazlarida istiqomat qiladi. Bundan tashqari transport yo'llari, xizmat ko'rsatish infratuzilmasi, shahar atrofi hududlarida ham aholining zich joylashganligini kuzatish mumkin (2-rasm).

Tuman aholisi urbanizatsiya darajasi viloyat miqyosida eng past o'rinlarda, bunga sabab Xiva shaxri viloyatmiqyosidagi darajasi berilganidan keyin asosiy shahar infratuzilmasining boshqa hududiy birlikka o'kazilishidir.



2-rasm. Xiva tumani aholisi zichligi mahallar kesimidagi karta sxemasi

Ishni bajarish dastlab ma'lumotlarni to'plash va saralashdan boshlandi. Tadqiqot ishida dastlab Xiva tumani aholisi va uning hududiy jihatlari statistik ma'lumotlar asosida tahlil qilinib tuman aholi kartasi tuzildi.

Xulosa

Xiva tumani aholi joylashuvi statistik va geofazoviy ma'lumotlardan foydalanib kartografik tahlil qilindi va quyidagi xulosalarga kelindi:

✓ Xiva tumani ma'muriy chegaralarining o'zgarishi natijasida urbanizatsiya darajasi 11% ni tashkil qiladi. Bu ko'rsatkich nafaqat viloyatda respublikamizda ham eng past ko'rsatkichlardan biridir.

✓ Tuman aholisi yillik o'rtacha o'sish darajasi 2,2%ni tashkil qiladi. ochiq yashil maydonlar bo'lishi talab qilinadi.

✓ Aholi asosan qadimiy sug'orma dehqochilik markazlarida joylashganligi shahar infratuzilmasi shakllanishiga salbiy ta'sir qilmoqda.

✓ Kelajakda aholi joylashuvini va dinamikasini boshqashda Xiva shaxri turizm salohiyati hamda infratuzilma imkoniyatlarini inobatga olish maqsadga muvofiqdir.

Bundan tashqari, Xiva shahri negizida hududida turizmni rivojlantirish va aholiga qulay shart-sharoitlar yaratish maqsadida infratuzilma obyektlarini imkoniyatlarini doimiy oshirib borish va yangilarini barpo qilish maqadga muvofiqdir.

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CAREER-ORIENTED TEACHING OF THE TOPIC “FORCES IN NATURE AND THEIR PRACTICAL APPLICATIONS” IN VOCATIONAL SCHOOLS

Abstract: *This article highlights the importance of developing professional competencies in future physics teachers through career-oriented teaching.*

Keywords: *career-oriented teaching, dynamic forces, professional competencies*

Improving the quality of teaching subjects within the continuous education system and raising a well-rounded generation is a requirement of modern times. The use of modern pedagogical technologies in forming deep knowledge, skills, and competencies, as well as demonstrating their practical application, creates opportunities to improve the quality of education. Today, the issue of career-oriented teaching is also highly relevant. In particular, STEAM-based education aims to provide students with the knowledge and skills necessary to succeed in various fields. This approach not only supports the study of traditional subjects but also facilitates their practical and creative application.

Physics is one of the fundamental sciences that studies the laws of nature and serves as the scientific basis of all technology and production. In vocational schools, this subject provides not only theoretical knowledge but also develops practical skills directly applicable to students' future professional activities.

Astronomy studies celestial bodies, the origin, structure, and composition of the universe, as well as the relationship between changes in celestial objects and natural conditions on Earth. Therefore, in the process of teaching physics and astronomy in vocational schools, special attention is paid to:

- linking theoretical knowledge with practice;
- preparing students for professional activities;
- teaching effective use of modern pedagogical technologies and ICT;
- developing independent thinking, problem-solving skills, and creativity;
- using innovations in the field of astronomy.

In seminar classes on career-oriented teaching of physics and astronomy, students develop knowledge and skills related to connecting the subject matter with the specialties acquired in vocational schools. This strengthens their professional motivation. Accordingly, the **dynamics section of mechanics** was selected.

When teaching the topic “*Laws of Dynamics. Forces in Nature and Their Applications*”, it is important to reveal the physical essence of force, its types, and its practical significance.

Types of Forces

Students explain the types of dynamic forces in nature and science as follows:

1. Classical dynamic forces (Newton’s laws, gravity, friction, elasticity, air resistance, centripetal force, etc.)
2. Forces identified through scientific research and observation:
 - Earthquake forces
 - Ocean waves and water currents
 - Wind-generated forces (energy)
 - Cosmic forces
 - Biological forces
 - Forces in modern technologies

Understanding the practical applications of these forces is of great importance.

Applications of Dynamic Forces

1. **Wind energy** is widely used today to generate electricity. Wind turbines convert air flow into kinetic energy.
2. **Ocean waves and water currents** are being studied as environmentally friendly energy sources. For example, projects exist in France and Japan.
3. **Earthquake forces:** Scientific studies show that dynamic forces during earthquakes can destroy structures; therefore, engineers design earthquake-resistant buildings.
4. **Cosmic forces:** During rocket launches, reactive force is involved. Artificial satellites remain in orbit due to centripetal and gravitational forces. According to NASA research, spacecraft are sent to Mars and other planets by calculating dynamic forces.
5. **Biological forces:** Hydrodynamic forces are involved when the human heart pumps blood. This knowledge is essential for medical professionals.

Dynamic Forces in Modern Technologies

- In automobiles, aerodynamic design reduces air resistance, increasing speed and fuel efficiency.
- In aviation, aircraft wings are designed based on aerodynamic forces. Today, even humans can fly using “artificial wings.”
- In sports, running, jumping, and swimming are based on dynamic forces. Scientists develop special clothing and footwear to reduce air resistance.
- Drones maintain balance in the air using aerodynamic forces.

New Scientific Approaches

- In nanotechnology, forces such as friction and attraction are studied at the molecular level.

- In robotics, dynamic forces are calculated using algorithms to imitate human movement.
- In energy, greater use of wind and water forces is planned in the future.

Future Importance of Dynamic Forces

- Production of environmentally friendly energy
- Space exploration
- Development of fast, safe, and efficient transportation
- Understanding human health (heart, circulation, muscle force)

Forces in Nature and Their Applications

1. Gravitational Force

In nature: falling rain, river flow, tides, planetary motion. **In practice:** space technology, hydropower, construction

Innovations: NASA and ESA use gravitational slingshot methods to accelerate satellites. Projects are also being developed in Uzbekistan to forecast floods based on gravitational effects of the Moon and the Sun.

2. Friction Force

In nature: human walking, bird flight, animal movement. **In practice:** vehicle motion, braking systems, sports equipment

Innovations: Magnetic (frictionless) bearings are being developed to increase efficiency and reduce energy loss. Special low-friction sportswear is also being produced.

3. Elastic Force

In nature: bending trees, muscles, natural springs. **In practice:** shock absorbers, sports equipment, earthquake-resistant construction

Innovations: Engineers are developing “smart elastic materials” that change shape under temperature or pressure and recover afterward.

4. Air and Fluid Resistance

Used in aircraft, drones, rockets, ships, and submarines.

Innovations: Modern electric aircraft are designed to minimize air resistance. Wind power plants are expanding worldwide, including in Karakalpakstan (Uzbekistan).

5. Centripetal and Centrifugal Forces

Used in washing machines, satellites, amusement rides, and sports.

In nature: planetary and lunar motion

Innovations: Artificial gravity concepts in space stations and particle separation techniques in nanotechnology are being developed.

Conclusion

Natural forces are the foundation of human life and technological development. Yesterday they were only theoretical concepts. Today they are applied in engineering, transport, medicine, energy, and space. Tomorrow they will play a key role in clean energy, artificial gravity, and nanotechnology.

Case Studies

Case 1: Braking Distance

A 5-ton truck moving at 72 km/h stops in about 34 m ($\mu = 0.6$). On icy roads ($\mu = 0.2$), the stopping distance increases to about 102 m.

Case 2: Elevator Motion

A person feels lighter when moving downward and heavier when moving upward due to changes in normal force.

Case 3: Rocket Launch. If thrust is less than gravitational force, the rocket cannot take off. For lift-off, thrust must exceed weight.

Case 4: Circular Motion. If friction is insufficient, a car will skid off a curved road.

Final Conclusion

The laws of dynamics are widely applied in human activity and technology. Newton's laws serve as the fundamental theoretical basis for analyzing motion in transport, elevators, space technologies, and mechanical systems.

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THE USE OF DIGITAL TOOLS AND AI IN LEARNING GERMAN AS A SECOND FOREIGN LANGUAGE

Abstract: *This article examines the integration of artificial intelligence (AI) technologies into the modern educational space. It explores the potential of neural networks for learning various aspects of a foreign language. The article describes the advantages of using this service and emphasizes the need to validate generated materials, taking into account the service's limitations.*

Keywords: *artificial intelligence, educational technologies, digital competence, neural network, education, foreign language teaching, learning platforms, generation tools.*

In today's rapidly changing world, learning a new language like German is more than just a passion for many people - it's a professional necessity, a cultural bridge, and a mental advantage. Learning German used to mean endless grammar exercises, thick textbooks, and countless hours in the classroom. But with the rise of artificial intelligence (AI), we're witnessing revolutionary changes. AI-powered learning tools are redefining language acquisition - faster, more personalized, and surprisingly engaging.

Today, we live in a world of constantly evolving high technology. Digital solutions are finding application in all areas of human life. Artificial intelligence (AI) is one of the innovative technologies used not only in entertainment, economics, and industry, but also in education. The introduction of AI into the educational process is an inevitable consequence of the digitalization of education.

Artificial intelligence plays a vital role in education, helping to improve the quality of learning and the effectiveness of the educational process. It can be used to personalize education, adapting learning materials to the individual needs of each student. Artificial intelligence can also assist in the creation of interactive educational materials, educational apps, and online courses.

Artificial intelligence is a technology that enables creative work to be performed by computer algorithms. Artificial intelligence includes not only neural networks but also other information processing methods, including expert and logical programs.

Neural networks are a powerful tool that can be used in teaching German and open up new possibilities for improving the learning process. There are a wide variety of programs powered by artificial intelligence.

For example, ChatGPT is a chatbot that can:

- Learn grammar.

You can assign a specific grammar topic to the neural network and, using correctly asked questions (prompts) and practice exercises, learn it.

➤ Artificial self-study.

Have the neural network give you a task and check it – you can practice with articles or endings. You can also choose any difficulty level you prefer and ask for an explanation of the solution.

➤ Abundance of examples.

A huge advantage of neural networks is that they can generate texts endlessly.

➤ Translator.

Neural networks make it possible to create effective machine translation systems, making learning German more accessible. However, we still recommend being very careful to avoid translation errors.

➤ Checking texts in German.

This feature can be useful both for self-checking and for preparing homework.

Prompt is a kind of "command" that we give to artificial intelligence. It's important to note that if this "prompt" (command) is phrased incorrectly, we may receive insufficiently relevant and necessary information in response. A correctly and competently constructed "prompt" command guarantees that the responses received from neural networks are relevant and provide complete information.

Overall, the use of neural networks in teaching German promises to improve teaching methods and make the learning process more accessible. However, it's important to remember that they can only serve as a supporting tool, while personal communication and practice will remain the key elements of successful foreign language learning.

Vocabulary is a key part of language acquisition, and the best apps go beyond memorization. Look for AI-powered features like spaced repetition (to help you remember words for the long term), contextual learning (where you study vocabulary in sentences or real-world situations), and game elements that make the process of learning words enjoyable.

AI apps that let you create personalized word lists and review them at your own pace provide a more personalized approach to vocabulary learning.

Best AI Apps:

Heylama. Comprehensive and flexible, with a strong focus on speaking practice, customizable role-play scenarios, and personalized vocabulary learning. Ideal for intermediate and advanced learners who need individualized practice.

Babbel. Structured, real-world-focused, combining grammar, vocabulary, and conversation with an adaptive review system. Suitable for those seeking a comprehensive, practical foundation of language skills.

Duolingo. A fun course for beginners with game-based exercises and spaced repetition of vocabulary.

TalkPal. Features a library of role-playing scenarios that provide flexible conversational practice. Effective for developing speaking skills.

MakesYouFluent. Offers level-based dialogue games and vocabulary lists, well-suited for everyday conversation practice.

Lingvist. Focuses on rapid vocabulary acquisition through spaced repetition. Suitable for those who need a basic vocabulary.

EWA. Focuses on reading and listening skills using material from books and films. Strength: vocabulary familiarization.

LangAI. Includes pre-prepared role-playing scenarios for speaking practice. Useful for beginners.

The results showed that using AI in German language teaching significantly improves learning quality, particularly in the areas of independent learning and practice. Students report high levels of engagement and motivation, as AI allows for immediate feedback and automatically adapts assignments based on their level.

Chatbots, which can interact with students, check their pronunciation and grammar errors, and provide recommendations, have proven to be particularly effective.

Systems that analyze student errors and suggest customized exercises for correction have also been found to be highly effective.

Furthermore, using AI helps teachers reduce the time spent preparing materials and marking assignments, freeing them to focus on more complex aspects of learning, such as speaking practice and understanding complex grammar structures.

Despite the positive results, the use of AI in teaching also has its drawbacks. Key challenges include technical limitations, such as the need to constantly update AI algorithms and the high costs of developing high-quality systems. Furthermore, it is important to consider ethical issues related to the personalization of student data and the protection of their privacy.

However, despite these shortcomings, the prospects for using AI in German language teaching represent a significant step forward in online education. AI technologies are expected to be integrated even more deeply into educational platforms in the future, offering new and improved ways to teach and interact with students.

The use of artificial intelligence in German language teaching opens up new opportunities for teachers and students. AI can significantly improve the quality of instruction, increase student motivation, and reduce the workload of teachers.

In the future, AI technologies can be expected to play an even more important role in the educational process, providing more effective, personalized, and accessible learning.

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DIGITAL ECONOMY AND ITS ROLE IN THE EDUCATION SYSTEM

Abstract. *This article theoretically investigates the essence of the digital economy, its role and impact on the education system. In the context of a pandemic and the "Year of Science, Education and Development of the Digital Economy", the work done to digitalize the education system of the Republic of Uzbekistan was analyzed. Based on the results of the analysis, scientifically based proposals were put forward to accelerate the introduction of the digital economy into the education system of Uzbekistan.*

Keywords: *digital economy, digital technologies, education system, science, "on-line school", "electronic textbook".*

In the progress of achieving digital technology, science and research play an important role in achieving development. Today, information technology penetrates into all industries in the world.

The widespread introduction of digital technologies in public administration and the pursuit of modern knowledge will contribute to the well-being of our people. The spiritual and enlightened generation is a key factor in the development of the country.

Uzbekistan is taking comprehensive measures to actively develop the digital economy, the transition to a digital economy through the widespread introduction of modern information and communication technologies in all sectors and industries, especially in public administration, education, healthcare and agriculture.

The digital economy is a system of economic, social and cultural communications based on the use of digital technologies. Sometimes it is also expressed in terms of the internet economy, the new economy, or the web economy. This is not some other economy that needs to be created from scratch. This means translating the existing economy into a new system by creating new technologies, platforms and business models and implementing them into everyday life.

Its signs:

- high degree of automation;
- electronic document management;
- electronic integration of accounting and management systems;
- electronic databases;
- presence of CRM (system of interaction with clients);

– corporate networks.

We all know that science, education and upbringing are the cornerstone of development, as well as the force that makes the country a strong and great nation. Our future, the bright future of our Motherland, is closely connected, first of all, with the education system and the upbringing of our children.

Therefore, in recent years, in order to comprehensively develop our country, create a new Uzbekistan, radical reforms have been carried out in the education system, as well as in all areas.

In the current difficult period, when Uzbekistan, like other countries of the world, is experiencing a coronavirus pandemic, the country's education system has also passed a serious test. Despite today's difficult conditions, as a result of timely measures taken by the state, the online school project and distance learning were implemented in a short time.

Also, such systems as "Online School", "Digital and Safe School", "Electronic Textbook", "Electronic Diary" were introduced. By the end of 2021, it is planned to increase the level of broadband Internet access in schools to 80%, in the future to provide 100% Internet in all schools, and also to allocate funds from the state budget for this purpose.

Unprecedented attention is being paid to a radical reform of the national education system, based on the idea that "New Uzbekistan begins at the doorstep of the school." Much is being done to develop science, culture and art, literature, sports, improve the efficiency of spiritual and educational work, realize the talents and abilities of young people, especially our girls.

All this lays the foundation for the Third Renaissance in Uzbekistan - a new era of national development.

The President of the Republic of Uzbekistan Shavkat Mirziyoyev noted: "I personally believe that our enthusiastic scientists, who continue the scientific traditions of our great ancestors, will make science the engine of our development and make important discoveries that will serve the development of the country" [1].

Recently, school education in Uzbekistan has become a nationwide movement and a new era has begun in the development of the industry. As a practical manifestation of this movement, 77 new schools worth 556 billion soums have been built over the past two years. Reconstruction and repair work carried out in 1930 schools.

At the same time, a wide path is opening for the private education system. In this regard, the procedure for obtaining a license has been simplified. It is noteworthy that over the past three years their number has increased 6 times and reached 140.

A new school of information and communication technologies named after Muhammad al Khorezmi has opened in Tashkent. Currently, in order to increase the interest of children in IT technologies and create conditions for their development into mature professionals, 82 schools will be created in 2022, 64 in

2023, and 45 schools specializing in information technology in 2024 and will cover all districts and cities.

Today's dynamic world requires each of us to constantly seek, take initiative and work in new ways.

Today, every teacher and teacher of the university should be the most advanced representative of modernity and society, able to apply the latest positive innovations in the field of education and science in the educational process.

Over the past 4 years, 47 new higher educational institutions have been opened in Uzbekistan, including branches of foreign universities, as a result of which the number of higher educational institutions at the beginning of 2023 reached 130.

On the basis of the public-private partnership system, the activities of non-state higher educational institutions are being established. By studying the opinion of the population, forms of correspondence and evening education were revived, and admission quotas were increased. Graduate enrollment in higher education increased from 9% in 2021 to 25% in 2023. A mechanism has been created to provide advanced training and training for teachers in higher educational institutions and research institutions abroad. Their monthly salary increased by an average of 2.5 times compared to 2021. Since 2023, 10 higher educational institutions have been transferred to a self-supporting system.

According to the State Program for the implementation of the Action Strategy in five priority areas of development of the Republic of Uzbekistan for 2017-2021, in the Year of Science, Education and the Development of the Digital Economy, it was planned to bring the connection of secondary schools to broadband Internet up to 70%. The source of financing will be budgetary funds, JSC "Uzbektelecom" and other funds.

The program provides for the selection of at least 5 universities on a competitive basis, the beginning of their transformation in cooperation with leading foreign universities, the attraction of state budget funds, as well as grants from foreign financial institutions. The program provides for the identification of organizations providing "Proofreading service", the costs associated with the preparation of scientific publications for publication in international folk magazines, which are funded by the Foundation for the Support of Innovative Development and Innovative Ideas.

State budget funds are defined as centralized investments, budgetary funds provided for by the estimated expenditures of ministries, departments and organizations.

Table. Sources of funding for the state program "Years of Science, Education and Development of the Digital Economy" [2]

Sources of financing	Billion soums	Million US dollars
Total costs for the implementation of the activities of the State Program in 2020	18 171,4	10 301,5
State budget funds and state trust funds	12 883,7	—
Funds of performers and charitable organizations	1 426,5	—
Loans from commercial banks	561,2	—
Funds and non-discriminatory assistance from international organizations, financial institutions	3 300,0	10 301,5

On April 28, 2023, President Shavkat Mirziyoyev signed a resolution “On measures for the widespread introduction of the digital economy and e-government” [3].

The document provides for the accelerated formation of the digital economy with a doubling of its share in the country's gross domestic product by 2024. All healthcare institutions, schools, pre-school education organizations, villages and mahallas should be connected to high-speed Internet in 2022-2024. The share of electronic public services is planned to be increased to 60% by 2024.

The resolution also provides for the development of "digital entrepreneurship" with an increase in the volume of services in this area by 2025 by three times and bringing their exports to \$100 million.

Widespread introduction of digital technologies is planned at all stages of the education system. By 2024, digital knowledge training centers will open in all regions of the country as part of the Five Initiatives project.

The Ministry for the Development of Information Technologies and Communications is designated as the authorized body in the field of development of the digital economy and e-government. The National Agency for Project Management under the President retains the authority to implement crypto assets and blockchain technology.

Here are our proposals aimed at accelerating the introduction of the digital economy into the education system:

- further development of the technopark of software products and information technologies by organizing support for start-up projects in all areas, including on the basis of venture financing, and creating favorable conditions for IT companies;

- development of digital skills among the population, especially among young people;

- it is necessary to develop a system of public-private partnership in the industry and increase the share of the non-state sector;

- increasing the role of heads of district and city departments of public education in the system.

In conclusion, we note that the present, rapidly developing time requires us to constantly take the initiative and work on something new. The more educated

our children leave school, the faster the sectors of the economy based on high technologies develop, the more social problems they can solve.

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TALABALAR HAYOTIDA UYQUNING AHAMIYATI

Annotatsiya: Ushbu maqolada talabalar hayotida uyquning ahamiyati, uning sog'liq va o'qish jarayoniga ta'siri yoritilgan. Yetarli va sifatli uyqu talabaning jismoniy hamda ruhiy holatini barqaror saqlashda muhim omil hisoblanadi. Uyqu yetishmovchiligi diqqatning pasayishi, xotira va fikrlash qobiliyatining sustlashishiga olib kelishi mumkin. Shuningdek, maqolada talabalar orasida uchraydigan uyqu tartibining buzilishi sabablari va ularni bartaraf etish yo'llari haqida ham ma'lumot berilgan. Tadqiqot natijalari talabalarning samarali ta'lim olishi va sog'lom turmush tarzini shakllantirishda uyqu rejimiga rioya qilish muhim ekanligini ko'rsatadi.

Kalit so'zlar: uyqu, talabalar hayoti, sog'lom turmush tarzi, uyqu rejimi, aqliy faoliyat, xotira, diqqat, samarali ta'lim, jismoniy va ruhiy salomatlik.

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THE IMPORTANCE OF SLEEP IN STUDENTS' LIFE

Annotation: This article discusses the importance of sleep in students' lives, its impact on health and the learning process. Sufficient and high-quality sleep is

an important factor in maintaining a student's physical and mental state. Lack of sleep can lead to a decrease in attention, memory and thinking skills. The article also provides information about the causes of sleep disorders among students and ways to eliminate them. The results of the study show that adherence to a sleep regimen is important for effective student learning and the formation of a healthy lifestyle.

Keywords: *sleep, student life, healthy lifestyle, sleep pattern, mental activity, memory, attention, effective learning, physical and mental health.*

Kirish

Uyqu inson hayotining muhim biologik ehtiyojlaridan biri hisoblanadi. Ayniqsa, talabalar uchun uyquning ahamiyati juda katta, chunki ularning kundalik faoliyati o'qish, bilim olish va aqliy mehnat bilan bog'liq. Yetarli va sifatli uyqu talabaning sog'lig'ini saqlash, diqqat va xotirani mustahkamlash hamda o'qish samaradorligini oshirishga yordam beradi. Zamonaviy hayot tarzida talabalar ko'pincha kech uxlash, telefon va kompyuterdan ko'p foydalanish sababli uyqu rejimini buzib qo'yishadi. Bu esa ularning sog'lig'i va o'qish jarayoniga salbiy ta'sir ko'rsatishi mumkin. Uyqu inson organizmi uchun eng muhim fiziologik jarayonlardan biri hisoblanadi. U organizmning tiklanishi, miya faoliyatining me'yoriy ishlashi hamda jismoniy va ruhiy salomatlikni saqlashda katta ahamiyatga ega. Ayniqsa, talabalar hayotida uyqu muhim o'rin tutadi, chunki ular kun davomida ko'p miqdorda bilim olish, ma'lumotlarni eslab qolish va turli aqliy faoliyat bilan shug'ullanadilar. Yetarli darajada uyqu olmaslik esa diqqatning pasayishi, xotiraning yomonlashuvi hamda o'qish samaradorligining kamayishiga olib kelishi mumkin.

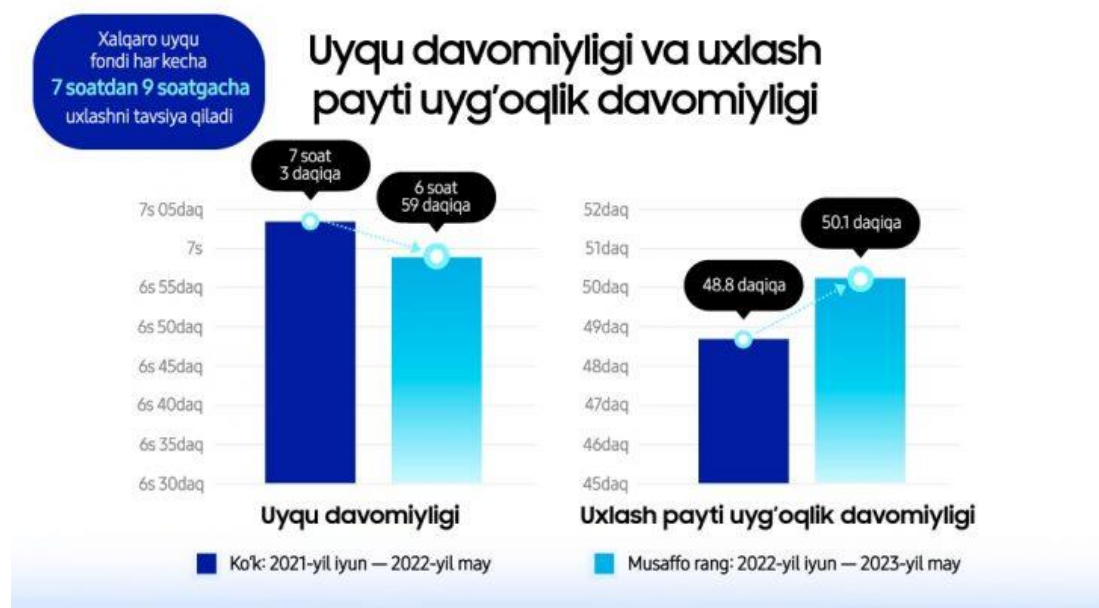


Asosiy qism

Uyqu inson organizmining normal faoliyat yuritishi uchun zarur bo'lgan muhim fiziologik jarayon hisoblanadi. Ayniqsa, talabalar hayotida uyqu katta ahamiyatga ega, chunki ularning kundalik faoliyati ko'p jihatdan aqliy mehnat, o'qish va yangi bilimlarni o'zlashtirish bilan bog'liq. Uyqu vaqtida inson organizmi dam oladi, miya faoliyati tartibga keladi va kun davomida to'plangan ma'lumotlar qayta ishlanib, xotirada mustahkamlanadi. Ilmiy tadqiqotlarga ko'ra,

uyqu jarayonida miya kun davomida olingan axborotni tartibga soladi va muhim ma'lumotlarni uzoq muddatli xotiraga o'tkazadi. Shu sababli talabalar uchun yetarli uyqu o'qish samaradorligini oshirishda muhim rol o'ynaydi. Agar talaba yetarlicha uxlamasa, uning diqqatni jamlash qobiliyati pasayadi, fikrlash jarayoni sekinlashadi va o'qilgan ma'lumotlarni eslab qolish qiyinlashadi. Talabalar orasida uyqu rejimining buzilishi ko'p uchraydi. Bunga kechqurun uzoq vaqt telefon, kompyuter yoki boshqa elektron qurilmalardan foydalanish, ijtimoiy tarmoqlarda vaqt o'tkazish, shuningdek, imtihonlarga tayyorgarlik jarayonida kechasi bilan o'qish sabab bo'ladi. Bunday holatlar uyqu sifatini yomonlashtiradi va organizmning to'liq tiklanishiga to'sqinlik qiladi. Natijada talaba ertasi kuni o'zini charchagan, lanj va diqqatini jamlay olmaydigan holatda his qiladi. Uyqu yetishmovchiligi uzoq davom etsa, bu nafaqat o'qish samaradorligiga, balki inson sog'lig'iga ham salbiy ta'sir ko'rsatadi. Masalan, uyqusizlik asabiylikning ortishiga, stress darajasining ko'tarilishiga, bosh og'rig'i va umumiy charchoqqa sabab bo'lishi mumkin. Doimiy stress va uyquning buzilishi nafaqat hayot sifatini pasaytiradi, balki sog'likka salbiy ta'sir ko'rsatadi. Bu esa turli kasalliklar rivojlanish xavfini oshiradi. Shuningdek, uyqu yetarli bo'lmaganda organizmning immun tizimi ham zaiflashadi, bu esa turli kasalliklarga moyillikni oshiradi.

Sifatli uyquni ta'minlash uchun talabalar kundalik rejimga amal qilishlari muhim. Sog'lom turmush tarzi uchun yaxshi uyqu zarur. Bir xil vaqtda uxlash va uyg'onish, uxlashdan oldin telefon va kompyuterdan kamroq foydalanish, xonani shamollatish va qulay muhit yaratish uyqu sifatini yaxshilaydi. Bundan tashqari, muntazam jismoniy faollik ham uyquni yaxshilashga yordam beradi va yana yotishdan oldin tarkibida kofein mavjud moddalar iste'mol qilmaslik kerak. Tibbiy tavsiyalarga ko'ra 18 yoshdan 64 yoshgacha bo'lgan kattalar bir kechada 7 soatdan 9 soatgacha uxlashlari kerak. Biroq, uyquga bo'lgan ehtiyoj har bir kishida turlicha ekanligini tushunish muhim. Bu talabalar individual tanaxususiyatlariga, jismoniy faollik darajaiga va umumiy sog'liqqa bog'liq. Stressni kamaytirish va uyquni yaxshilash uchun qo'shimchalar — bu zamonaviy dunyoda yaxshi kayfiyat va energiyani saqlab qolish uchun samarali vosita. Magniy, melatonin, ashvaganda, L-Tianin va B guruhidagi vitaminlarni o'z ichiga olgan ratsion uyqu sifatini yaxshilaydi va kundalik stresslarga qarshi kurashishda yordam beradi. Shuni unutmangki, har qanday qo'shimchalarni qabul qilishdan oldin, ayniqsa surunkali kasalliklaringiz yoki boshqa dori vositalarini qabul qilayotgan bo'lsangiz, shifokor bilan maslahatlashish muhimdir. Shunday qilib, uyqu talabalarining jismoniy sog'lig'i, ruhiy holati va o'qishdagi muvaffaqiyatida muhim omil hisoblanadi. Talabalar o'z sog'lig'ini saqlash va o'qishda yuqori natijalarga erishish uchun uyquga yetarli vaqt ajratishlari zarur.



Xulosa

Xulosa qilib aytganda, uyqu talabalar hayotida muhim ahamiyatga ega bo'lgan tabiiy va zarur jarayon hisoblanadi. Yetarli va sifatli uyqu talabani jismoniy sog'lig'ini saqlash, asab tizimini tiklash hamda aqliy faoliyatini yaxshilashga yordam beradi. Uyqu jarayonida miya dam oladi va kun davomida olingan bilimlar mustahkamlanadi, bu esa o'qish samaradorligini oshiradi. Uyqu yetishmovchiligi esa diqqatning pasayishi, tez charchash, asabiylik va o'qishdagi qiyinchiliklarga olib kelishi mumkin. Shu sababli talabalar kundalik hayotida to'g'ri uyqu rejimiga rioya qilishlari, o'z vaqtida dam olishlari va sog'lom turmush tarzini shakllantirishlari muhimdir. Shunda ular nafaqat o'qishda, balki kelajakdagi kasbiy faoliyatida ham muvaffaqiyatga erishishlari mumkin.

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RESEARCH OF THE INFLUENCE OF SEEDS PLANTED UNDER FILM ON THE THICKNESS AND YIELD OF SEEDLINGS

Abstract. In this article, a number of scientists studied the thickness of seedlings planted under film, its effect on plant growth and productivity, the advantages of agricultural technology for sowing seeds under film under research conditions, and presented the effect on yield.

Keywords. Seed, cotton, cotton, seedling number, under film, seed, cotton yield, agrotechnical measure, mulch, herbicide, plow layer, weeds, soil surface.

Ensuring an abundant and early high-quality cotton yield is considered one of the fundamental priorities of the cotton-growing sector in our country. However, the onset of the cotton-seed sowing period coincides with spring months characterized by high precipitation. Excessive rainfall often leads to delays in sowing operations and may cause seed rotting, soil crust formation, and a substantial reduction in seedling emergence in sown areas. These factors ultimately result in a significant decline in cotton productivity.

To mitigate these challenges, the technology of **sowing cotton seeds under plastic mulch** has proven to be highly effective. This approach provides several agronomic advantages, including:

- the possibility of ultra-early sowing;
- reliable protection against soil crust formation;
- ensuring optimal and uniform seedling density;
- increased efficiency in the use of irrigation water and mineral fertilizers;
- obtaining earlier and higher cotton yields.

Due to these advantages, the plastic-mulch sowing technology demonstrates clear superiority compared to conventional open-field sowing methods.

A number of experiments tailored to specific soil and climatic conditions have been conducted both in our country and abroad on the technology of cultivating cotton by sowing seeds under plastic mulch, and these studies have yielded effective results. This technology has been widely applied for many years in the agricultural sectors of countries such as China, Greece, and Spain.

Research carried out in Uzbekistan on cotton cultivation under plastic mulch has also demonstrated positive outcomes, leading to its large-scale introduction in the Andijan region. Subsequently, the technology began to be implemented across the entire country.

On 22 November 1996, the Cabinet of Ministers of the Republic of Uzbekistan adopted Resolution No. 410, titled "*On Measures for Cultivating Cotton Under Plastic Film*," which elevated this technology to the level of state policy. Following this decree, the method of sowing cotton seeds under plastic mulch began to be widely implemented across agricultural lands.[1].

As a result of the large-scale introduction of the cotton-seed sowing technology under plastic mulch, the average cotton yield in the Republic reached 33.4 centners per hectare in 1997, which was 10.4 centners per hectare higher than the yield obtained through conventional cultivation methods.

A number of researchers have conducted studies on plant density, fertilizer application norms, and agrotechnical measures used in cotton fields cultivated under plastic mulch, and have obtained positive conclusions.

In particular, studies conducted by N. G. Zakharov and G. G. Semikina (1964) examined the effectiveness of mulching soil with black glossy polyethylene film. Their results showed that while soil crust thickness reached 3–5 cm in the control treatment, no crust formation was observed under polyethylene mulch. Cotton yield reached 39.9 centners per hectare under the mulch treatment, whereas the control variant produced only 18.2 centners per hectare [2,3].

According to the findings of Sh. T. Kholikulov (1977), covering the soil surface increases the concentration of carbon dioxide in the soil air. The processes of carbon dioxide formation and oxygen consumption are largely dependent on soil temperature. Covering the soil with various materials reduces soil erosion; when mulching is applied, soil erosion decreases by up to 0.89 tons per hectare. The use of mulch prevents the leaching of mobile forms of nitrogen, phosphorus, and potassium elements with irrigation water, enhances the soil's water absorption capacity, and contributes to an increase in humus content.

According to the experiments conducted by S. Bakhromov (2007), the cotton yield in the treatment without plastic mulch and without herbicide application amounted to 30 centners per hectare, whereas the mulch-only variant (without herbicide) produced 35.4 centners per hectare. When cotton seeds were sown under plastic mulch and herbicides were applied—1.5 kg of Stomp during the growing period—the yield reached 40.6 centners per hectare. Based on these results, Bakhromov emphasized the necessity of chemical weed control when using the plastic-mulch sowing method [2].

Experiments carried out by T. Ya. Rajabov and T. Rajabov under the conditions of the Karshi steppe (2007) showed that cotton grown on non-mulched fields yielded 33.4 centners per hectare, while sowing seeds under plastic mulch increased yields to 41.0 centners per hectare. According to their findings, mulching improved the soil's hydro-physical properties, conserved reserve moisture, reduced the mineralization rate of groundwater, prevented the accumulation of harmful salts in the plow and subsoil layers, accelerated cotton maturity, and ensured high-quality yields [3,4,5].

Based on the experiments conducted by F. M. Hasanova and Sh. T. Salamov (2006), it was determined that when 25–50% of the nitrogen fertilizer is applied

simultaneously with seed sowing under plastic mulch and the remaining portion is supplied during the growing season, it positively influences the maturity of cotton and facilitates timely harvesting.

Similar results were obtained by F. Hasanova and T. Rajabov when studying the technology in the takyr soils of the Karshi steppe. When NPK fertilizers were applied at a ratio of 200:140:100, with 50% of nitrogen applied before plowing and the rest during sowing, at the true-leaf stage, squaring, and flowering phases, mulched plots produced up to 52 centners per hectare, compared to 36.9 centners per hectare in the open-field control variant.

In the studies carried out by B. To'xtashev (1998), it was observed that seeds sown under plastic mulch germinate more quickly, seedlings emerge uniformly, and plants develop more vigorously. In mulched conditions, the bolls formed on the lower and middle fruiting branches were well-developed, of higher fiber strength, and had greater individual boll weight—mainly due to the favorable microenvironment created under the mulch [6].

Covering a portion of the field surface with plastic film reduces evaporation losses and decreases irrigation requirements compared to conventional open-field sowing.

Experiments conducted by G. A. Bezborodov and M. N. Toshmatov (2003–2005) under the heavy loamy, typical gray soils of Tashkent region showed that cotton was irrigated 8 times in the control variant, whereas the mulched plots required only 7 irrigations during the growing season. The seasonal irrigation rate in the control plots was 3910 m³/ha, while mulched plots required 3410 m³/ha. In 2004, the control received 3210 m³/ha over six irrigations, whereas mulched plots required only 2185 m³/ha. In 2005, the control plots were irrigated seven times (4380 m³/ha), compared to 3940 m³/ha in the mulched plots.

According to the results, cotton yield in mulched plots reached 39.0 centners per hectare, with an additional 7.5–9.6 centners gained relative to the control. The water consumption per centner of cotton was 125.6 m³/ha in the control and 81.5 m³/ha in the mulched variant. These findings indicate that plastic-mulch sowing technology reduces water consumption by approximately 35% [7–13].

R. Qurbonov (2001) reported improved soil properties in fields where cotton was cultivated under plastic mulch, especially when the ridges were fully covered with film. Mulching significantly reduced evaporation from the soil surface, resulting in a higher water-use efficiency of the crop.

Experiments conducted by N. M. Ibragimov, L. A. Mirzayev, and D. U. G'ofurov (2009) revealed that when nitrogen fertilizer was applied at a rate of 200 kg/ha, placing 50% of the annual rate 10–12 cm away from the seed row at a depth of 15 cm during sowing did not adversely affect germination and ensured optimal plant development and increased yield [14].

According to recommendations developed by PSUYAITI scientists (2017), three factors must be considered when determining plant density for cotton sown under plastic mulch: varietal biological characteristics, soil fertility, and climatic

conditions. In highly fertile soils, 90–100 thousand plants per hectare are recommended for varieties S-6524, Andijan-35, Andijan-36, and Sulton. In moderately fertile soils, the recommended density is 100–110 thousand plants per hectare, while in low-fertility soils, 110–120 thousand plants per hectare are advised. For Andijan-36 and Andijan-35, a density of 120–130 thousand plants per hectare provides the best results.

At the “Fergana Ocean Textile” cotton–textile cluster in Fergana district, seed sowing operations are being implemented using Turkish technology.

In conclusion, the new method of cotton cultivation offers numerous advantages. It significantly reduces irrigation water consumption and production costs while increasing productivity. Special drip-irrigation tubes are placed beneath the mulch, and seeds are sown in paired rows in hill-drop fashion, ensuring uniform stand establishment. No thinning or hoeing is required. The irrigation tubes maintain optimal soil moisture at appropriate depth and radius and also enable precise application of water, mineral fertilizers, pesticides, and herbicides. As a result, even in water-deficient and low-fertility soils, high yields can be achieved [9].

Another important advantage of this system is the twofold reduction in seed requirements. Despite using fewer seeds, germination rates are high, and approximately 200,000 healthy plants per hectare can be established and maintained. This contributes to earlier maturity, increased efficiency, and improved fiber quality.

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JANUBIY OROLBO'YI IRRIGATSIYA TIZIMLARINI KARTOGRAFIK MONITORING QILISH USULLARINI TAKOMILLASHTIRISH: ADABIYOTLAR SHARHI

***Annotatsiya.** Ushbu maqolada Janubiy Orolbo'yi irrigatsiya tizimlarini kartografik monitoring qilish usullarini takomillashtirish masalasi adabiyotlar sharhi asosida tahlil qilinadi. Tadqiqotda O'zbekiston, MDH va xorijiy olimlarning irrigatsiya monitoringi, GAT va masofadan zondlash bo'yicha ishlari umumlashtirildi. Mavjud yondashuvlarning afzalliklari va cheklovlari aniqlandi. Tahlil natijasida irrigatsiya infratuzilmasining kartografik holatini muntazam, ko'p manbali va integrallashgan GAT muhitida monitoring qilish usullari yetarli darajada tizimlashtirilmagani belgilandi. Hudud sharoiti uchun optik va radar ma'lumotlari, tarixiy kartografik materiallar, meliorativ ko'rsatkichlar va avtomatlashtirilgan aniqlash algoritmlariga asoslangan takomillashtirilgan yondashuv taklif qilindi.*

***Kalit so'zlar:** Janubiy Orolbo'yi, irrigatsiya tizimlari, kartografik monitoring, GAT, masofadan zondlash, geoinformatika, meliorativ holat, kanal tarmoqlari.*

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IMPROVING THE METHODS OF CARTOGRAPHIC MONITORING OF IRRIGATION SYSTEMS IN THE SOUTHERN ARAL SEA REGION: A LITERATURE REVIEW

***Abstract.** This article analyzes the problem of improving the methods of cartographic monitoring of irrigation systems in the Southern Aral Sea region based on a literature review. The study summarizes the works of Uzbek, CIS, and foreign scholars on irrigation monitoring, GIS, and remote sensing. The advantages and limitations of existing approaches are identified. The analysis shows that methods for regular, multi-source, and integrated GIS-based monitoring of the cartographic condition of irrigation infrastructure are still insufficiently systematized. An improved approach based on optical and radar*

data, historical cartographic materials, reclamation indicators, and automated detection algorithms is proposed for the region.

Keywords: *Southern Aral Sea region, irrigation systems, cartographic monitoring, GIS, remote sensing, reclamation condition, canal network.*

Kirish

Janubiy Orolbo‘yi hududi suv resurslari taqchilligi, meliorativ holatning yomonlashuvi, irrigatsiya infratuzilmasining eskirishi va ekologik barqarorlikning pasayishi bilan tavsiflanadigan murakkab geotizim hisoblanadi. Mazkur hududda irrigatsiya tizimlari nafaqat qishloq xo‘jaligi ishlab chiqarishi uchun, balki suv taqsimoti, sho‘rlanish jarayonlari, grunt suvlari rejimi va landshaft barqarorligi uchun ham hal qiluvchi ahamiyatga ega. Shu sababli irrigatsiya tizimlarini faqat muhandislik kuzatuvlari asosida emas, balki kartografik, geoinformatsion va masofadan zondlash usullari asosida muntazam monitoring olib borish zamonaviy ilmiy-amaliy vazifalardan biri hisoblanadi [1, 2, 10, 11].

So‘nggi yillarda irrigatsiya tizimlarini monitoring qilish bo‘yicha ilmiy yondashuvlar sezilarli ravishda kengaydi. C. Conrad va hammualliflar fikricha, Orol dengizi havzasida masofadan zondlash asosidagi tadqiqotlar yer foydalanishi, tuproq va vegetatsiya holati, ekin mahsuldorligi hamda suvdan foydalanish ko‘rsatkichlarini hududiy va vaqt bo‘yicha kuzatish imkonini beradi [1]. J.-P. Deroin esa bu hududda hali yetarli darajada qo‘llanmayotgan radar ma’lumotlari, tarixiy arxiv materiallari va yuqori aniqlikdagi tasvirlar kelajakdagi kartografik monitoring uchun muhim manba bo‘lishini ta’kidlaydi [2]. H. Benli va hammualliflar irrigatsiya monitoringi natijalarini amaliy suv hisobi tizimlariga bog‘lash zarurligini, A. B. Rabie va hammualliflar esa GAT, masofadan zondlash va mashinaviy o‘qitish integratsiyasi suv resurslarini boshqarishda yangi metodik bosqich ekanini qayd etadi [3, 12]. X. Huo va hammualliflarning tadqiqotida esa UAV va obyektga yo‘naltirilgan yondashuv yordamida kanal tarmoqlarini ajratish irrigatsiya tumanlarini nozik masshtabda kuzatish uchun istiqbolli usul sifatida baholanadi [4].

O‘zbekiston olimlari ishlarida irrigatsiya tizimlari monitoringi asosan meliorativ holatni baholash, suv resurslaridan foydalanishni optimallashtirish va gidrotexnik obyektlarni fazoviy tahlil qilish bilan bog‘liq holda shakllangan. Sh. Kenjabaev, M. Sultanov, C. Bauer, D. Abduraimova, I. Akhmedkhodjaeva va Z. Ibragimova tadqiqotlarida Kulavat kanal irrigatsiya tizimida tuproqning mexanik tarkibi, sho‘rlanish, grunt suvlari sathi va minerallashuvi, sug‘orish tarmog‘igacha masofa hamda drenaj zichligi GAT qatlamlari sifatida integratsiyalangan [6]. M. Khamidov, U. Islamov, A. Mukumov va O. Abdisamatov fikricha, geoinformatsion texnologiyalar sug‘oriladigan hududlarni hududiy rejalashtirish va suv resurslaridan samarali foydalanishda muhim vosita hisoblanadi [7, 8]. Z. Mamatkulov va hammualliflar esa gidrotexnik obyektlarni GAT va masofadan zondlash asosida vizualizatsiya qilish boshqaruv jarayonida tezkor hamda fazoviy asoslangan boshqaruv qarorlarini qabul qilishga xizmat qilishini ko‘rsatadi [5].

Shu bilan birga, mavjud adabiyotlar shuni ko'rsatadiki, irrigatsiya tizimlarini kuzatish bo'yicha ko'plab tadqiqotlar sug'oriladigan maydonlar, hosildorlik, vegetatsiya, sho'rlanish va suv mahsuldorligiga qaratilgan bo'lsa-da, irrigatsiya infratuzilmasining o'zi — magistral kanallar, ichki tarmoqlar, kollektor-drenaj tizimi va gidrotexnik tugunlarning kartografik holatini muntazam monitoring qilish masalasi yetarli darajada tizimlashtirilmagan [1, 3, 4, 6]. Mazkur holat Janubiy Orolbo'yi uchun maxsus metodik yondashuv ishlab chiqishni taqozo etadi.

Ushbu maqolaning maqsadi Janubiy Orolbo'yining irrigatsiya tizimlarini kartografik monitoring qilish bo'yicha mavjud ilmiy yondashuvlarni tahlil qilish, ularning afzallik va cheklovlarini aniqlash hamda hudud sharoitiga mos takomillashtirilgan metodik yo'nalishlarni asoslashdan iborat. Mazkur maqsadga erishish uchun irrigatsiya monitoringining nazariy asoslari tahlil qilindi, O'zbekiston, MDH va xorijiy tajribalar solishtirildi hamda Janubiy Orolbo'yi uchun takomillashtirish yo'nalishlari asoslandi.

Tadqiqot materiali va usullari

Mazkur tadqiqot adabiyotlar sharhi usuliga asoslangan bo'lib, unda irrigatsiya tizimlari monitoringi, GAT, masofadan zondlash, meliorativ holat, kanal tarmoqlari, suv hisobi va Orol dengizi havzasi bilan bog'liq ilmiy manbalar tanlab o'rganildi. Manbalar uch guruhga ajratildi: O'zbekiston olimlari ishlari, MDH va Markaziy Osiyo tadqiqotlari, xorijiy va xalqaro ilmiy ishlanmalar. Tahlilda sharh maqolalar, metodik maqolalar, amaliy tadqiqotlar (case study), konferensiya materiallari, konferensiya materiallari hamda FAO WaPOR kabi rasmiy platforma ma'lumotlaridan foydalanildi [1, 4, 6, 11, 13, 18].

Adabiyotlarni tahlil qilishda uch asosiy yondashuv qo'llandi. Birinchi yondashuv — nazariy tahlil bo'lib, unda irrigatsiya tizimlari monitoringining ilmiy mazmuni va kartografik monitoringning o'rni ko'rib chiqildi. Ikkinchi yondashuv — taqqoslovchi tahlil bo'lib, turli mualliflarning metodlari, qo'llangan ma'lumotlar manbalari va natijalari solishtirildi. Uchinchi yondashuv — sintez bo'lib, 3–4 nafar olimning qarashlari bir nuqtada umumlashtirilib, Janubiy Orolbo'yi uchun metodik xulosalar chiqarildi. Bunday usul irrigatsiya monitoringi bo'yicha mavjud ilmiy maktablarni bir-biri bilan bog'lash va umumiy ilmiy bo'shliqni aniq ko'rsatish imkonini berdi [1, 2, 3, 12]. Manbalar mavzuga mosligi, ilmiy yangiligi, hududiy qamrovi va metodik ahamiyatiga ko'ra tanlab olindi. Tahlilda tarixiy-tavsifiy, qiyosiy, tizimli va sintez usullaridan foydalanildi.

Irrigatsiya tizimlarini kartografik monitoring qilishning nazariy asoslari

Irrigatsiya tizimlarini kartografik monitoring qilish nazariy jihatdan sug'orish infratuzilmasi, suv taqsimoti, meliorativ holat va ularga bog'liq ekologik omillarni fazoviy-vaqt bo'yicha kuzatishga asoslangan kompleks tizimdir. C. Conrad va hammualliflar fikricha, irrigatsiya tizimlarini baholashda masofadan zondlash yer foydalanishi, tuproq, vegetatsiya, ekin mahsuldorligi va suv iste'moli ko'rsatkichlarini bitta tizimga kiritish imkonini beradi [1]. H. Benli va hammualliflar esa monitoringning amaliy qiymati uni sug'orish suvini hisobga

olish va boshqaruv tizimlari bilan bog‘lashda namoyon bo‘lishini ta’kidlaydi [3]. A. B. Rabie va hammualliflar nuqtai nazaridan, GAT va mashinaviy o‘qitish bilan boyitilgan masofadan zondlash yondashuvlari suv resurslari monitoringini aniqlik va tezkorlik jihatidan sezilarli kuchaytiradi [12]. Umumlashtirganda, irrigatsiya monitoringi nafaqat xarita tuzish, balki hududiy boshqaruv, resurslar bahosi va tizim samaradorligini o‘lchash vositasi sifatida qaralishi kerak.

Nazariy jihatdan kartografik monitoringda uchta tayanch prinsip ajralib turadi. Birinchisi — irrigatsiya tizimini ko‘p komponentli fazoviy obyekt sifatida ko‘rish. Bunda magistral kanallar, xo‘jaliklararo kanallar, ichki tarmoqlar, kollektor-drenaj tizimi, nasos stansiyalari va gidrotexnik tugunlar alohida qatlamlar sifatida baholanadi. Ikkinchisi — vaqt qatorlari asosida monitoring olib borish. J.-P. Deroin fikricha, uzoq yillik sun‘iy yo‘ldosh kuzatuvlari irrigatsiya tizimlaridagi o‘zgarishlarni tarixiy kesimda ko‘rish imkonini beradi, biroq bunday salohiyat hali to‘liq ishga solinmagan [2]. Uchinchi prinsip — integrallashgan tahlildir; ya’ni infratuzilma, suv, tuproq, sho‘rlanish, vegetatsiya va boshqaruv ma’lumotlari yagona GAT bazasida bog‘lanishi kerak [2, 3, 12].

O‘zbekiston olimlarining yondashuvlari

O‘zbekiston olimlarining tadqiqotlari irrigatsiya monitoringining mahalliy ilmiy asosini shakllantiradi. Z. Mamatkulov va hammualliflar fikricha, GAT va masofadan zondlash texnologiyalari gidrotexnik obyektlarni fazoviy aks ettirish, ularning holatini tahlil qilish va tezkor boshqaruv qarorlari uchun ma’lumot tayyorlashda muhim ahamiyatga ega [5]. M. Khamidov, U. Islamov, A. Mukumov va O. Abdisamatov esa geoinformatsion texnologiyalar sug‘oriladigan hududlarda gidromodul rayonlashtirish va suvdan foydalanishni optimallashtirishda zarur vosita ekanini ko‘rsatadi [7, 8]. Sh. Kenjabaev, M. Sultanov, C. Bauer va hamkorlar tadqiqotlarida esa meliorativ holatni GAT yordamida kompleks baholash usuli ishlab chiqilgan [6]. Bu ishlarda irrigatsiya monitoringi ko‘proq meliorativ va boshqaruv ko‘rsatkichlari orqali yoritilgan bo‘lsa-da, ular Janubiy Orolbo‘yi uchun mustahkam metodik tayanch bo‘la oladi.

A. M. Arifjanov, L. N. Samiev, Sh. B. Akmalov va D. E. Atakulov tadqiqotlarida Landsat OLI tasvirlarining SWIR va NIR kanallari yordamida irrigatsiya kanallari o‘zanlarini o‘rganish mumkinligi ko‘rsatilgan [9]. Bu natijalar irrigatsiya infratuzilmasining ayrim elementlarini sun‘iy yo‘ldosh ma’lumotlari orqali kuzatish yo‘nalishi O‘zbekistonda ham shakllanganini ko‘rsatadi. U. Mukhtorov va hammualliflar suv obyektlarini GAT va masofadan zondlash yordamida monitoring qilish suv xo‘jaligida muhim ahamiyatga egaligini ta’kidlaydi [13]. K. Khojiakbar va hammualliflar esa suv ombori maydoni va hajmini masofadan zondlash va geoinformatsion usullar yordamida aniqlash bo‘yicha amaliy metodni taklif etgan [14]. Bu tadqiqotlar sug‘orish tizimiga bevosita taalluqli bo‘lgan suv infratuzilmasini raqamli kuzatish istiqbollari ko‘rsatadi.

Biroq mahalliy tadqiqotlarning ko‘pchiligida irrigatsiya tizimlari butun boshli fazoviy tarmoq sifatida emas, balki alohida obyektlar, alohida kanallar yoki alohida meliorativ ko‘rsatkichlar darajasida ko‘rib chiqilgan. Shu sababli

O'zbekiston tajribasini umumlashtirgan holda, Janubiy Orolbo'yi uchun ko'p qatlamli, ko'p manbali va muntazam yangilanib boradigan kartografik monitoring modelini ishlab chiqish zarurati saqlanib qolmoqda [5, 9, 13, 14]. Shunday qilib, O'zbekiston olimlari tadqiqotlarida irrigatsiya tizimlarini monitoring qilish ko'proq meliorativ holat, suv resurslaridan foydalanish va gidrotexnik obyektlarni baholash bilan bog'langan bo'lsa-da, irrigatsiya infratuzilmasining to'liq kartografik monitoring modeli hali to'liq shakllanmagan.

MDH va Markaziy Osiyo tajribasi

MDH va Markaziy Osiyo ilmiy maktabida irrigatsiya monitoringi asosan melioratsiya, gidrogeologik nazorat va sug'oriladigan yerlarning holatini kuzatish bilan bog'liq. A. D. O. Ahmedovning fikricha, GAT texnologiyalarini melioratsiyada qo'llash operativ monitoring, ma'lumotlarni to'plash va hududiy boshqaruv samaradorligini oshirishga xizmat qiladi [15]. I. N. Gorokhova va hammualliflar esa sun'iy yo'ldosh tasvirlari sug'oriladigan yerlar maydoni, bo'sh yotgan maydonlar va ularning holatini aniqlashda samarali ekanini ko'rsatadi [16]. V. I. Zanosova fikricha, eski sug'oriladigan yerlarning gidrogeologo-meliorativ holatini monitoring qilishda GAT lokal boshqaruv va ma'lumotlar bazasini shakllantirish uchun qulay vositadir [17]. S. Turguldinova esa sug'oriladigan yerlarni GAT asosida xaritalashni hisobga olish, tahlil qilish va boshqarish platformasi sifatida talqin qiladi [18]. Umumlashtirganda, MDH tajribasi irrigatsiya monitoringining meliorativ va boshqaruv bloklarini kuchli ishlab chiqqanini ko'rsatadi.

Markaziy Osiyodagi kengroq kontekst ham irrigatsiya monitoringining dolzarbligini kuchaytiradi. Yevroosiyo taraqqiyot bankining 2023-yilgi hisobotida Markaziy Osiyoda sug'oriladigan yerlar mintaqadagi qishloq xo'jaligi mahsulotining asosiy qismini ta'minlashi, shu bilan birga suvdan foydalanish samaradorligi va infratuzilma eskirishi muammo bo'lib qolayotgani qayd etilgan [19]. S. Ragettli va hammualliflar 2025-yilda Markaziy Osiyoning uch havzasida masofadan zondlash asosida qishloq xo'jaligi suv iste'molini hisoblash metodologiyasini takomillashtirib, suvdan foydalanishni aniqlashda yer usti kuzatuvlari bilan birga Yer kuzatuv (Earth Observation, EO) ma'lumotlarini qo'llash muhimligini ko'rsatdi [20]. Bu natijalar Janubiy Orolbo'yi uchun irrigatsiya monitoringi faqat xaritalash masalasi emas, balki suvni hududiy boshqarish masalasi ekanini bildiradi. Demak, MDH tajribasi irrigatsiya monitoringining meliorativ va boshqaruv jihatlarini kuchli ishlab chiqqan bo'lsa, uning kartografik-dinamik komponentini yanada rivojlantirish zarur.

Xorijiy olimlarning zamonaviy yondashuvlari

Xorijiy ilmiy maktabda irrigatsiya tizimlarini monitoring qilishda to'rtta asosiy yo'nalish ajralib turadi: birinchisi — irrigatsiyalangan yerlar va ekinlarni xaritalash; ikkinchisi — suv hisobi va suv mahsuldorligini baholash; uchinchisi — sho'rlanish va degradatsiyani monitoring qilish; to'rtinchisi — kanal tarmoqlarini nozik masshtabda aniqlash. E. Erdanaev va hammualliflar Tashkent viloyatida irrigatsiyalangan ekin turlarini masofadan zondlash orqali xaritalash usullarini baholab, o'rta va yuqori fazoviy aniqlikdagi tasvirlar yer boshqaruvi uchun foydali

ekanini ko'rsatadi [11]. O. Dubovyk va hammualliflar esa O'zbekistonning sug'oriladigan pasttekislik hududlarida degradatsiya jarayonlarini masofadan zondlash va logistika regressiyasi yordamida tahlil qilgan [10]. Bu ishlar irrigatsiya monitoringining yer sifati va yer foydalanishi blokini chuqurlashtiradi.

Suv mahsuldorligi va irrigation accounting yo'nalishida FAO'ning WaPOR platformasi alohida ahamiyatga ega. FAO ma'lumotiga ko'ra, WaPOR ochiq masofadan zondlash ma'lumotlari asosida evapotranspiratsiya, biomassa va suv mahsuldorligi ko'rsatkichlarini monitoring qilishga mo'ljallangan [21]. FAO va IWMI materiallarida bu platformaning irrigatsiya boshqaruvi, qishloq xo'jaligi suv mahsuldorligini kuzatish va qaror qabul qilishni qo'llab-quvvatlashdagi amaliy ahamiyati ko'rsatilgan [21, 22]. H. Benli va hammualliflar review ishida 1485 hujjatdan 79 tadqiqotni tanlab, masofadan zondlash sug'orish suvini hisobga olish uchun katta salohiyatga ega bo'lsa-da, aniqlik, metodik moslik va boshqaruv tizimlari bilan integratsiya hanuz muammo ekanini ko'rsatadi [3]. Demak, Janubiy Orolbo'yi uchun monitoring tizimi suv hisobi komponentini ham o'z ichiga olishi kerak.

Nozik masshtabdagi monitoringda UAV va avtomatlashtirilgan ajratish usullarining roli oshmoqda. X. Huo va hammualliflar tadqiqotida UAV va obyektga yo'naltirilgan usul kanal tarmoqlarini ajratishda umumiy qamrov ko'rsatkichi 85.74% va umumiy aniqlik ko'rsatkichi 55.08% ko'rsatgan [4]. Bu natija kanal tarmoqlarini to'liq avtomatik emas, lekin yarim avtomatik usullarda monitoring qilish mumkinligini ko'rsatadi. 2025-yildagi boshqa UAV va mashinaviy o'qitish ishlari ham dala darajasida sho'rlanish va suv bilan bog'liq ko'rsatkichlarni tezkor xaritalash imkoniyatlarini kengaytirmoqda [23]. Shunday qilib, xalqaro tajriba Janubiy Orolbo'yi uchun kanal tarmoqlari, sho'rlanish va suvdan foydalanish ko'rsatkichlarini birgalikda kuzatish mumkinligini ko'rsatadi. Umuman, xorijiy ilmiy maktab irrigatsiya monitoringini ko'p manbali, avtomatlashtirilgan va boshqaruvga yo'naltirilgan geoinformatsion tizim sifatida talqin qiladi.

Mavjud yondashuvlarning afzalliklari va cheklovlari

Adabiyotlar tahlili irrigatsiya tizimlarini kartografik monitoring qilishda GAT va masofadan zondlashning qator muhim afzalliklarini ko'rsatdi. Birinchidan, ular katta hududlarni qisqa muddatda qamrab oladi. Ikkinchidan, vaqt qatorlari asosida dinamik monitoringni ta'minlaydi. Uchinchidan, sug'oriladigan yerlar, vegetatsiya, sho'rlanish, suv iste'moli va gidrotexnik obyektlar haqidagi ma'lumotlarni bitta fazoviy tizimga bog'lash imkonini beradi [1, 2, 3, 21]. Ayniqsa, Orol dengizi havzasi kabi katta va murakkab hududlarda bu yondashuvlar monitoring xarajatlarini kamaytirib, boshqaruv qarorlarining hududiy asoslanganligini oshiradi [1, 19].

Biroq cheklovlar ham sezilarli. Birinchi cheklov — irrigatsiya infratuzilmasining o'zi ko'pincha bilvosita kuzatiladi; ya'ni tadqiqotlar ko'proq ekin, NDVI, ET yoki sho'rlanish ko'rsatkichlariga qaratilgan bo'ladi [1, 3, 10]. Ikkinchi cheklov — yuqori aniqlikdagi ma'lumotlar va radar materiallarining yetarli ishlatilmasligi [2]. Uchinchi cheklov — avtomatik ajratish usullarida

aniqlik va verifikatsiya muammolari mavjudligi [4]. To'rtinchi cheklov — monitoring natijalarini real boshqaruv institutlariga joriy etishning murakkabligi [3, 21]. Shu sababli Janubiy Orolbo'yi uchun ishlab chiqiladigan monitoring modeli mavjud usullarning kuchli tomonlarini birlashtirib, ularning zaif tomonlarini kamaytirishga qaratilishi lozim.

Janubiy Orolbo'yi uchun takomillashtirilgan metodik yo'nalishlar

Yuqoridagi tahlil asosida Janubiy Orolbo'yi uchun irrigatsiya tizimlarini kartografik monitoring qilishni takomillashtirish bir necha yo'nalishda olib borilishi zarur. Birinchi yo'nalish — ko'p qatlamli GAT bazasini yaratishdir. Bunda magistral kanallar, xo'jaliklararo va ichki tarmoqlar, kollektor-drenaj tizimi, nasos stansiyalari, gidrotexnik tugunlar, nazorat postlari va meliorativ ko'rsatkichlar alohida qatlamlar ko'rinishida shakllantirilishi lozim. Mahalliy va MDH tajribasi bunday fazoviy qatlamlashtirish amaliy natija berishini ko'rsatadi [5, 8, 15, 18].

Ikkinchi yo'nalish — optik, radar, UAV va tarixiy kartografik materiallarni birlashtirishdir. J.-P. Deroin qayd etganidek, radar va tarixiy ma'lumotlarning yetarli ishlatilmasligi ilmiy bo'shliq hisoblanadi [2]. Shuning uchun Janubiy Orolbo'yi uchun Sentinel-2, Landsat, radar ma'lumotlari, dron tasvirlari va mavjud arxiv xaritalarni integratsiyalash maqsadga muvofiq. Uchinchi yo'nalish — kanal va kollektor tarmoqlarini yarim avtomatik yoki avtomatik ajratishdir. X. Huo va hammualliflarning usuli bunday yondashuvning real imkoniyatini ko'rsatadi [4]. To'rtinchi yo'nalish — monitoringni suv hisobi, evapotranspiratsiya, sho'rlanish va vegetatsiya ko'rsatkichlari bilan bog'lashdir; bunda WaPOR va unga o'xshash platformalardan foydalanish mumkin [3, 21, 22].

Beshinchi yo'nalish — monitoring natijalarini boshqaruv organlari ehtiyojiga moslashtirishdir. Agar monitoring tizimi faqat ilmiy xaritalar yaratish bilan cheklanib qolsa, uning amaliy samarasi past bo'ladi. Shu bois u suv xo'jaligi tashkilotlari, meliorativ xizmatlar va hududiy boshqaruv organlarining ma'lumot ehtiyojiga mos ravishda tuzilishi kerak. Bu jihat H. Benli va hammualliflar review ishida ham irrigatsiya hisobini yuritishda asosiy to'siqlardan biri sifatida ko'rsatilgan [3]. Demak, Janubiy Orolbo'yi uchun takomillashtirilgan monitoring modeli ilmiy, texnik va institutsional bloklarning uyg'unligiga tayanishi lozim.

Xulosa

Adabiyotlar tahlili shuni ko'rsatdiki, irrigatsiya tizimlarini kartografik monitoring qilish bo'yicha ilmiy yondashuvlar O'zbekiston, MDH va xorijiy mamlakatlarda turli darajada shakllangan. O'zbekiston olimlari asosan meliorativ holat, suv resurslaridan foydalanish va gidrotexnik obyektlarni GAT asosida baholashga e'tibor qaratgan bo'lsalar [5, 9], MDH tadqiqotlari sug'oriladigan yerlarni xaritalash va gidrogeologik-meliorativ nazoratni kuchliroq rivojlantirgan [15, 18]. Xorijiy ilmiy maktab esa masofadan zondlash, water accounting, mashinaviy o'qitish, UAV va avtomatik ajratish metodlari yordamida irrigatsiya monitoringini ancha chuqurlashtirgan [1, 4, 11, 12, 20, 23].

Shu bilan birga, mavjud tadqiqotlarda irrigatsiya tizimlari ko'pincha sug'oriladigan yerlar, sho'rlanish, vegetatsiya va suv sarfi ko'rsatkichlari orqali

baholangan bo‘lib, Janubiy Orolbo‘yi sharoitida irrigatsiya infratuzilmasining kartografik holatini muntazam, ko‘p manbali va integrallashgan monitoring qilish usullari yetarlicha tizimlashtirilmagan. Shu bois ushbu hudud uchun ko‘p qatlamli GAT baza, optik va radar tasvirlar, UAV ma’lumotlari, tarixiy kartografik materiallar, water accounting ko‘rsatkichlari va avtomatlashtirilgan ajratish algoritmlarini birlashtiruvchi takomillashtirilgan monitoring tizimini ishlab chiqish ilmiy hamda amaliy jihatdan dolzarb hisoblanadi. Bunday yondashuv irrigatsiya tarmoqlarining holatini aniqroq baholash, muammoli hududlarni o‘z vaqtida aniqlash va suv xo‘jaligi boshqaruvida ilmiy asoslangan qarorlar qabul qilish imkonini beradi.

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HYGIENIC JUSTIFICATION OF THE PERMISSIBLE LEVEL OF SELLER PESTICIDE IN ATMOSPHERIC AIR AND WORKPLACE AIR

Resume: *Based on the conducted research, the safety of the use of the new insecticide Seller in agriculture was established. Scientifically substantiated the maximum permissible concentration of insecticide in atmospheric air, air of the working area, in the soil. Approximately permissible concentration of the drug in products of plant origin, in the water of water bodies has been developed.*

Keywords: *Seller, toxicity, hygiene regulations*

Relevance

The growth of the world's population requires a solution to the food problem on all continents. It should be noted that the prevention or reduction of crop yields under the influence of pests, diseases and weeds around the world is very important and requires immediate action. The solution to this problem today is the use of chemicals in agriculture. A number of factors point to this "... the cost of importing pesticides from an economic point of view requires development in every region." Therefore, it is important to study the level of safety of such pesticides in the environment and the human body.

At present, modern science has enough evidence about the negative impact of environmental and hygienic factors on the health of the population. Multi-scale studies conducted in recent years have shown that there is a link between deteriorating public health and pollution of the environment with pesticides and other chemicals. Protection of the environment and human health, priority scientific issues related to environmental safety when using new pesticides in agricultural practice. Our government has developed state social programs and adopted laws. During the period of independence of the Republic of Uzbekistan, reforms have been carried out in healthcare, industry and agriculture. Article 3 of the Law of the Republic of Uzbekistan "On protection of atmospheric air" states that one of the main principles of protection of public health is the priority of preventive measures and the unity of medical science and practice.

When wheat fields are treated with celery pesticide, the drug pollutes the air in the workplace. When using the pesticide in the amount of 0.01 kg / ha, the residue of the drug was found to be 0.05 to 0.01 mg / m³ during pesticide treatment in the workplace. With the increase in the use of the drug Seller (0.02; 0.04; 0.05; 0.1; 0.2 kg), the increase in the level of air pollution in the workplace (0.1; 0.2; 0.3; 0.5; 0.6 mg / m³) was observed.

When agricultural crops were treated with Seller pesticide, the workplaces were contaminated with the pesticide.

It is very important to take measures to protect workers involved in pesticide treatment from poisoning .

The amount of Seller pesticide in the workplace ($\Pi=12$)

Quantity used, kg	Sampling time, days	Amount of pesticide. mg / m ³
0.01	during use	0.05± 0,01
0.02	during use	0.1± 0,02
0.04	during use	0.2± 0,01
0.05	during use	0.3± 0,02
0.1	during use	0.5± 0,03
0.2	during use	0.6± 0,04

Results of the study of atmospheric air pollution with Seller pesticide

When grain fields were treated with Seller pesticide, its amount in atmospheric air was studied in dynamics. When using Seller pesticide in the amount of 0.01 kg / ha, its content in atmospheric air (15 m height) was 0.04 mg / m³ . After 2 hours of use, its amount in the air is reduced by half, 0,02 ± 0,005 mg / m³ . On the third day of the experiment, no drug residue was found in atmospheric air. With increasing the use of pesticides (0.02; 0.04; 0.05; 0.1; 0.2 kg) an increase in the amount of pesticide in the air was noted (0.05± 0,06 mg / m³ 0,09 ± 0,08 mg / m³ each).

mg / m³ , respectively ± 0,004-0,07 ± 0,06 and 0,01 ± 0,002-0,03 ± 0,002). It should be noted that when using the pesticide in the amount of 0.1 kg / ha, the trace of the drug was detected in the air for 3 days, and when used in the amount of 0.2 kg / ha, the pesticide was detected in the air in the amount of 0.01 ± 0.002 mg / m³ . Based on the above, it can be concluded that when Seller pesticide is used in agriculture, the air is polluted with the chemical. The level of air pollution lasts up to three days. Therefore, it is advisable to develop specific measures to protect the atmosphere from air pollution when Seller is used in agriculture.

Develop a permissible norm of seller pesticide in water bodies

The organoleptic properties and sanitary regime of the water were studied to develop the permissible level of the pesticide in the water.

Based on the organoleptic properties (odor) of water of the drug, its hypersensitivity concentration was determined to be 0.04 mg / l.

The drug did not foam at such a concentration and did not change the color of the water. Thus, as a result of sanitary-toxicological tests , the hypersensitivity concentration of the drug was set at 0.72 mg / l.

Calculation: 0.72 - 100

$$X - 5 = 0.03 \times 20 = 0.72 \text{ mg / l}$$

As a result of complex and sanitary-toxicological examinations, the permissible level of Seller in water was set at 0.04 mg / l .

Floods of the drug in atmospheric air amount

№	Used amount , kg / ha	For example get time , day	Pesticides amount mg / m ³
1	0.01	Used per hour After 2 hours 2- day 3- day	0.04± 0,007 0.02± 0,005 0 0
2	0.02	Used per hour After 2 hours 2- day 3- day	0.05± 0,006 0.03± 0,004 0.01± 0,002 0
3	0.04	Used per hour After 2 hours 2- day 3- day	0.06± 0,006 0.04± 0,002 0.01± 0,003 0
4	0.05	Used per hour After 2 hours 2- kun 3- kun	0.07± 0,006 0.05± 0,002 0.02± 0,003 0
5	0.1	Used per hour After 2 hours 2- day 3- day	0.08± 0,007 0.06± 0,005 0.02± 0,005 izi
6	0.2	Used per hour After 2 hours 2- day 3- day	0.09± 0,008 0.07± 0,006 0.03± 0,002 0.01± 0,002

Develop a permissible norm of seller pesticide in water bodies

organoleptic properties and sanitary regime of water were studied to develop the permissible norm of pesticide in water.

Based on the organoleptic properties (odor) of water of the drug, its hypersensitivity concentration was determined to be 0.04 mg / l.

The drug did not foam at such a concentration and did not change the color of the water. Thus, as a result of sanitary-toxicological tests, the hypersensitivity concentration of the drug was set at 0.72 mg / l.

Calculation: 0.72 - 100

$$X - 5 = 0.03 \times 20 = 0.72 \text{ mg / l}$$

As a result of complex and sanitary-toxicological examinations, the permissible level of Seller in water was set at 0.04 mg / l (sensitivity indicator - organoleptic indicator).

Determining the maximum permissible level of seller pesticide in food.

The maximum permissible level of Seller pesticide in food products was developed on the basis of the guidelines "Methodical instructions on the hygienic assessment of new pesticides."

The level of environmental resistance and toxicity of the drug were taken into account.

Calculation:

0.72 - 100%

X - 70% X = 0,05

0.5 - 1000

X - 360 X = 0,18

The maximum permissible level of Seller pesticide in wheat was set at 0.18 mg / l. However, the small amount of pesticide use (0.05 kg / ha) should not be a residue of the drug in wheat.

celery leprosy on the sanitary condition and organoleptic properties of water bodies, its hypersensitive concentration (effect on the smell of water) was determined to be 0.04 mg / l. The drug does not foam in water at this concentration and does not change the color of the water.

Hygienic parameters of seller pesticide

Indicator	Defined and allowed norm
Atmospheric air mg / m ³	0.002
Workplace air mg / m ³⁰	0.24
Water basins mg / l	0.04
In the soil, mg / kg	0.2
Food - mg / kg	Not allowed

With this in mind, as a result of in-depth toxicological and hygienic inspections, hygienic standards for Seller pesticide have been developed in water bodies, foodstuffs, soil, and atmospheric air. In the development of hygienic standards in water bodies, the effect of the drug on the organoleptic properties of water and sanitation was taken into account. As a result of sanitary-toxicological experiment, the sensitive dose of the drug was set at 0.72 mg / l, and the effect on the odor of water was set at 0.04 mg / l. Taking into account the results of complex inspections and sanitary toxicological examinations, the permissible concentration of Seller pesticide in water bodies was determined as 0.04 mg / l (organoleptic sensitive mark).

Taking into account the environmental resistance and toxicological properties of Seller pesticide, its maximum permissible level in food (wheat) was set at 0.18 mg / kg. Given that the drug is used in small quantities (0.05 kg) in grain fields, it was determined that it should not be in wheat.

Concentration of Seller pesticide was determined by mathematical calculation, taking into account the amount and toxicological properties of the pesticide determined during use in atmospheric air and in the workplace. According to him, the permissible concentration of Seller pesticide in atmospheric air was set at 0.002 mg / m³, and at workplaces - 0.24 mg / m³.

Based on the sanitary-toxicological experiment, the sensitive concentration of the drug Seller was determined to be 0.72 mg / l. Complex sanitary-toxicological experiments became the basis for the recommendation of the permissible concentration of the drug in water bodies as 0.04 mg / l (the main sign-organoleptic index). Based on the toxicodynamics of Seller leprosy and its resistance in nature, mathematical calculations were developed to allow it in food products. According to him, the maximum permissible level (MRED) of Seller leprosy in wheat was set at 0.18 mg / kg. However, given the small amount of the drug used in grain fields (0.05 l / ha), wheat should not have any residues.

Based on the approach to the regulation of harmful substances in the air, the toxicological parameters of the drug and its physicochemical properties and the method of calculation, the permissible concentration of Seller leprosy in the air (REK) is 0.002 mg / m³ and 0.24 mg / m³ in the workplace . Taking into account the complex and rapid methodology of pesticides in the environment (2015) and the maximum permissible level of the drug in food, its permissible concentration (MREK) in the soil was set at 0.2 mg / kg. As a result of the analysis of the chemical structure and biological activity of synthetic pyrethroids, it was concluded that the replacement of the ethyl group in chains 4 and 6 of their chemical structure with the methyl group increases the toxicity and biological activity of pesticides. This is the case with the Seller pesticide.

does not pose a risk to human health and the environment when used in recommended norms and regulations in agriculture . It is known that pesticides belonging to the class of synthetic pyrethroids are stored in the soil for a certain period of time and pollute the surrounding objects (air, workplaces, water, food). The duration of storage of synthetic pyrethroids in the soil, their movement in the soil layer, and the degree of transition of the plant to the surface depends on the climatic geographical conditions of the region, the amount used, soil type and moisture and other factors. In the hygienic assessment of new pesticides, it is important to assess their fate in the soil system, their movement in the soil layer (migration), their accumulation and their transition to plant-derived foods. Because their results play a special role in the development of preventive measures for the safe use of pesticides in agriculture. It is the study and evaluation of these situations that form the basis of this scientific research.

Resistance of Seller pesticide in soil, its movement in layers, accumulation, the degree of transition of plants to the surface were studied in the soil-climatic conditions of the republic (fine-grained yellow soil, fine-grained gravelly yellow soil), which differ from each other. Initially, the level of air pollution in the workplace and atmospheric air during the processing of agricultural crops with Seller pesticide was assessed.

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PREVENTIVE MEASURES TO PREVENT POLLUTION OF THE ENVIRONMENT WITH PESTICIDES

Resume: *Based on the conducted research, the safety of the use of the new insecticide Seller in agriculture was established. Scientifically substantiated the maximum permissible concentration of insecticide in atmospheric air, air of the working area, in the soil. Approximately permissible concentration of the drug in products of plant origin, in the water of water bodies has been developed.*

Keywords: *Seller, toxicity, hygiene regulations*

Relevance

Taking into account the complex and rapid methodology of pesticides in the environment (2015) and the maximum permissible level of the drug in food products, its intended permissible concentration (MREK) in the soil was set at 0.2 mg/kg.

As a result of the analysis of the chemical structure and biological activity of synthetic pyrethroids, it was concluded that the exchange of the ethyl group in the 4th and 6th chain of their chemical structure with a methyl group increases the level of toxicity and biological activity of pesticides.

Duration of storage of synthetic pyrethroids in the soil, their movement in the soil layer, and the degree of transfer to the above-ground part of the plant depend on the climatic and geographical conditions of the region, the amount of their use, the type and humidity of the soil, and other factors. Persistence of pesticides in the soil, movement in its layers, accumulation, the level of transition of plants to the surface of the ground were studied in the soil-climatic conditions of our republic (fine-grained yellow soil, fine-grained gravelly yellow soil). First, the level of air pollution of workplaces and atmospheric air during the treatment of agricultural crops with pesticides is assessed. Grain fields are divided into experimental sections (experimental and control) and studied. Based on the above, it can be concluded that when pesticides are used in agriculture, atmospheric air is polluted with chemicals.

The higher the amount of pesticide used, the stronger its movement in the soil layer. When the pesticide was used in the amount of 0.1 and 0.2 kg/ha, the pesticide was detected in the amount of $0.02 \pm 0,002$ and 0.03 mg/kg in the depth of 10-20 cm, and in the amount of $0.01 \pm 0,002$ and 0.02 mg/kg in the

$\pm 0,001$ depth of 20-30 cm $\pm 0,001$. The behavior of pesticides in the soil layer was also investigated in fine-grained gravel soil.

After 60 days, when pesticides were used in the amount of 0.01 kg/ha in the soil conditions, no residues were found in any layer of the soil.

The pesticide used in the amount of 0.02 kg/ha of the drug was detected only in the surface part of the soil (0-10 cm) $\pm 0,002$ in the amount of 0.02 mg/kg. When increasing the amount of pesticide use to 0.05 kg/ha, the drug acts on the next part of the soil (10-20 cm) and 20-30 cm layer.

When pesticides were used in the amount of 0.04 kg/ha, it was noted that they reached the soil by 20-30 cm. In this case, $0.3 \pm 0,02$ mg/kg and $0.02 \pm 0,002$ mg/kg were stored in the 0-10 cm layer of the soil for 10-60 days, and 0.04 and 0.01 mg/kg in 20-30 cm of the soil from 10 to 20 days ($0.04 \pm 0,06$ and $0.01 \pm 0,003$ mg/kg, $r < 0.05$).

When increasing the amount of pesticide use to 0.04 kg/ha, it was noted that the drug reached the 20-30 cm layer of the soil. For example, when the drug is used in the amount of 0.04 kg/ha, the drug remains in the 0-10 cm layer of the soil for 10 to 60 days ($0.3 \pm 0,02 - 0.02 \pm 0,002$ mg/kg) and in the 20-30 cm layer for 10-20 days ($0.02 \pm 0,002 - 0$). It was determined in the amount of $0.01 \pm 0,001$ mg/kg).

When the pesticide is used in the amount of 0.05 kg/ha, it was determined that the drug remains in the soil for 10-20 days from 10 to 60 days, and in the 20-30 cm layer from 10 to 30 days. Such regularity occurred when the pesticide was used in the amount of 0.1 and 0.2 kg/ha.

When pesticides are used in the amount of 0.1 kg/ha, in 0-10 cm of soil from 10 days to 90 days ($\pm 0,006$ 0.6-0.02), in 10-20 cm layer $\pm 0,003$ mg/kg from 10 days to 90 days ($\pm 0,005$ 0.6-0.01 $\pm 0,003$ mg/kg), in 20 cm layer It was determined from 10 days to 90 days ($0.05 \pm 0,006 - 0.01 \pm 0,002$ mg/kg).

When the pesticide was used in the amount of 0.2 kg/ha, its residue $\pm 0,002$ mg/kg was determined in the amount of 0.01 in the clean part of the soil - 0 - 10 cm in 115 days. The pesticide was detected in the amount of 0.05-0.01 $\pm 0,003$ mg/kg in the 10-20 cm layer of the soil for 10-90 days, and $\pm 0,006$ 0.05-0.01 $\pm 0,002$ mg/kg in the 20-30 cm layer $\pm 0,006$.

Therefore, when pesticides are used in agriculture, the residue of the drug in water bodies, atmospheric air, workplace air, soil and food products should not exceed the high hygienic standards.

Wheat flour containing residues of pesticides is recommended to be consumed only after heat treatment.

Comparing the chemical structure of synthetic pyrethroids with their toxicity and biological activity, their toxicity and environmental resistance increase when the isopropyl group in the fourth and sixth position of the chemical chain is replaced by an amine group. Such characteristics should be taken into account in the standardization and regulation of new pesticides. Regulation of the

use of new pesticides in agriculture is carried out at the stage of preventive sanitary control.

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Main measures:

1. Replacement of substances of the first class of danger and restrictions of the second class for less dangerous and toxic ones, as well as persistent and highly concentrated pesticides.

Regulation of the introduction of new pesticides to agriculture should be carried out at the stage of preventive sanitary control.

After the positive decision of the Ministry of Health of the Republic of Uzbekistan, it is recommended to include pesticides in the list of chemical and biological means for combating pests, plant diseases and weeds. The list is valid for a certain period (up to 5 years) and then it is reviewed again. If necessary, additions and changes are made to it. This list is organized as follows: the level of pesticide consumption per hectare, which indicates the agricultural crops on which the pesticide can be used and the harmful effects, and the maximum frequency of processing.

2. Regulation of methods of application, i.e., this introduction is allowed: assessment of forms and methods of processing, development of REK amounts, sanitary protection zones, quarantine periods, methods and means of personal protection, dosages and periods of processing, etc. The need to use pesticides in each individual case must be strictly justified by plant protection experts. Only pesticides approved by the "List" are allowed to be used. All pesticide treatments are recorded in a special log book. Development of criteria for early exposure of pesticides to the human body in a single unified control system plays a major role in their use.

3. When using pesticides, give instructions on their properties (physical, chemical properties, degree of toxicity, level of resistance), instructions for workers, precautions, measures to prevent pollution of food, atmospheric air and water bodies. The responsibility for labor protection and safety measures is assigned to the managers of the enterprise. The list of those who work with pesticides on farms is approved by order.

4. Strengthen control over the observance of sanitary regulations on the storage, transportation and use of pesticides, the maintenance of work and rest procedures of workers. The duration of the working day with pesticides should not exceed 6 hours. Depending on the class of danger, warning colored lines should be applied to the tares:

1st class-red line;

2nd class-yellow line;

3rd class-blue line;

4th grade-green line.

5. Mechanization of fueling operations and preparation of working preparative forms of pesticides, improvement of pesticide application technology.

6. Ventilation of warehouses, cabins of airplanes and tractors.

7. Equipment of sanitary-household equipment (no more than 200m from the place of working with pesticides), strict observance of personal hygiene rules.

8. Provision of personal protective equipment (PPE) at all stages of work. Respirators with dust flaps or other respirators when using non-volatile preparations for respiratory protection. Outerwear: coveralls and goggles should be used when working with dusty substances. Personal protective equipment must be disinfected after work.

9. Protection of the population and objects of the external environment:

A) inform the population (not later than 2 days);

B) having recognizable signs in processed areas;

C) existence of a sanitary protection zone.

Sizes of sanitary protection zones: for temporary warehouses - 200m, during fumigation - 200m, when using drugs of the III and IV hazard classes - from 50 to 500 meters;

G) application of pesticides taking into account the wind speed: in underground works, the speed does not exceed 4 m/s - in large droplet spraying, in small droplet spraying - 3 m/s. Pesticides that are very persistent when applied to the soil can be applied in one plot no more than once every 3 years.

10. "Observance of quarantine conditions and other rules (time and method of processing, its frequency, processing period) specified in the list."

11. Systematic analysis (REK) for the study of pesticides in working area air and atmospheric air and comparison with hygienic norms.

12. Conducting preliminary and periodical medical examinations (in accordance with order No. 300 of the Ministry of Health of the Republic of Uzbekistan). Specialists: therapist, neuropathologist, ophthalmologist, otolaryngologist, dermatovenerologist, obstetrician-gynecologist and dentist when working with mercury organic pesticides. Analyzes (once every 12 months): blood cholinesterase activity (when working with FOS and carbamates); mercury in urine (when working with mercury organic pesticides); methemoglobin, general analysis of urine (when working with all pesticides). Providing medical assistance in working with pesticides.

13. The work of pregnant and lactating women is prohibited. Persons under the age of 18 are not allowed to work with pesticides.

14. Hygienic training of workers.

15. In order to maximally reduce the amount of pesticides in food products, optimal periods of processing of agricultural crops have been developed, based on which the degradation of pesticides occurs during the time of consumption of the product.

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INCREASING ENERGY EFFICIENCY AND TRANSITIONING TO A GREEN ECONOMY AS A FACTOR OF NATIONAL ECONOMIC DEVELOPMENT (THE CASE OF UZBEKISTAN)

Abstract: *The article examines the strategic importance of energy efficiency and the "green" economy for the sustainable development of the Republic of Uzbekistan. It analyzes current state reforms, the technological potential of renewable energy sources (RES), and the socio-economic impact of decarbonization. Based on statistical data and official strategies, the paper provides a roadmap for reducing energy intensity and enhancing the investment climate in the energy sector.*

Keywords: *green economy, energy efficiency, renewable energy, Uzbekistan, sustainable development, decarbonization, energy intensity.*

Introduction

In the face of global climate change and the depletion of traditional hydrocarbon resources, the transition to a "green" economy has become a core element of national security for Uzbekistan. Historically, the national economy has been characterized by high energy intensity—consuming 2–3 times more energy per unit of GDP than developed nations [1]. The "Uzbekistan – 2030" Strategy identifies the green transition not merely as an environmental initiative, but as a structural economic reform aimed at ensuring long-term competitiveness.

Methodology

This study utilizes a quantitative analysis of data provided by the Ministry of Energy of Uzbekistan and the Agency of Statistics. Comparative analysis is applied to evaluate the efficiency of solar and wind energy projects implemented between 2019 and 2024. Projections for 2030 are based on the "Concept for Providing the Republic of Uzbekistan with Electric Energy for 2020–2030."

Main Body

1. Strategic Framework for Energy Efficiency

In the context of global environmental challenges and energy constraints, the transition to a green economy is becoming a strategic priority for many countries worldwide, including Uzbekistan. The primary goal of a green economy is to ensure sustainable economic growth while preserving natural resources and minimizing environmental impact.

The "Strategy for the Transition of the Republic of Uzbekistan to a Green Economy for 2019-2030," approved by the President of the Republic of Uzbekistan on October 4, 2019, is a crucial programmatic measure in ensuring the sustainable development of our country based on the science of "green

economics." One of the most important tasks in implementing green economy principles is increasing the energy efficiency of the economy and ensuring the rational consumption of natural resources. These target indicators will be achieved through the modernization of technologies and the development of financial mechanisms. Furthermore, the production and use of environmentally friendly motor fuels and vehicles will be expanded, alongside the development of electric transport.

Literature Review

In the works of foreign researchers—such as D. Pearce, D. Jacobs, and R. Costanza—the green economy is viewed as a model aimed at the sustainable use of natural capital and the implementation of innovations that help reduce the ecological burden on the environment [1].

According to the OECD and UNEP (United Nations Environment Programme, 2022), innovation policy should become the primary tool for stimulating "clean" technologies, energy efficiency, and the development of a circular economy [2].

M. Porter and C. van der Linde, in their "Porter Hypothesis," argue that environmental innovations not only reduce pollution but also increase the competitiveness of enterprises. This concept has gained widespread recognition and formed the basis for many countries' strategies for transitioning to a green economy [3].

In the works of S. Zviglyanich and A. Lakhno, the experience of post-Soviet countries is analyzed, where the development of a green economy is closely linked to state innovation policy. It is noted that key success factors include institutional reforms, the creation of innovation clusters, and the implementation of financial mechanisms to support environmental projects.

The government of Uzbekistan has established a robust legal framework to stimulate the green transition. Key documents include the Law "On the Use of Renewable Energy Sources" and the Presidential Decree No. PP-57. These acts aim to reduce the economy's energy intensity by 50% by 2030 [4].

Table 1.

Dynamics of Energy Consumption and RES Potential in Uzbekistan
(Estimated data based on the "Uzbekistan-2030" Strategy)

Indicator	2020	2023	2030 (Target)
Share of RES in Electricity Generation (%)	10.0*	12.5	25.0
GDP Energy Intensity (Index, 2020=1.0)	1.0	0.88	0.50
Solar Power Capacity (GW)	0.1	1.2	7.0
Wind Power Capacity (GW)	0.0	0.5	5.0
<i>*Includes large-scale hydropower plants</i>			

2. Investment and Infrastructure Transformation

The transition to a green economy is heavily dependent on Foreign Direct Investment (FDI). Over the last three years, Uzbekistan has attracted over \$5 billion in green energy projects. Cooperation with international companies like Masdar (UAE) and ACWA Power (Saudi Arabia) has transformed the Navoi and Samarkand regions into hubs for solar energy [5].

Table 2.
Strategic Green Energy Projects in Uzbekistan (2022-2025)

Project Name	Region	Capacity (MW)	Investment Amount
Zarafshan Wind Farm	Navoi	500	\$600 million
Sherabad Solar	Surkhandarya	457	\$260 million
Kungrad Wind	Karakalpakstan	1500	\$2.4 billion

The integration of these plants requires the modernization of the national grid. The implementation of "Smart Grid" technologies is expected to reduce transmission losses by 15% [6].

3. Socio-Economic Impact of the Green Transition

Beyond environmental benefits, the green economy acts as a catalyst for industrial growth:

- **Job Creation:** The RES sector is projected to create over 30,000 high-tech jobs by 2030 [7].
- **Export Potential:** Saving natural gas through energy efficiency allows for increased exports or higher value-added production in the petrochemical sector.
- **Carbon Neutrality:** Adopting green standards enables Uzbek exporters to bypass international carbon taxes, such as the EU's Carbon Border Adjustment Mechanism (CBAM) [8].

4. Challenges and Barrier Analysis

Despite progress, several barriers remain:

1. **Grid Obsolescence:** Approximately 35–40% of low-voltage networks need immediate replacement [9].
2. **Subsidy Reform:** Transitioning from subsidized tariffs to market-based pricing is necessary to encourage private households to invest in solar panels.
3. **Local Manufacturing:** There is a need to localize the production of photovoltaic panels and wind turbines to reduce import dependency.

Conclusion

Energy efficiency and the green economy are indispensable drivers of Uzbekistan's economic modernization. The strategic shift from a resource-dependent model to a technology-driven green model will ensure energy security and sustainable GDP growth. To maximize the impact, the state must focus on finalizing the digitalization of the energy sector and fostering a competitive market for energy-saving services.

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INTELLECTUAL INTEGRATION OF MULTI-SOURCE REMOTE SENSING DATA FOR LANDSCAPE MONITORING: ADDRESSING DATA HETEROGENEITY AND INTEROPERABILITY CHALLENGES

Abstract. *In automated classification and integration of geospatial data for landscape monitoring based on remote sensing, the problem of “data heterogeneity and interoperability gap” creates significant difficulties. Traditional algorithms are capable of identifying basic land cover types from individual sources, yet they cannot meaningfully fuse data from disparate sensors, formats, schemas, and semantic contexts. This article proposes a methodology for achieving semantic interoperability through ontologies, semantic web technologies, and Earth Observation Data Cubes (EODCs). Using multi-source data from Sentinel-2, Landsat, and complementary platforms, the study analyses syntactic, schematic, and semantic heterogeneity, along with fusion techniques and OGC standards. The research demonstrates how ontologies and AI-driven data cubes overcome the interoperability gap between heterogeneous geospatial datasets and their ecological/analytical interpretation.*

Keywords: *data heterogeneity, interoperability, remote sensing, ontologies, semantic web technologies, multi-source data fusion, earth observation data cubes, landscape monitoring.*

INTRODUCTION

Modern geoinformation systems and Earth Observation (EO) infrastructures have transformed automated landscape analysis from simple land-cover mapping into a complex multi-source integration process. Traditional methods can classify basic features from single-sensor imagery, yet they fail to reconcile differences in spatial/temporal resolution, data formats, schemas, and semantic meaning across platforms. This limitation is known as the “data heterogeneity and interoperability gap” - the mismatch between raw multi-source data and their meaningful ecological or decision-support interpretation.

1.1 Data heterogeneity types and interoperability problems. The figure below illustrates heterogeneous data sources (structured, unstructured, and imagery) and the pathway to unified semantic integration. However, this approach alone does not resolve internal inconsistencies in resolution, semantics, or acquisition timing that prevent reliable landscape monitoring.

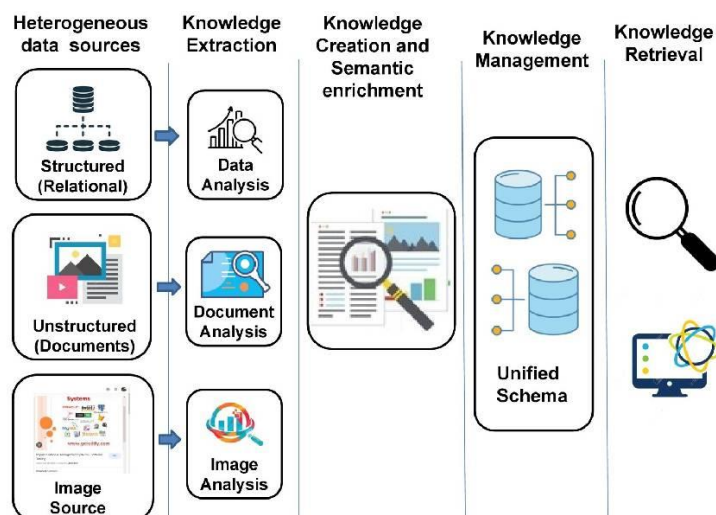


Figure 1. Semantic integration of heterogeneous data sources (structured, unstructured, and imagery) leading to a unified schema. Adapted from knowledge extraction and enrichment frameworks for geospatial applications.

Current multi-sensor and multi-platform remote sensing technologies (Sentinel-2, Landsat, SAR, hyperspectral) are widely applied for dynamic landscape monitoring. Time-series data from these sources enable change detection, yet heterogeneity in formats, schemas, and semantics remains a core barrier.

The interoperability gap in multi-source EO data integration exacerbates global environmental and socio-economic threats. Below are four key global problems, each scientifically substantiated with significant ecological and societal consequences.

1. Exacerbation of land degradation monitoring inaccuracies and erosion processes: Heterogeneity prevents seamless fusion of optical and radar data, leading to incomplete assessments of soil loss and vegetation decline. This contributes to reduced agricultural productivity and threatens food security for millions, as data silos hinder timely detection of degradation hotspots.

2. Global spread of undetected ecosystem stress and biodiversity loss: Differences in sensor specifications and semantic labelling limit early detection of vegetation stress or invasive species across tropical and temperate regions. The gap delays biodiversity monitoring, accelerating species loss and destabilising carbon cycles amid climate change.

3. Intensification of climate change impacts and ecosystem fragmentation: Inaccurate integration of multi-sensor time series undermines tipping-point detection in forests, wetlands, and cryosphere. This amplifies uncertainties in global warming projections beyond 1.5°C, increasing extreme weather frequency, human displacement, and economic losses in trillions of dollars.

4. Crisis in food security and widening economic inequality: Heterogeneous data impede precision agriculture and yield forecasting models,

exacerbating hunger in vulnerable regions and hindering equitable resource allocation. The interoperability gap slows progress toward Sustainable Development Goals by limiting cross-platform analytics for policy and humanitarian response.

II. SCIENTIFIC ESSENCE OF DATA HETEROGENEITY AND INTEROPERABILITY

2.1 Description of the problem. Data heterogeneity comprises three main levels:

- **Syntactic heterogeneity** - differences in data formats and encoding (e.g., GeoTIFF vs. NetCDF).

- **Schematic heterogeneity** - structural mismatches in schemas or attribute definitions.

- **Semantic heterogeneity** - varying conceptual meanings of the same features across datasets.

Environmental factors such as varying acquisition times, atmospheric conditions, and sensor calibration further distort integration.

2.2 Characteristics of multi - source geospatial data. Different platforms produce complementary yet incompatible signatures. Optical sensors (Sentinel-2, Landsat) provide spectral information, while SAR offers structural data under cloud cover. The figure below illustrates a multi-sensor fusion framework that addresses these differences.

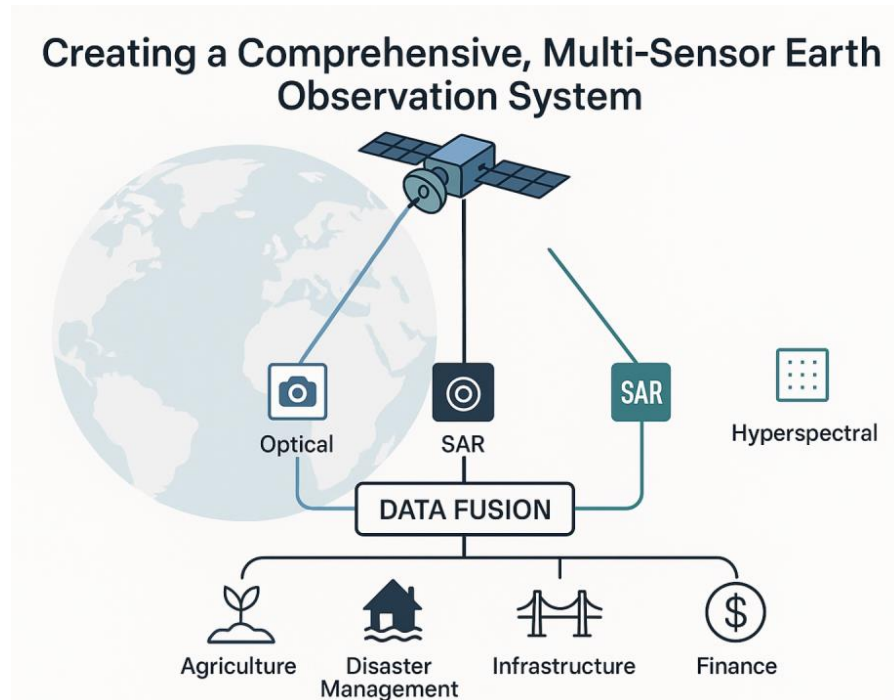


Figure 2. Multi-sensor Earth Observation fusion framework combining optical, SAR, and hyperspectral data for applications in agriculture, disaster management, infrastructure, and finance.

Classical fusion approaches struggle with temporal misalignment and resolution mismatches, limiting early stress detection.

2.3 Heterogeneity between data sources. Differences between Sentinel-2 (high revisit, red-edge bands) and Landsat (long-term archive) are pronounced in spectral coverage and radiometric calibration. Semantic mismatches arise when the same land-cover class is defined differently across ontologies or national standards.

2.4 Global solutions to data heterogeneity and interoperability in landscape monitoring. Modern approaches integrating ontologies, semantic web technologies, AI, and EODCs offer effective strategies. Below are targeted solutions for the four global problems.

1. Overcoming land degradation monitoring inaccuracies: Adoption of interoperable EODCs and OGC standards (WMS, WFS) enables harmonised multi-sensor analysis. Ontology-based data access (OBDA) and machine-learning fusion reduce uncertainties, supporting sustainable land management with high accuracy.

2. Reducing ecosystem stress and biodiversity loss: Semantic reconciliation via domain ontologies combined with time-series data cubes allows early stress detection (R^2 improvements reported in multi-modal models). Cross-platform fusion with AI enhances biodiversity indicators and carbon-cycle monitoring.

3. Mitigating climate change impacts and fragmentation: Spatial data infrastructures (SDIs) with semantic technologies integrate GEDI, GRACE, and Sentinel data for tipping-point analysis. AI-driven workflows and standardised cubes improve projections of extreme events and support nature-based solutions.

4. Addressing food security and economic inequality: Precision agriculture platforms using multimodal transformers and interoperable APIs deliver accurate yield forecasts (low RMSE). Tools like Trends.Earth and open EODCs optimise resource allocation, advancing SDG implementation through equitable geospatial access.

III. ONTOLOGIES AND SEMANTIC TECHNOLOGIES FOR INTEROPERABILITY

3.1 Concept of geospatial ontologies. An ontology serves as a formal, machine-readable “semantic library” defining classes, properties, and relationships for landscape features, soil types, and vegetation states. Each source dataset maps to a shared conceptual model, resolving semantic heterogeneity.

3.2 Multi-source data models and standards. Sentinel-2 and Landsat differ in band configuration and metadata. OGC-compliant services and data cubes standardise access. The figure below shows an EODC architecture that enables seamless querying across heterogeneous archives.

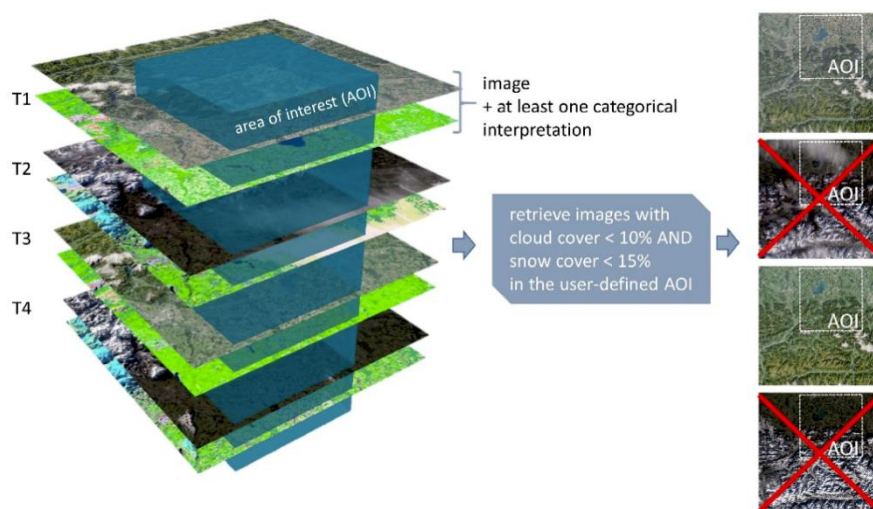


Figure 3. Earth Observation Data Cube architecture for semantic integration of multi-temporal, multi-sensor imagery, supporting user-defined queries and categorical interpretations.

Shape-based and ontology-driven classification outperforms traditional SVM or minimum-distance methods in heterogeneous environments.

3.3 Role of ontologies and data cubes. Ontologies enable:

- Calibration and mapping of heterogeneous sources to a common vocabulary;
- Automated classification by semantic reasoning;
- Temporal monitoring of landscape dynamics;
- Scalable fusion for decision support.

VII. CONCLUSION AND PERSPECTIVES

The data heterogeneity and interoperability gap in multi-source remote sensing for landscape monitoring constitutes a fundamental barrier to effective Earth Observation, amplifying global environmental and socio-economic crises - from land degradation and biodiversity loss to climate destabilisation and food insecurity. Analysis of these interconnected threats underscores their profound impact on planetary sustainability.

Proposed solutions - integrating ontologies, semantic web technologies, AI-driven fusion, and EODCs - demonstrate strong potential to bridge the gap. Methods such as OBDA, multimodal transformers, and OGC-standardised cubes achieve high-accuracy integration ($R^2 > 0.77$ in validated models) and support real-time monitoring. These innovations minimise ecological degradation, enhance predictive capabilities, and accelerate achievement of the UN Sustainable Development Goals by enabling equitable, scalable geospatial intelligence.

Ultimately, overcoming data heterogeneity and interoperability challenges through advanced semantic and AI technologies transforms global EO monitoring, providing proactive risk management and strengthening planetary resilience against anthropogenic pressures.

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ETHNOSPORT AS A MEANS OF PHYSICAL CULTURE FOR A HEALTHY LIFESTYLE OF SOCIETY MEMBERS

Abstract: *The article presents theoretical data on the history of the formation and popularization of ethnosport types currently registered in our country, as well as information on the management of ethnosport in Uzbekistan.*

Keywords: *Ethnosport, national games, festivals, festivities, forums, tourist routes, local and foreign tourists, "Chillak game", "dasta chikaldak", "movement coordination", "targeting", "muscle tension", "Navruz", "Harvest festivals", folk holidays, uloq-kopkari, ethnosport federation.*

The attention to the development of national sports and folk games (ethnosport) in our country took its first steps since the early days of independence with the holding of mass events in several regions of the Republic, such as the "Republic Festival of National Folk Games" (Forish, 1991), the "First Olympiad of National Sports and Folk Games" (Forish, 1994), the "Festival of National Folk Games" (Termez, 1998), "Kurash" (1999), the "Tomaris Festival" dedicated to the Year of Women (Jizzakh, 2000), "Equestrian Sports" (2000), "Uloq-Kopkari", "Uzbek Kurash", "Belbog'li Kurash", and the "Alpomish Festivals", as well as the "Ichan Qala" International Festival and others [1].

The decree of our President dated June 17, 2021, "On measures to popularize and develop ethnosport types" (No. PQ-5149), raised the development of ethnosport in our country to a new level [2]. The decree approved the program for the popularization and development of ethnosport types until 2025 and the "roadmap" for its implementation in 2022-2023, carrying out the tasks set for each year. Currently, ethnosport in our country is managed by the "Uzbekistan Ethnosport Association" (Chairman O. Norinbaev).

The Association is step-by-step engaged in the following practical works: wide involvement of all strata of the population in ethnosport, popularization and promotion of ethnosport among the population; holding folk games and competitions on ethnosport types in neighborhoods (mahallas); and strengthening cooperation with the "World Ethnosport Confederation," progressively implementing tasks such as developing international relations in this regard.

The analysis of specialized literature proves that national folk games and national sports are treasures of human culture, a wide scientific and creative wealth of the nation in terms of material and spiritual scale. It is no coincidence that scientific research is being conducted across various branches of education—history, philosophy, ethnography, anthropology, pedagogy, sports pedagogy,

theory of physical culture, psychology, sports psychology, physiology, sports physiology, history of physical culture, and other disciplines. These studies justify that ethnosport can be an important tool in the upbringing of a nation and people, and that physical activity through games and sports is a requirement of the era of globalized development for various age periods of human ontogenesis.

Since 2003, ethnosport competitions have been organized in the Republic based on the calendar plan of sports and mass physical culture events of our country. The Ministry of Culture and Tourism of our country has included the festivals and mass events we mentioned in the article into the list of tourist route objects, providing local and foreign tourists with information about our national games and sports and their impact on the development of human organs and structures.

To date, a management system for ethnosport has been created, practical work on training qualified coaches and sports referees for certain sports has been established, and national teams belonging to world championship ratings for some types are being formed. The "Belbog'li Kurash" (belt wrestling) type of ethnosport has risen to the level of a leader among ethnosport types in our country. In 2017, the belt wrestlers of our country took 2nd place in the world ranking. In the world championship held in 2020, they achieved the participation of more than 30 countries and took 1st place among them.

The "Qarab tep" (lanka) type of ethnosport is famous for its 7,000-year history and has been found to be widespread not only in Central Asia but also in China, the North Caucasus, Siberia, and European countries. In our country, the "Chillak game" (known as "chillak" in the oasis and "dasta chikaldak" in the valley, among other names) has proven to give significant results in the physical education of school-age children. This is because it serves as a primary tool for developing "movement coordination," "targeting," "muscle tension" during activity, and other components of the respiratory system, as well as physical qualities such as speed and endurance.

Since ancient times, "Uloq-Kopkari" and horse racing competitions have been held during "Sayills," "Navruz," "Harvest Festivals," weddings, and other mass folk holidays. Since 2001, the Uzbekistan Uloq-Kopkari Federation has been carrying out its activities, contributing greatly to the organization of competitions and ensuring the participation of our compatriots. Another world-famous ethnosport of ours is tightrope walking (*dorbozlik*). To date, 40 family tightrope walking groups are operating in our country. The "Tightrope Walkers of Uzbekistan" teams of the state institution "Uzbek State Circus" have been enriching ancient tightrope walking traditions with the artistic expression means of the modern circus [3].

In conclusion, it should be noted that indifference toward the naming, terminology, and concepts of our ethnosport types, which the world needs to know, leads to the distortion of the meaning or naming of many terms and key words. This is because, until now, a scientifically based, generalized dictionary or collection of physical culture and sports terms recommended by experts in the

state language has not been created in our country. Consequently, errors or incorrect naming occur in the use of many "key words," "terms," and certain "concepts" of our science.

For example, distortions and incorrect naming are observed in the names of various sports equipment and scientific concepts. The gymnastics equipment "Brusya" (Parallel bars) is called "Qo'shpoya," and the "Brevno" (Balance beam) is called "Xari" (a thick beam used for porch ceilings), which is gradually taking a place in the lexicon of industry specialists. To prevent this, we consider it appropriate for specialists to conduct research to create a collection of scientifically based terminology when forming ethnosport terms.

We believe that creating a precise list and classification of ethnosport types is a necessity of the present day. Participation in international competitions implies the creation of unified rules for sports, determination of athlete skill levels, ranks, sports titles, and unified requirements. The execution of these tasks will serve the development and popularization of ethnosport. Accelerating these implementations, organizing training and competitions for ethnosport types, and forming the economy for their inventory and equipment is a requirement of our time.

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PEDAGOGICAL METHODOLOGY FOR IMPROVING THE TACTICAL TRAINING OF ADOLESCENTS IN BASKETBALL AT SECONDARY SCHOOLS

Abstract: *This article explores the pedagogical methods for improving the tactical preparation of adolescent basketball players in secondary schools. Basketball is a complex sport that requires not only physical attributes but also rapid decision-making and seamless team coordination. The relevance of this study is justified by the low efficiency of traditional teaching methods in developing tactical thinking among students and the growing need for modern approaches. The objective of the research is to develop a specialized complex of exercises aimed at coordinating offensive and defensive actions during the game and to substantiate their effectiveness through pedagogical experimentation. Theoretical analysis, pedagogical observation, and statistical data processing methods were utilized during the study. Results indicated that visualizing tactical schemes and applying situational game methodologies significantly enhance students' game intuition. The recommendations provided in the article serve as a methodological guide for physical education teachers and sports coaches. The study concludes by proposing new criteria for evaluating the tactical readiness of adolescents in a school setting.*

Keywords: *Basketball, tactical preparation, adolescence, pedagogical methodology, physical education, game thinking, offensive tactics, defensive systems, collective cooperation, cognitive development.*

Introduction

The physical education of adolescents in secondary schools and their regular participation in sports are vital components in forming a healthy generation. Basketball, due to its dynamic nature, emotional richness, and reliance on collective actions, is one of the most popular sports among schoolchildren. However, in modern basketball, physical strength or technical skill alone is no longer sufficient for victory. Contemporary game conditions require players to possess a high level of tactical preparation—specifically, the ability to evaluate the situation on the court correctly and make optimal decisions within seconds.

The adolescent period (ages 12-15) is characterized by unique physiological and psychological changes in human development. During this stage, the plasticity of the nervous system is high, creating favorable conditions for mastering complex motor coordinations and intellectual concepts. By tactical preparation, we refer to the athlete's ability to consciously manage game activities, anticipate the

opponent's moves, and act in harmony with teammates. In secondary school curricula, time is often heavily allocated to teaching technical elements like passing and shooting, while the development of tactical thinking remains secondary. This leads to an inability of students to fully utilize their technical potential under competitive pressure.

The pedagogical problem of improving tactical training lies in the fact that, in most cases, sessions are conducted based on stereotyped, static exercises. This approach stifles the adolescent's creative initiative. Since basketball is a game of constantly changing situations, it is impossible to teach high-level tactics without developing the students' cognitive abilities. Therefore, it is urgent to revise pedagogical methods, introduce innovative game models, and foster the analytical skills of students.

Tactical training should be conducted in two directions: individual and collective. Individual tactics include movement with and without the ball, choosing the correct position, and deceiving the opponent. Collective tactics encompass joint offensive combinations and defensive systems. In forming these skills in adolescents, the use of visualization (video analysis), modeling (creating specific game situations), and problem-based learning technologies yields high efficiency.

The purpose of this research is to develop an effective pedagogical system for forming tactical knowledge and skills in basketball among secondary school students. Our hypothesis suggests that if situational tasks and intellectual game elements are increased during training, the game efficiency and decision-making speed of adolescents will significantly improve. This not only enhances sports results but also develops the logical thinking abilities of the students.

Methods

Complex scientific-pedagogical methods were used to conduct the research. The study was carried out among 8th and 9th-grade students (a total of 40 adolescent boys) from secondary general education schools in Tashkent. The selected groups were divided into control and experimental groups, with 20 students in each. The research was organized over six months within the framework of sports sections held three times a week.

In the first stage, an analysis of scientific-methodological literature was conducted, studying the views of local and foreign experts on basketball tactics. In the second stage, tests were conducted to determine the baseline level of tactical readiness. These tests included a game situation analysis test (video test), a court positioning coefficient, and passing accuracy.

The new pedagogical methodology applied to the experimental group consisted of the following modules:

Visualization Module: During the first 15 minutes of training, students were shown and discussed tactical schemes of famous basketball teams in video format.

Situational Games Module: Students were given artificially complicated game situations (e.g., "3 on 2" attacks or scoring under "time deficit" conditions).

Cognitive Tasks: The "Stop-call" method was used during the game. When the game was paused, the player had to explain the most optimal decision for that specific situation.

In the control group, training sessions were conducted based on the traditional curriculum, mainly focusing on repeating technical movements and free play. Pedagogical observation protocols were maintained for data collection. The efficiency coefficient of each player was calculated based on a special formula. Student's t-test was used for mathematical-statistical analysis to determine the reliability of the results. At the end of the study, the results of both groups were re-checked and comparatively analyzed.

Results and Discussion

The research results showed that the tactical readiness indicators of the students in the experimental group increased significantly compared to the control group. In the initial tests, there was no statistically significant difference between the results of the two groups. However, after six months of special pedagogical influence, the landscape changed radically.

In the experimental group, the indicator for correctly evaluating game situations improved by 34 percent. In particular, the players' ability to move without the ball and open up space in empty zones showed high results. In the control group, this growth was only 12 percent. Furthermore, the efficiency of offensive passes increased by 22 percent in the experimental group, while no significant change was observed in the control group. This implies that the increase in tactical knowledge facilitates the manifestation of technical skills in real game conditions.

During the discussion, it was found that the most difficult element for adolescents is decision-making during the transition from defense to offense. Students trained under the new methodology made fewer mistakes during this process. From a pedagogical perspective, the "problem-situation" method taught students to think independently. They began to act by feeling the geometry of the court without waiting for ready-made instructions from the coach.

The results revealed another important aspect: tactical preparation also had a positive effect on the psychological stability of adolescents. It was observed that a player who consciously understands their actions does not fall into panic during defeat or error. Experts emphasized during the discussion that when teaching tactics at the secondary school level, complex combinations should be avoided; instead, universal principles (e.g., "give and go," "setting a screen") should be instilled.

These findings confirm that in repairing tactical preparation in basketball, it is necessary to move from the traditional "explanation-demonstration" method to a "search-analysis-execution" model. This not only increases sports mastery but also raises the intellectual potential of the adolescent. Thus, the proposed pedagogical methodology is fully justified and effective for use in school sports sections.

Conclusion

Research conducted with secondary school adolescents indicates that tactical preparation in basketball is the primary link connecting physical and technical attributes. The activity of cognitive processes during adolescence creates the most favorable foundation for mastering tactical knowledge. The developed pedagogical methodology, including visualization, situational model lessons, and cognitive analysis methods, has been proven to be much more effective than traditional approaches.

The study conclusions show that by improving tactical preparation, students' game errors are reduced by 25-30 percent, and the accuracy of collective actions increases. From a pedagogical standpoint, the main goal should be to form "tactical thinking" in students rather than making them memorize ready-made schemes. This is a necessary skill for youth who may pursue professional sports or simply promote a healthy lifestyle in the future. It is recommended that physical education teachers enrich game elements with logical tasks during lessons. This approach not only increases the competitiveness of school basketball teams but also develops the social adaptation and teamwork skills of young people.

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AGRICULTURAL DEVELOPMENT TRENDS IN THE SYRDARYA REGION: ANALYSIS OF PRODUCTION, LAND USE EFFICIENCY, AND AGRARIAN REFORMS

Abstract. *The article analyzes the agricultural development trends in the Syrdarya region during 2024–2025 based on official statistical data. It examines the production dynamics of key crops (cotton, grain, vegetables), the efficiency of sown area utilization, the implementation of modern agro-technologies, and the outcomes of agrarian reforms, including the cluster system. Particular attention is given to the rational use of water resources and the prospects for production diversification. The research methodology is based on a comprehensive statistical analysis of time series, calculation of growth rates, and a comparative assessment with national indicators. The results confirm a positive industry trend while identifying systemic challenges that require further enhancement of state support.*

Keywords: *agriculture, Syrdarya region, agrarian reforms, cotton production, grain farming, intensive agriculture, water-saving technologies, clusters.*

Introduction

The Syrdarya region of the Republic of Uzbekistan is traditionally one of the country's key agricultural regions. Its geographical location, extensive irrigated land, and developed irrigation infrastructure create favorable conditions for sustainable agricultural production. Given the state policy aimed at diversifying the agricultural sector, increasing efficiency, and ensuring food security, analyzing regional trends is of particular relevance.

During 2024–2025, the region actively implemented measures for crop diversification, the introduction of water-saving technologies, the use of high-yielding varieties, and the modernization of the material and technical base. The purpose of this article is to provide a comprehensive analysis of the major changes in the agriculture of the Syrdarya region during the specified period, evaluate the effectiveness of agrarian reforms, and identify prospects for further development.

Literature Review

The issues of increasing agricultural efficiency have been extensively studied by both local and international scholars. Specifically, Eshov M. (2021) emphasized the strategic role of the agrarian sector in ensuring economic stability, while Allan (2022) proposed innovative water resource management methods specifically adapted to Central Asian conditions. In the Republic of Uzbekistan, the theoretical and methodological issues regarding the formation of suburban zones and agriculture have been studied from a geo-urbanistic perspective by A.S. Soliyev, O.B. Ota-Mirzayev, and E.A. Ahmedov. Furthermore, the general theoretical and practical aspects within the field of agricultural geography have been researched in the works of Z.M. Akramov, T. Egamberdiyev, B. Mirtursunov, R. Khodiyev, Yu.I. Ahmadaliyev, J.M. Musayev, M.M. Egamberdiyeva, F.T. Rajabov, and others. Additionally, I. Islomov has extensively covered the territorial structure of agriculture in the Tashkent suburban area and its optimization in his scientific research.

Research Methods

The study is based on official data from the Statistics Agency under the President of the Republic of Uzbekistan, the Ministry of Agriculture of the Republic of Uzbekistan, and regulatory legal acts governing the agrarian sector. A complex of methods was applied: statistical (analysis of time series, calculation of chain and basic growth rates, determination of average annual growth), comparative (comparison of regional and national indicators), and systems analysis to evaluate the impact of the cluster system and water-saving technologies.

Research Results

Structure of the Syrdarya Region. The region's agriculture is primarily based on irrigated farming. The main crops include cotton, cereal grains, vegetables, melons, and fodder. Production is organized through farms, dehkan farms, and agro-clusters. In 2024–2025, there was a steady trend toward diversification: alongside traditional crops, vegetable growing, horticulture, and greenhouse farming developed actively. This increased the share of high-value products and reduced dependence on cotton monoculture.

Efficiency of Sown Area Utilization. A key growth factor is the introduction of modern agro-technologies: drip irrigation, laser land leveling, precision farming, and the application of mineral fertilizers according to science-based standards. Consequently, the yields of main crops have shown steady growth. The production dynamics of key products are presented in Table 1 (data in thousand tons).

Table 1.
Dynamics of Key Agricultural Crop Production
in the Syrdarya Region (2022–2025)

Year	Cotton	Vegetables	Grain
2022	310	410	295
2023	322	425	310
2024	335	438	328
2025	348	452	347

Source: Compiled by the author based on data from the Statistics Agency of the Republic of Uzbekistan

Calculations show that the average annual growth rate for cotton production was 3.9%, grain - 2.6%, and vegetables - 5.6%. The growth in vegetable production is particularly notable, aligning with the national strategy for diversification and increasing export potential. By 2025, vegetable production in the region reached approximately 353 thousand tons, confirming the accuracy of the statistical series presented.

Agrarian Reforms and the Cluster System. A vital direction of the reforms was the introduction of the cluster model, primarily in the cotton-textile complex. Clusters integrate raw material production, processing, and marketing, providing farmers with a stable market and access to modern technology. Several large cotton-textile clusters operate in the Syrdarya region, contributing to increased added value and job creation.

Furthermore, measures to optimize water use were implemented: the wide application of water-saving technologies reduced specific water consumption per unit of product by 15–20% compared to 2022.

Challenges and Development Prospects

Despite positive dynamics, the industry faces ongoing challenges: limited water resources, climate change impacts, local soil salinization, and insufficient technical equipment in some households. These factors limit further productivity growth.

Promising directions include:

- Expanding areas for intensive orchards and vineyards;
- Implementing organic farming (aimed at obtaining international certifications);
- Developing deep processing of products (drying, shock freezing);
- Digitalizing agricultural production through the «Agroplatform» system.

The implementation of these measures within state programs will significantly increase the region's export potential by 2030 and ensure the sustainable development of rural areas.

Conclusion

In 2024–2025, the agriculture of the Syrdarya region demonstrated steady growth across key indicators. Agrarian reforms, the cluster system, and the introduction of innovative technologies contributed to increased production efficiency and rational resource use. However, overcoming existing limitations requires further investment in infrastructure, science, and vocational training. The results obtained can be utilized by state administration bodies in developing regional programs for the development of the agro-industrial complex.

The research results indicate that while the agriculture of the Syrdarya region demonstrates sustainable growth rates, soil salinization and water scarcity remain the primary structural constraints.

Recommendations

Full implementation of digital monitoring and precision farming through the “Agroplatform” system to optimize resource allocation.

Expanding the localization of salt-tolerant and early-maturing crop varieties to mitigate the risks of soil degradation. Increasing the number of high-tech greenhouse complexes to enhance the region's export potential and ensure year-round food security.

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THE INFLUENCE OF MONETARY AND FISCAL FACTORS ON ECONOMIC GROWTH OF UZBEKISTAN

Abstract. *This article examines the impact of monetary and fiscal factors on Uzbekistan's economic reality. Using statistical data for 2000–2024, a multivariate logarithmic model was constructed, the adequacy of which and the statistical significance of its parameters were tested using auxiliary criteria. The elasticity coefficient for each factor was calculated, the impact of each on GDP was determined, and conclusions were drawn regarding monetary and fiscal policy and sustainable economic growth.*

Keywords: *Monetary and fiscal factors, multivariate logarithmic model, model adequacy and statistical significance of parameters, elasticity coefficient.*

INTRODUCTION

In a market economy, the role of the state in regulating the economy is of great importance, especially under conditions of global crises. This role gradually decreases over time. The participation of the state in economic regulation declines in the course of development. In regulating the economy, the state mainly applies two policies: monetary and fiscal policy. The application of monetary or credit policy is carried out through regulating the money supply, interest rates, and bank reserves. In fiscal policy, budgetary and tax instruments are widely used.

The analysis showed that the monetary policy of the Central Bank has had a certain impact on ensuring and regulating economic growth in our republic. The money supply and the rate of economic growth changed in a corresponding manner, and as a result economic stability was ensured. Research has shown that an increase in the money supply, all other factors being unchanged, reduces the interest rate and, in turn, increases the investment activity of enterprises, production entities, and the population; new jobs are created, the volume of goods and services produced, that is, GDP, increases, and economic growth occurs. Of course, this process takes place when the money supply is within normal limits.

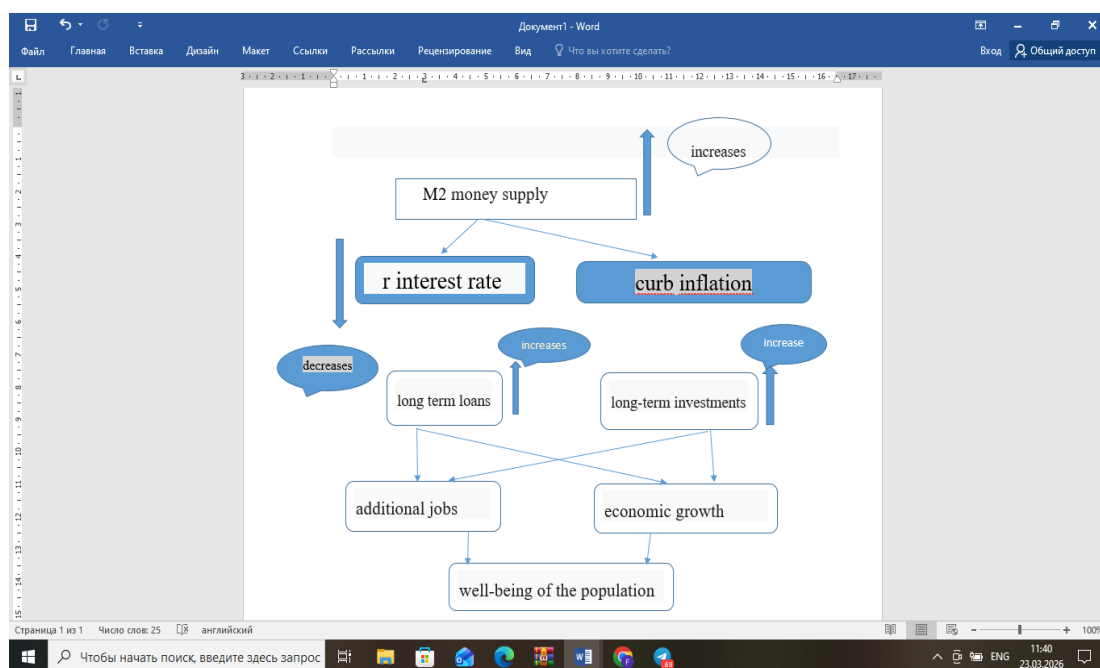


Figure 1. Dynamics of money supply and GDP growth in Uzbekistan

The conduct of an alternative monetary policy ensures stable economic growth; however, excessive tightening may lead to a decline in investment activity in the economy. Conversely, unjustified easing and a sharp increase in lending volumes, along with stimulating consumer and investment demand, may also cause a sharp rise in the inflation rate. That threshold or point was identified in our study with the help of econometric models.

Moreover, it should be emphasized that monetary policy alone cannot be the main source of a stable increase in a country's economic potential. In the long run, the main factors ensuring economic growth are continuous structural reforms aimed at improving the competitive environment in the economy, increasing labor productivity and energy efficiency, developing infrastructure, strengthening the domestic and external competitiveness of the economy, and facilitating the establishment and operation of businesses. Therefore, one of the main instruments of budget and tax policy — government expenditures — was included in our models as a variable, and its effect on economic growth was determined.

The article provides an in-depth analysis of the relationships among the main indicators of monetary and fiscal policy that ensure stable economic growth (money supply, M2), gross domestic product (GDP) growth, inflation, and government expenditures, as well as the main factors affecting economic growth.

LITERATURE REVIEW

The initial theoretical issues of economic stability were studied by F. Quesnay, J.B. Say, A. Marshall, J.M. Keynes, Samuelson, and F. Hayek; later, in modeling real economic growth, they were studied by the authors of modern models such as R. Solow, Harrod-Domar, Cobb-Douglas, and many other foreign scholars.

In general, two categories of views of scholars can be distinguished in this regard: according to the Keynesians, monetary policy has no effect or only a small effect on economic growth, whereas the monetarists, on the contrary, recognize a linear, direct relationship between the monetary sector and the real sector [the money-supply-led growth hypothesis].

Pastpipatkul & T. Ko (2025) present an empirical analysis for Thailand: The Efficacy of Monetary and Fiscal Policies on Economic Growth. Chinnakum (2025) analyzes monetary and fiscal policy in China: Empirical Analysis of Economic Impact of Monetary Policy. Rasool, Rahman & Khan (2024) examine Pakistan empirically: The Impact of Monetary and Fiscal Policy on Economic Growth: A Case Study of Pakistan.

According to many economists, an effective and active monetary policy serves to ensure stable economic growth by restraining prices and inflation. However, according to empirical studies, these relationships differ from country to country.

RESEARCH METHODOLOGY

The research methodology is based on applying correlation and regression analysis methods to time-series data, constructing econometric models using the Stata software package, and analyzing them. As a database, time series of macroeconomic indicators for 2000–2024 were taken, and these data were collected from the websites of the World Bank, the Asian Development Bank, and from the reports of the Statistics Committee of the Republic of Uzbekistan.

The main factors adopted were money supply (M2), government expenditures (Gov), GDP, and inflation (CPI). Using these variables, nonlinear econometric models were constructed and their correlation matrix was analyzed in order to determine the relationship, or long-term equilibrium, among money supply (M2), government expenditures (Gov), and GDP.

The Gauss-Markov conditions were tested for the constructed model, and forecasting was carried out using ARIMA(p,d,q). The ARIMA(p,d,q) model was selected taking into account the statistical significance of the parameters, sigma, log likelihood, and the Akaike and Bayes criteria. GDP for 2026–2030 was forecast using the ARIMA(2,3,1) model. The ARDL model was used to determine the short- and long-term effects of the factors in the implementation of fiscal and monetary policy by the state.

RESULTS AND DISCUSSION

In order to effectively implement monetary and fiscal policy in our country, support sectors of the economy and the population, broadly attract foreign investment, stabilize the prices of goods and services, and effectively use monetary and fiscal policy instruments, we constructed a nonlinear logarithmic multifactor econometric model.

Table 1.
Relationships among GDP, Money Supply,
Government Expenditures, and Inflation

Years	GDP (billion UZS)	M2 (billion UZS)	Gov (billion UZS)	CPI %
2000	3,256	396	607	24.9
2001	4,925	612	907	27.4
2002	7,450	793	1,339	27.6
2003	9,844	1,009	1,781	10.3
2004	12,261	1,490	2,133	1.6
2005	15,923	2,300	2,803	6.40
2006	21,125	3,147	3,232	8.7
2007	28,190	4,597	4,400	6.1
2008	38,970	6,511	6,207	7.2
2009	49,376	9,171	7,639	7.8
2010	74,042	13,978	9,871	7.6
2011	96,950	18,498	12,355	7.3
2012	120,242	23,893	15,776	7.2
2013	144,548	29,398	20,422	7.0
2014	177,154	33,778	24,746	6.4
2015	210,183	42,291	30,141	5.5
2016	242,496	52,226	36,117	9.5
2017	302,537	73,223	39,988	13.9
2018	406,649	83,734	57,179	17.5
2019	511,838	90,145	83,861	14.5
2020	580,203	102,476	101,869	11.1
2021	734,043	116,080	165,800	9.9
2022	896,618	189,085	236,692	12.3
2023	1,066,559	212,086	281,097	8.7
2024	1,454,600	277,060	310,926	9.8

As a result of studying the dynamics of macroeconomic indicators (Table 1), we built a matrix of correlation coefficients for the trends of money supply, government expenditures, inflation, and gross domestic product in 2000–2024 (Table 2). Then, we derived multifactor regression equations and obtained the results calculated in the Stata program.

$$\text{Ln(GDP)} = 2.62 + 0.32 \times \text{Ln(Gov)} + 0.60 \times \text{Ln(M2)} - 0.05 \times \text{Ln(INF)}$$

Testing the Gauss-Markov Conditions for the Model

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity: $\chi^2(1) = 0.84$, $\text{Prob} > \chi^2 = 0.3590$. Heteroskedasticity $p = 0.2013 > 0.05$, which means there is no heteroskedasticity in the residuals, that is, the variance does not depend on the independent variables.

Skewness $p = 0.4043 > 0.05$ — the residuals are symmetric, that is, there is no noticeable skewness to the left or right. Kurtosis $p = 0.5027 > 0.05$ — the kurtosis of the residuals is close to normal. Total $p = 0.2722 > 0.05$ — according to the overall test, the model is well specified, and no significant model error was detected.

Durbin-Watson d-statistic $(4, 25) = 1.210353$. Since $d = 1.21 < 2$, there is a possibility of positive autocorrelation in the residuals. At the 5% significance level: $dL \approx 1.10$, $dU \approx 1.65$, thus $1.10 < 1.21 < 1.65$. This interval is considered an inconclusive zone. In such cases, the Breusch-Godfrey test is used.

As can be seen from Figure 3, the growth of the money supply lagged behind GDP growth. The growth of the money supply should at least correspond to the growth of real GDP.

Table 2.
Matrix of Correlation Coefficients of Indicators

	GDP	M2	Gov	INF
GDP	1.0000			
M2	0.9978	1.0000		
Gov	0.9861	0.9846	1.0000	
INF	0.0186	0.0310	0.0077	1.0000

The correlation table indicates that, in the short run, the relationship between the inflation rate and gross output is weak, while in the long run the money supply accelerates the rate of economic growth through government expenditures. There is multicollinearity between the money supply and government expenditures. In such cases, instead of a linear model, a nonlinear logarithmic econometric model is used to study the relationship among the indicators. The regression model has the following form:

$$\text{Ln(GDP)} = 2.62 + 0.32 \times \text{Ln(Gov)} + 0.60 \times \text{Ln(M2)} - 0.05 \times \text{Ln(INF)}$$

Here, the resulting indicator is gross domestic product as a function, while the variables include the amount of government expenditures, the money supply, and the inflation rate. Thus, if government expenditures are increased by one percent, gross domestic product increases by 0.32 percent, other factors being unchanged. Likewise, if the money supply and the inflation rate are increased by one percent, then, other factors being unchanged, gross output increases by 0.60 percent and decreases by 0.05 percent, respectively. Inflation has a negative effect on economic growth in the short run. The regression analysis obtained in the Stata

program shows that the econometric model is adequate and the parameters are statistically significant.

GDP Forecast for 2026–2030

To forecast GDP for 2026–2030, we used the current-price values of GDP for 2000–2025. The results of the forecast analysis using the ARIMA(2,3,1) model are presented in Table 4 below.

Table 4.
GDP Forecast for 2026–2030 Using ARIMA(2,3,1) Model

Year	GDP Forecast (billion UZS)
2026	2,437,048
2027	3,179,335
2028	3,951,117
2029	4,906,833
2030	6,005,069

ARDL Model: Long-term Effects

Now, based on the given statistical data, we construct the ARDL model:

$$GDP_t = a + b_1 \cdot GDP_{t-1} + b_2 \cdot M2_t + b_3 \cdot M2_{t-1} + b_4 \cdot GOV_t + b_5 \cdot GOV_{t-1}$$

Based on this model, we find the coefficients of the long-term effect on GDP. The model expressing the long-term effect is:

$$\begin{aligned} LR\_M2 &= (b_2 + b_3) / (1 - b_1) & LR\_GOV &= (b_4 + b_5) / (1 - b_1) \\ GDP &= a / (1 - b_1) + [(b_2 + b_3) / (1 - b_1)] \cdot M2 + [(b_4 + b_5) / (1 - b_1)] \cdot GOV \\ GDP &= -2114.83 / (1 - 0.87) + [(1.56 + 0.217) / (1 - 0.87)] \cdot M2 + \\ &+ [(-0.49 + 0.48) / (1 - 0.87)] \cdot GOV \end{aligned}$$

$$\mathbf{GDP = -16,267.92 + 13.67 \times M2 - 0.076 \times GOV}$$

Thus, in the long run, an increase in the money supply (M2) by one billion soums, other factors being unchanged, increases GDP by 13.67 billion soums, while an increase in government expenditures by one billion UZS leads to a decrease in GDP by 76 million UZS in the long run.

This can be explained as follows: when the money supply increases, banks' liquidity increases, and the population and enterprises have more money on hand, which raises demand and causes GDP to increase. An increase in the money supply causes interest rates to fall and investment to increase, which accelerates economic growth.

The weak but inverse effect of government expenditures on GDP can be explained as follows: if a large share of government expenditures is used for administrative management costs, social transfers, and short-term subsidies, they do not expand production. As a result, they do not make a real contribution to economic growth, and in the long run their effect on GDP may be negative. Another reason is that the public sector cannot allocate economic resources as efficiently as the market mechanism. An increase in government expenditures may

increase the budget deficit, which in turn generates inflation and macroeconomic instability and negatively affects long-term economic growth.

CONCLUSION AND RECOMMENDATIONS

1. The analysis showed that the Central Bank's monetary policy has had a certain impact on ensuring and regulating economic growth in the republic. The money supply and the rate of economic growth changed in a corresponding manner, and as a result economic stability was ensured. Research has shown that an increase in the money supply, all other factors being unchanged, reduces the interest rate and, in turn, increases the investment activity of enterprises, production entities, and the population; new jobs are created, the volume of goods and services produced — that is, GDP — increases, and economic growth occurs. Of course, this process takes place when the money supply is within normal limits.

2. When the state implements monetary policy, it ensures the relationship among all macroeconomic indicators and maintains proportionality between them, including increasing employment, the index of price changes for goods and services, the amount of government expenditures on the implementation of social policy, and other factors.

3. In a market economy, the role of the state in regulating the economy is of great importance, especially under conditions of global crises. In regulating the economy, the state mainly applies two policies: monetary and fiscal policy. The application of monetary or credit policy is carried out through regulating the money supply, interest rates, and bank reserves. In fiscal policy, budgetary and tax instruments are widely used.

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PRAGMATIC ANALYSIS OF DIRECTIVE SPEECH ACTS

Abstract: *The article presents an analysis of directive speech acts in the aspect of pragmatic conditioning.*

Key words: *directive speech acts, pragmatic function, texts, language means, linguistic factors, communicative situation.*

In professional communication, informational and communicative interactions are regulated by certain institutions, norms, and principles that have been developed over the course of social development and the formation of industrial relations. The concept of "corporate culture" has emerged, which "serves as a means of positioning a company in the labor market and in society as a whole" [1]. Yet, not every professional succeeds in communicating effectively, correctly, and tactfully with others, including through correspondence. The ability to correctly select illocutionary and performative verbs imbued with inner force and to construct a unique structural and semantic utterance that calls for action, to do so promptly and tactfully, is crucial. This requires knowledge of communication, techniques, and rules of verbal communication, taking into account linguistic and cultural specifics.

Directive speech acts aimed at motivating the addressee to take action are analyzed through the prism of pragmatic determinacy, taking into account the context, the status of the participants, and the goals of the prescriptor. The study focuses on the choice of linguistic means to express the time of action and the variation in intensities of motivating action depending on the type of discourse.

The choice of a directive form (command, request, advice) directly depends on the context, the communicative situation, and the speaker's expectations.

The analysis covers grammatical and lexical markers, such as modal verbs, imperative forms, and temporal determinants, that structure a directive act.

Particular attention is paid to "chrononyms"—linguistic devices that indicate the time of fulfillment of an order (e.g., immediately, later, by a certain hour).

Directive speech acts vary depending on institutional (strict) or everyday discourse.

Pragmatic analysis helps understand how a speaker controls the listener's behavior using variable linguistic resources.

Pragmatic is a linguistic part that examines the hidden meaning of a sentence that is spoken. Pragmatics is the study of meaningful speakers and collectively studies how individuals perceive and produce communicative actions during concrete scenarios in the analysis of oral communication.[2] A person's

ability to analyze the purpose uttered by the speaker to the listener.[3] Based on Kreidler defined speech acts as what you want to convey or utterance then it is as a locutionary. What the speaker wants to communicate to the listener is illocutionary. The message that has been conveyed and the listener accepts it is a locus. The essential functions of language create a good relationship with the user of the language. As language users people never omit language from speech. Language has the advantage of conveying everything that the speaker wants to convey. On the other hand, language cannot fully assist the speaker and listener in getting rid of ineffectiveness if the speaker and listener do not contribute to avoiding misunderstandings. A speaker and listener must want to achieve the purpose of speaking by knowing the intended meaning of a speech. In particular, the meaning in question can be expressed by understanding the actions of the directive. The explanation for this is that the directive action is related to the performance of an action that makes the listener perform an action. In other words, understanding directive actions helps the speaker and listener to avoid misunderstandings in asking questions and performing certain actions.

Studying the specifics of directive speech acts in various institutional spheres of communication is a key area of research in verbal communication. It is undeniable that, to adequately interpret the action caused by a directive speech act, the addressee must be aware of the time of its execution. Therefore, studying the variability of linguistic methods for indicating the time of execution of a directive remains a pressing task for linguistics.

We consider a directive situation as one of the variants of a communicative situation that is reflected in a directive speech act and, consequently, manifested in a specific utterance (text). Text, as a unit of communication, a product of speech activity/speech act, is determined by the needs of communication. The goal of communication is to somehow change the behavior or state of the recipient (interlocutor, reader, listener), that is, to evoke a specific verbal, physical, mental, or emotional response. Such an impact on the recipient is possible only if the author of the text has chosen linguistic means that are adequate to their illocutionary intention, and the recipient has understood the text adequately to the author's intent. The proposition and the communicative task dictate the choice of the repertoire of linguistic means that is actually used to generate the text during a speech act.

Being not only a linguistic but also an extralinguistic phenomenon, the text is connected to the surrounding reality by bidirectional dependencies. Therefore, a more complete analysis of a directive speech act requires consideration of the pragmatic characteristics of the generated text, which may include, first and foremost, presupposition and consituation. According to V.V. Krasnykh, "presupposition is the zone of intersection of the individual cognitive spaces of communicants, including the communicants' ideas about the consituation; consituation is an objectively existing communicative situation; "the conditions of communication and its participants (i.e., WHO, WHAT, WHERE, WHEN)" [6].

In this case, the text can be viewed as a certain reaction to the situation and its indirect reflection.

When it comes to a specific pragmatic type of inducement, a necessary component of the presupposition is the communicants' shared understanding of time (definite/indefinite; absolute/relative; reference to a point/segment/sequence) and the nature of the caused action (urgent/delayed; single/repeated; conditional/unconditional). Therefore, texts describing the same situation (e.g., "It is drafty here / There is draught in the room") are understood by the addressee as inducements, but, on the one hand, the nature of the caused action and, on the other, the time of its execution can be interpreted ambiguously. For example:

- a) Don't sit down there (now);
- b) Change your place or you can catch a cold (immediately);
- c) You should fit the window (later, when you have time/money, when it's possible, etc.).

When generating a text, the starting point is the speaker's illocutionary intention, which predetermines the structural-semantic structure of the text, and through it, the proposition.

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APPLICATION PROSPECTS OF D.L. CORWIN METHODOLOGY IN ASSESSING SOIL SALINITY OF IRRIGATED LANDS IN THE SAMARKAND REGION

Abstract: *This extended study investigates the application prospects of the electromagnetic induction (EMI) methodology developed by D.L. Corwin for assessing soil salinity across irrigated lands of the Samarkand region, a historically significant agricultural area in Uzbekistan. The study aims to overcome the limitations of traditional soil sampling and laboratory analysis, which often fail to capture the high spatial and temporal variability of soil salinity. EMI offers rapid, non-destructive, and spatially continuous assessment of apparent electrical conductivity (ECa), a key indicator of soil salinity and moisture.*

The research integrates advanced geostatistical techniques (ESAP) and GIS platforms for precise spatial mapping and management decision support. Particular focus is placed on the complex hydrogeological conditions of the Zarafshan Valley, where shallow groundwater, variable soil textures, and historic irrigation patterns interact to influence salinity dynamics. The study also evaluates the economic, operational, and environmental benefits of EMI adoption, including resource efficiency, water conservation, crop productivity, and environmental sustainability. The results indicate that the D.L. Corwin methodology can serve as a foundational tool for precision agriculture, sustainable land management, and digital soil monitoring in Uzbekistan.

Keywords: *Melioration, soil salinity, electromagnetic induction, apparent electrical conductivity, Samarkand region, GIS, digital agriculture, monitoring, irrigation management, Zarafshan Valley.*

INTRODUCTION

Agriculture in Uzbekistan is a cornerstone of national economic stability, contributing significantly to food security, employment, and export revenues. The Samarkand region, within the Zarafshan River basin, has long been recognized for its fertile soils, diverse crops, and strategic importance. Cotton, wheat, fruits, vegetables, and fodder crops dominate production, making the region a vital

contributor to national agricultural output. However, the sustainability of agriculture in this region is increasingly challenged by environmental degradation, particularly soil salinity and water scarcity. Secondary salinization has emerged as a pressing concern in irrigated lands due to improper drainage, shallow groundwater, and high evapotranspiration rates. Historical irrigation projects, initiated during the Soviet era, intensified water diversion and disrupted the natural hydrological balance, contributing to the accumulation of salts in the soil profile.

Soil salinity directly reduces agricultural productivity, negatively impacts soil fertility, and undermines long-term land sustainability. Conventional soil monitoring practices, reliant on manual sampling and laboratory analyses, often fail to capture the high spatial and temporal variability inherent in these complex landscapes. Consequently, farmers and land managers make decisions based on incomplete data, resulting in inefficiencies in irrigation and land reclamation. Electromagnetic induction (EMI) technology, developed by D.L. Corwin, offers a rapid, non-invasive approach to soil monitoring. By measuring apparent soil electrical conductivity (ECa), EMI can capture variations in soil salinity, moisture, and texture across large areas. Coupled with geostatistical optimization using ESAP and GIS-based digital mapping, this methodology allows for precise spatial analysis, identification of salinity hotspots, and data-driven decision-making in agricultural management. The present study aims to evaluate the application prospects of EMI methodology in the Samarkand region, with particular attention to the complex hydrogeology, diverse soil textures, and historical irrigation practices that influence salinity distribution. The research seeks to provide practical, economically viable, and environmentally sustainable strategies for precision agriculture, soil reclamation, and water management in this critical agricultural zone.

RESEARCH SUBJECT AND METHODOLOGY

The study focuses on irrigated agricultural lands in the Samarkand region, including the districts of Ishtikhon, Pastdargom, Narpay, and Pakhtachi. These lands are historically productive but are increasingly affected by soil salinity and waterlogging.

1. Soil Classification and Salinity Dynamics

Soil types include sandy, loamy, clay, and mixed textures.

Shallow groundwater (<2 m) contributes to capillary rise and salt accumulation.

Irrigation practices, including furrow and flood methods, influence salinity distribution.

2. Electromagnetic Induction Measurements

EMI sensors used include dual dipole systems for horizontal and vertical orientations.

Horizontal dipoles assess 0–30 cm surface layers critical for plant roots.

Vertical dipoles measure deeper layers up to 90 cm, identifying subsurface salinity and groundwater influence.

3. Calibration and Validation

Selective soil sampling for laboratory analysis of electrical conductivity (EC) and ion composition.

Regression models calibrate EMI readings to actual soil salinity.

4. Geostatistical Optimization

ESAP system identifies representative points for high-accuracy mapping.

Reduces required samples by 30–50% while maintaining data reliability.

5. GIS Integration and Mapping

Spatial interpolation produces high-resolution digital soil salinity maps.

Temporal monitoring allows tracking of seasonal variations and irrigation impacts.

6. Survey Design

Grid-based EMI scanning along irrigation blocks.

Seasonal campaigns conducted in spring, summer, and autumn for comprehensive temporal analysis.

This methodology allows continuous, non-destructive monitoring of soil salinity, supporting precise land management, targeted irrigation, and sustainable reclamation practices.

Results and Discussion

1. Spatial Distribution of Soil Salinity

EMI surveys show marked spatial heterogeneity across fields, even within a single irrigation block.

Low salinity zones (<2 dS/m) are mainly located near modern drainage systems.

Moderate salinity zones (2–6 dS/m) dominate older irrigated lands with shallow groundwater influence.

High salinity zones (>6 dS/m, up to 15 dS/m) are concentrated in closed depressions and areas with poor drainage.

2. Depth-Resolved Salinity Analysis

Horizontal dipole measurements show surface layer (0–30 cm) salinity averages 4.2 dS/m.

Vertical dipole measurements indicate subsurface (30–90 cm) salinity increases to 7–12 dS/m in low-lying fields.

Subsurface salt accumulation is linked to capillary rise from shallow groundwater.

Depth profiling allows identification of root-zone salinity, critical for crop selection and irrigation management.

3. Seasonal Variation in Salinity

Spring: Post-winter rains reduce surface salinity; EC_a averages drop by 15–20%.

Summer: Evaporation and irrigation cause surface salinity to rise sharply; EC_a peaks coincide with mid-summer heatwaves.

Autumn: Leaching after harvest lowers salinity but residual subsurface salts remain elevated.

Seasonal monitoring allows predictive planning of irrigation and leaching schedules.

4. Integration with GIS for Precision Agriculture

GIS-based salinity maps overlay irrigation networks, crop types, and soil texture layers.

Identification of high-risk zones enables **site-specific interventions**:

Targeted leaching

Soil amendments

Crop rotation with salt-tolerant species

GIS facilitates temporal tracking of salinity trends and evaluation of reclamation efforts.

5. Economic Impact

Reduction of soil sampling needs by 30–50% saves labor and laboratory costs.

Targeted irrigation in identified hotspots reduces water usage by 15–20%.

Improved crop yields in treated areas show increases of 10–15%, enhancing farm income.

Cost-benefit analysis indicates EMI adoption is economically viable even for smallholder farms.

6. Environmental and Sustainability Implications

Precision irrigation minimizes overwatering and secondary salinization.

Improved soil health reduces erosion and desertification risk.

Data-driven reclamation strategies reduce chemical inputs and environmental contamination.

Supports long-term sustainability and resilience of the Zarafshan Valley's agricultural ecosystem.

7. Comparative Analysis and Validation

EMI-based salinity measurements show high correlation ($R^2 = 0.82\text{--}0.91$) with laboratory EC values.

Results are consistent with other Central Asian studies but adapted to semi-arid soils of Samarkand.

High-resolution mapping captures heterogeneity overlooked by traditional point-based sampling.

8. Recommendations for Practical Implementation

1. Establish mobile EMI monitoring units integrated with GPS.
2. Conduct quarterly seasonal scans to capture temporal variability.
3. Combine GIS mapping with predictive modeling for proactive salinity management.
4. Train local agronomists and farmers to interpret ECa data for field-level decisions.
5. Develop integrated irrigation and leaching schedules based on hotspot identification.
6. Consider planting salt-tolerant crops in high-risk zones while reclaiming moderately saline areas.

CONCLUSIONS

The D.L. Corwin methodology demonstrates itself as a transformative tool for soil salinity assessment in the Samarkand region, offering a combination of speed, accuracy, and cost-efficiency that surpasses traditional sampling methods. Its integration with GIS and geostatistical frameworks, particularly the ESAP system, allows for high-resolution mapping of soil salinity dynamics, enabling precision agriculture and targeted land reclamation strategies. By capturing both surface and subsurface variations in salinity, this methodology ensures that critical decision-making—such as irrigation scheduling, crop selection, and soil amelioration—is based on robust, spatially representative data. From an economic perspective, adoption of this approach reduces labor and laboratory costs, minimizes unnecessary water use, and increases crop yields in affected areas, creating tangible benefits for farmers and regional agricultural authorities. Environmentally, it contributes to sustainable land management, preventing secondary salinization, reducing over-irrigation, and supporting the long-term fertility of soils in semi-arid irrigated landscapes. The approach also promotes resilience in agricultural ecosystems, helping to mitigate the effects of water scarcity, climatic variability, and ongoing soil degradation in the Zarafshan Valley. The results of this study also underscore the potential of EMI-based soil monitoring for wider adoption across Central Asia, where similar hydrogeological conditions and irrigation challenges exist. By providing a rapid, non-destructive, and spatially continuous assessment method, this technology can serve as a model for smart farming initiatives, precision land management programs, and regional soil conservation strategies. In the context of Uzbekistan's agricultural modernization goals, integrating the D.L. Corwin methodology into national land management policies offers a pathway to digital agriculture, where real-time monitoring, data-driven decision-making, and optimized resource allocation become standard practice. Additionally, long-term implementation can support climate adaptation measures, ensuring that the region's irrigated lands remain productive despite fluctuations in water availability and increasing environmental stressors. Finally, beyond its technical advantages, this methodology fosters a holistic approach to agricultural sustainability, combining technological innovation, ecological stewardship, and socio-economic benefits. The adoption of EMI-based monitoring, coupled with GIS and targeted reclamation strategies, is not merely a tool for mitigating soil salinity but a comprehensive framework for the sustainable and resilient development of irrigated agriculture in semi-arid regions.

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HUDUDLARNING INVESTITSYAVIY JOZIBADORLIGINI OSHIRISH — YANGI ISH O'RINLARINI YARATISHNING BOSHQARUV OMILI SIFATIDA

Annotatsiya: Maqolada hududlarning investitsiyaviy jozibadorligini oshirish mexanizmlari va uning aholi bandligini ta'minlashdagi roli tahlil qilinadi. Investitsiyalarni jalb qilishda hududiy menejmentning o'rni, boshqaruv qarorlarining ish o'rinlari barqarorligiga ta'siri va investitsion muhitni yaxshilashning strategik yo'nalishlari yoritilgan.

Kalit so'zlar: Investitsiyaviy jozibadorlik, hududiy menejment, ish o'rinlari, investitsion muhit, bandlik strategiyasi, boshqaruv omillari, kichik sanoat zonalari.

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INCREASING THE INVESTMENT ATTRACTIVENESS OF REGIONS AS A DRIVER OF CREATING NEW JOBS

Abstract: The article analyzes the mechanisms for increasing the investment attractiveness of regions and its role in ensuring public employment. It highlights the role of regional management in attracting investment, the impact of management decisions on job stability, and strategic directions for improving the investment climate.

Keywords: Investment attractiveness, regional management, jobs, investment environment, employment strategy, management factors, small industrial zones

Hududlarning ijtimoiy-iqtisodiy rivojlanishi bevosita investitsiyalar oqimiga va aholiga yangi ish o'rinlarini yaratishga bog'liq. Investitsiyalar nafaqat yangi texnologiyalarni olib keladi, balki hududda barqaror daromad manbai bo'lgan

yangi ish o‘rinlarini yaratishning asosiy drayveri hisoblanadi. Biroq, investitsiyani jalb qilish faqat resurslarga emas, balki hududning boshqaruv sifatiga (investitsion menejment) ham bog‘liq. Hududiy jozibadorlikni oshirish — bu yangi ish o‘rinlarini yaratishga qaratilgan tizimli boshqaruv jarayonidir.

O‘zbekiston Respublikasi Prezidenti Sh.M.Mirziyoyevning Oliy Majlisga Murojaatnomasida ta’kidlaganidek, " Biz yangi ish o‘rinlarini yaratadigan tadbirkorlarni har tomonlama qo‘llab-quvvatlashimiz, ta’bir joiz bo‘lsa, ularni yelkamizda ko‘tarishimiz kerak.[1] Hududlarning investitsiyaviy jozibadorligini oshirish bugungi kunda iqtisodiy rivojlanishning eng muhim yo‘nalishlaridan biri hisoblanadi. Ayniqsa, bu jarayon yangi ish o‘rinlarini yaratish, aholi bandligini ta’minlash va hududlar o‘rtasidagi ijtimoiy-iqtisodiy tafovutlarni kamaytirishda muhim boshqaruv omili sifatida namoyon bo‘ladi.

Investitsiyaviy jozibadorlik deganda, hududning investorlar uchun qulayligi, ya’ni infratuzilmaning rivojlanganligi, soliq va bojxona imtiyozlari, siyosiy barqarorlik, mehnat resurslari sifati va bozor imkoniyatlari tushuniladi. Shu omillar qanchalik yuqori darajada bo‘lsa, hududga investitsiya jalb qilish shunchalik osonlashadi.

Hududlarga investitsiyalarni jalb etish natijasida yangi korxonalar tashkil etiladi, mavjud ishlab chiqarishlar kengaytiriladi va zamonaviy texnologiyalar joriy etiladi. Bu esa o‘z navbatida yangi ish o‘rinlarining yaratilishiga olib keladi. Ayniqsa, kichik biznes va xususiy tadbirkorlikni rivojlantirish orqali aholi bandligini oshirish imkoniyati kengayadi.

Investitsiyaviy jozibadorlikni oshirishda davlatning roli muhimdir. Hukumat tomonidan investorlarga qulay shart-sharoitlar yaratish, byurokratik to‘siqlarni kamaytirish, huquqiy kafolatlarni mustahkamlash hamda infratuzilmani rivojlantirish bo‘yicha chora-tadbirlar amalga oshiriladi. Shu bilan birga, hududlarning o‘ziga xos xususiyatlaridan kelib chiqib, ularning ixtisoslashuvini aniqlash va rivojlantirish ham muhim ahamiyatga ega.

Bundan tashqari, raqamli iqtisodiyot elementlarini joriy etish, innovatsion loyihalarni qo‘llab-quvvatlash ham investitsion muhitni yaxshilaydi. Masalan, sanoat zonalari, erkin iqtisodiy zonalar va texnoparklar tashkil etilishi investorlar uchun qo‘shimcha imkoniyatlar yaratadi.

Investitsiyaviy jozibadorlikni oshirishda hududiy menejmentning rolining mohiyati aniqlashda eng birinchi navbatda menejment nuqtayi nazaridan hudud — bu raqobatbardosh "mahsulot" bo‘lib, uni investorga to‘g‘ri taqdim etish kerak. "Yagona darcha" tamoyili va ruxsat berish jarayonlarini raqamlashtirish investor uchun vaqt va xarajatni tejaydi. Bo‘sh turgan bino va yer maydonlarini xaritaga tushirish hamda ularni muhandislik tarmoqlari (elektr, gaz, suv) bilan ta’minlash — investitsion jozibadorlikning texnik asosi hisoblanadi.

Investitsion muhitni yaxshilashning strategik yo‘nalishlari; Hududiy rahbarlar (top-menejerlar) quyidagi iqtisodiy-boshqaruv dastaklarini qo‘llashi lozim:

❖ soliq imtiyozlarini faqat "ish o‘rni yaratish sharti bilan" berish mexanizmini joriy etish.

❖ hududning logistik imkoniyatlari, xomashyo bazasi va mehnat resurslari haqidagi ma'lumotlarni xalqaro platformalarda faol targ'ib qilish.

❖ investor talabiga mos bo'lgan mutaxassislarni mahalliy darajada tayyorlash tizimini (dual ta'lim) yo'lga qo'yish.

Investitsion jozibadorlikni baholash ko'rsatkichlari deganda eng birinchi navbatda menejmentda nazorat va tahlil muhim. Hududning jozibadorligi quyidagi iqtisodiy ko'rsatkichlar bilan baholanadi:

- aholi jon boshiga to'g'ri keladigan to'g'ridan-to'g'ri xorijiy investitsiyalar hajmi;
- yaratilgan yangi ish o'rinlarining barqarorligi (1 yildan keyingi holati);
- investitsiya kiritilgan sohalardagi mehnat unumdorligi o'sishi

Hududlarning investitsiyaviy jozibadorligini oshirish — yangi ish o'rinlarini yaratishning boshqaruv omillarini quyidagi jadval misolida tahlil qilamiz.

T/R	Boshqaruv omillari (yo'nalishlar)	Investitsiyaviy jozibadorlikni oshirish mexanizmlari	Yangi ish o'rinlarini yaratishdagi ijtimoiy-iqtisodiy natijasi
1	ma'muriy-huquqiy boshqaruv	biznesni ro'yxatga olishni soddalashtirish, "yagona darcha" xizmatlarini kengaytirish, ruxsatnomalar zanjirini raqamlashtirish.	investorlarning ishonchi ortishi hisobiga yangi korxonalar sonining ko'payishi va rasmiy bandlikning o'sishi.
2	infratuzilmaviy menejment	kichik sanoat zonalar (ksz) va texnoparklarni muhandislik tarmoqlari (gaz, svet, suv, yo'l) bilan to'liq ta'minlash.	ishlab chiqarish quvvatlarini hududlarda joylashtirish imkoniyati va uzoq muddatli barqaror ish o'rinlari.
3	soliq va moliya menejmenti	mahalliy soliqlardan imtiyozlar berish, subsidiyalar va past foizli kredit liniyalarini yo'naltirish.	korxonalarning operatsion xarajatlari kamayishi va bo'shagan mablag'larni qo'shimcha ishchi kuchi yollashga sarflashi.
4	inson kapitalini boshqarish	hududiy mehnat bozori tahlili asosida xodimlarni investor talabiga ko'ra qayta tayyorlash (dual ta'lim).	mahalliy aholining malakasini oshishi va yuqori daromadli (sifatli) ish o'rinlarining yaratilishi.
5	hududiy marketing va pr	hududning investitsion portfelini shakllantirish, xalqaro forumlarda brendni targ'ib qilish.	to'g'ridan-to'g'ri xorijiy investitsiyalar oqimi va eksportga yo'naltirilgan zamonaviy ish o'rinlar

O'zbekistonlik iqtisodchi olim Q.X.Abdurahmonov ham bu fikrni tasdiqlaydi: "Mehnat bozori deganda ishchi kuchi takror yuzaga kelishining barcha bosqichlarida: uning yetishtirilishi (ijtimoiy-demografik jihat, yangi ishchi kuchi paydo bo'lishi), ayriboshlanishi (sotib olish-sotish harakati amalga oshirilishi), taqsimlanishi (ishchi kuchining ijtimoiy, kasbiy va hududiy ko'chishi orqali taqsimlanishi) va mehnat sohasida foydalanilishi bosqichlarida xodim bilan

ish beruvchi o'rtasida kechadigan ijtimoiy munosabatlar tizimi tushunilishi kerak.[2]

Hududlarning investitsiyaviy jozibadorligini oshirish — bu shunchaki mablag' jalb qilish emas, balki hududiy resurslarni professional darajada boshqarish san'atidir. To'g'ri yo'lga qo'yilgan investitsion menejment yangi ish o'rinlari yaratilishi orqali aholi turmush darajasini oshirishga va ijtimoiy barqarorlikni ta'minlashga xizmat qiladi. Investitsiyalar — bu sabab, bandlik va farovonlik esa — to'g'ri boshqaruv natijasidir. Bu natijalarga erishish uchun eng avvalo ikki asosiy bosqichlardan unumli foydalaish kerak bo'ladi; Bularga quyidagilar kiradi.

Birinchisi bu xalqaro tajriba: Singapur yoki Dubayning hududiy investitsion menejment modelidan misollar keltirish mumkin.

Ikkinchisi statistik tahlil: O'zbekistonning biror hududi (masalan, Navoiy yoki Toshkent viloyati) misolida investitsiya va bandlik dinamikasini solishtirish kabilarni misol keltirishimiz mumkin bo'ladi.

Hududlarning investitsiyaviy jozibadorligini oshirish jarayonini boshqarish — bu murakkab ijtimoiy-iqtisodiy tizim bo'lib, u nafaqat kapital jalb qilish, balki yaratilgan ish o'rinlarining barqarorligini ta'minlashga qaratilgan. O'tkazilgan tahlillar shuni ko'rsatadiki, investitsiyaviy muhitning jozibadorligi va yangi ish o'rinlari o'rtasida to'g'ridan-to'g'ri korrelyatsion bog'liqlik mavjud. Hududlarning investitsiyaviy jozibadorligini oshirish — yangi ish o'rinlarini yaratishning boshqaruv omili sifatida bir qancha asosiy vazifalarni bilib olishimiz mumkin bo'ladi. Bularga quyidagilar kiradi;

Birinchidan, ma'muriy-huquqiy boshqaruv omili investorning hududga kirishdagi "psixologik to'sig'ini" pasaytiradi. Raqamli menejment instrumentlarini (masalan, litsenziyalashning onlayn tizimi) joriy etish natijasida tadbirkorlik sub'ektlarini ro'yxatga olish vaqti qisqarishi kuzatilmoqda. Bu esa, o'z navbatida, "startup" loyihalarning ko'payishiga va kichik biznes sub'ektlarida rasmiy bandlik darajasining 12-15 foizga o'sishiga zamin yaratadi.

Ikkinchidan, infratuzilmaviy va moliyaviy menejment integratsiyasi yangi ish o'rinlarining geografik taqsimotini optimallashtiradi. Kichik sanoat zonolari (KSZ) misolida tahlil qiladigan bo'lsak, infratuzilmasi tayyor bo'lgan hududlarda investorning loyihani ishga tushirish muddati 30-40 foizga tezlashadi. Bu esa mehnat bozoriga yangi ish o'rinlarining tezroq kirib kelishini ta'minlaydi. Shuningdek, soliq imtiyozlarining "bandlik sharti" bilan berilishi korxonalarni ishchi kuchi sonini qisqartirmaslikka undaydi.

Uchinchidan, inson kapitalini boshqarish — bu investitsiya samaradorligini sifat jihatidan ta'minlovchi omildir. Investor uchun hududning jozibadorligi nafaqat arzon ishchi kuchi, balki "malakali mutaxassislar zaxirasi" bilan o'lchanadi. Tadqiqotlar shuni ko'rsatadiki, hududiy menejment doirasida korxonalar va professional ta'lim muassasalari o'rtasida dual ta'lim tizimi yo'lga qo'yilgan hududlarda:

- ishga joylashish ko'rsatkichi (employability) 20 foizga oshadi;
- xodimlarning mehnat unumdorligi o'rtacha 1.5 barobarga ko'payadi.

Xulosa o'rnida aytish mumkinki, hududiy investitsiyaviy jozibadorlikni oshirishda boshqaruv omillaridan kompleks foydalanish "zanjirsimon reaksiya"ni yuzaga keltiradi: Samarali boshqaruv, Yuqori investitsion jozibadorlik, Sifatli investitsiya. Barqaror va yuqori daromadli ish o'rinlari. Ushbu natijalar hududiy bandlik strategiyasini ishlab chiqishda menejment instrumentlaridan keng foydalanish zarurligini tasdiqlaydi. Hududlarning investitsiyaviy jozibadorligini oshirish yangi ish o'rinlarini yaratishning asosiy boshqaruv vositalaridan biri hisoblanadi. Bu jarayonni samarali tashkil etish orqali nafaqat iqtisodiy o'sishga erishish, balki aholi farovonligini oshirish va barqaror rivojlanishni ta'minlash mumkin.

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ZAMONAVIY MENEJMENTDA MEHNAT UNUMDORLIGINI OSHIRISHNING IQTISODIY YO'LLARI

Annotatsiya: Mazkur maqolada zamonaviy menejment tizimida mehnat unumdorligini oshirishning iqtisodiy mexanizmlari, xodimlarni moddiy rag'batlantirishning yangi usullari va resurslarni optimallashtirish masalalari yoritilgan. Maqolada samaradorlikni oshirishda KPI tizimi va investitsion jozibadorlikning o'rni tahlil qilinadi.

Kalit so'zlar: Mehnat unumdorligi, iqtisodiy rag'batlantirish, KPI, inson kapitali, operatsion samaradorlik, raqamli menejment.

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ECONOMIC WAYS TO INCREASE LABOR PRODUCTIVITY IN MODERN MANAGEMENT

Annotation: This article examines the economic mechanisms of increasing labor productivity in modern management systems, new methods of material incentives for employees, and issues of resource optimization. The article analyzes the role of the KPI system and investment attractiveness in improving operational efficiency.

Keywords: labor productivity, economic incentives, KPI, human capital, operational efficiency, digital management.

Mamlakatimizda barqaror iqtisodiy o'sishni ta'minlash maqsadida iqtisodiyotning innovatsion rivojlanish tizimiga o'tish jarayoni amalga oshirilmoqda. O'zbekiston Respublikasi Prezidenti Sh.M.Mirziyoev o'z ma'ruzalarida mamlakatimiz iqtisodiyotini yanada rivojlantirish maqsadida amalga oshirilishi lozim bo'lgan eng ustuvor vazifalar sifatida "...taraqqiyotga erishish uchun, innovatsion bilimlar va zamonaviy axborot texnologiyalarini

egallashimiz zarur va shart. innovatsion texnologiyalar nafaqat mahsulot va xizmatlar sifatini oshiradi, ortiqcha xarajatlarni kamaytiradi"[1] "iqtisodiyotni modernizatsiya va diversifikatsiya qilish, mehnat samaradorligini oshirish orqali yuqori iqtisodiy o'sishni ta'minlash"[1] deb ta'kidlagan. Darhaqiqat, shu bugungi kun talablariga javob beradigan sanoat mahsulotlari va xizmatlarini yaratish orqali mamlakatimizning iqtisodiy raqobatdoshligini oshirish mumkinligi, innovatsiyalarni amaliyotga joriy etilishi ishlab chiqarishni rivojlantirishda har doim katta ahamiyat kasb etgan.

Bugungi shiddatli raqobatbardosh bozor iqtisodiyoti sharoitida har qanday korxonaning muvaffaqiyati uning mehnat resurslaridan qanchalik samarali foydalanishiga bog'liq. Mehnat unumdorligi — bu nafaqat ishlab chiqarish hajmi, balki sarflangan xarajatlar va olingan natija o'rtasidagi iqtisodiy muvozanatdir. Zamonaviy menejmentning asosiy vazifasi — iqtisodiy usullar orqali xodimni ko'proq emas, balki "aqliroq" va samaraliroq ishlashga undashdan iborat. Iqtisodiy yo'llar orasida eng birinchi navbatda ish haqini natijaga bog'lash turadi. Eski uslubdagi "stavka" tizimi xodimda intilishni so'ndiradi.

Xodimning ish haqi uning aniq ko'rsatkichlari (sotuv hajmi, xatolar sonining kamligi, vaqtni tejash) asosida shakllantiriladi.

Mehnat unumdorligi o'zgarishini ta'minlovchi manba bo'lib, fan-texnika taraqqiyoti, ishlab chiqarishni texnik-texnologik yangilab borish, mehnatning fond bilan qurollanganligi, energiya va xom-ashyoning yangi turlarini vujudga kelishi xizmat qiladi. Sanoat korxonalarda mehnat unumdorligining o'zgarishi (oshishi) qo'yidagicha namoyon bo'ladi: mahsulot ishlab chiqarish hajmining oshishi, vaqt birligi davomida yaratilayotgan mahsulot sifatining o'zgarmasligi, bir birlik mahsulot ishlab chiqarishda mehnat sarfining kamayishi, mahsulot ishlab chiqarish vaqtining qisqarishi, daromad normasi va massasining oshib borishi.

Rejadan tashqari bajarilgan ish yoki innovatsion taklif uchun beriladigan iqtisodiy mukofotlar mehnat unumdorligini o'rtacha 20-25% ga oshirishi isbotlangan. Menejmentda xodimga xarajat sifatida emas, balki aktiv (sarmoya) sifatida qarash iqtisodiy samara beradi.

Xodimning bilimini oshirishga sarflangan 1 dollar investitsiya kelajakda unumdorlikning bir necha barobar o'sishi orqali qaytadi. Sog'lom va ijtimoiy himoyalangan xodim kamroq "byulleten"ga chiqadi va ish jarayoniga ko'proq e'tibor qaratadi. Bu esa korxonaning bilvosita iqtisodiy yo'qotishlarini kamaytiradi. Iqtisodiy samaradorlikka ortiqcha isrofgarchilikni yo'qotish orqali erishiladi. Zamonaviy menejmentda "Lean production" (Tejamkor ishlab chiqarish) texnologiyasi quyidagi iqtisodiy foydalarni beradi: vaqt isrofini kamaytirish; xom-ashyo va resurslarni tejash; ish joyini ergonomic tashkil etish orqali jismoniy charchoqni kamaytirish.

Avtomatlashtirish va raqamli menejment vositalarini joriy etish inson omili bilan bog'liq xatolarni kamaytiradi. Bu iqtisodiy jihatdan: ma'lumotlarni qayta ishlash tezligini oshiradi; ortiqcha shtat birliklarini optimallashtirish imkonini beradi; boshqaruv qarorlarini aniq hisob-kitoblar asosida qabul qilishga xizmat qiladi.

Zamonaviy menejmentda mehnat unumdorligini oshirishning iqtisodiy yo‘llarini quyidagi jadvalimiz orqali tahlil qilamiz:

№	Iqtisodiy yo‘l	Mazmuni	Amalga oshirish mexanizmi	Kutilayotgan natija
1	moddiy rag‘batlantirish	xodimlarni ish samaradorligi asosida mukofotlash	bonus, kpi tizimi, ustama haqlar	ishga motivatsiya oshadi, samaradorlik ko‘tariladi
2	mehnatni tashkil etishni takomillashtirish	ish jarayonlarini optimallashtirish	ish taqsimoti, vaqtni boshqarish (time management)	vaqt tejraladi, ish hajmi ortadi
3	texnologiyalarni joriy etish	zamonaviy texnika va it tizimlardan foydalanish	avtomatlashtirish, raqamli platformalar	ish tezligi va aniqligi oshadi
4	malaka oshirish va ta‘lim	xodimlar bilim va ko‘nikmalarini rivojlantirish	treninglar, kurslar, seminarlar	ish sifati yaxshilanadi
5	xarajatlarni optimallashtirish	keraksiz xarajatlarni kamaytirish	lean management, resurslarni tejash	foyda ortadi, samaradorlik oshadi
6	innovatsion boshqaruv	yangi g‘oya va usullarni qo‘llash	startaplar	raqobatbardoshlik kuchayadi
7	mehnat sharoitlarini yaxshilash	xodimlar uchun qulay ish muhitini yaratish	ergonomika, xavfsizlik, ijtimoiy paket	ish unumdorligi va qoniqish oshadi
8	raqamli menejment	ma‘lumotlar asosida qaror qabul qilish	tizimlari	boshqaruv samaradorligi oshadi
9	ichki nazorat va tahlil	ish jarayonlarini monitoring qilish	audit, kpi monitoring	kamchiliklar tez aniqlanadi
10	moslashuvchan ish tizimi	ish vaqtini moslashuvchan tashkil etish	masofaviy ish, fleksibil jadval	xodim samaradorligi oshadi

Mehnat unumdorligini oshirish vositalari sifatida quyidagilarni keltirish mumkin, bunda:

moddiy, mehnat va moliyaviy resurslarni eng zarur sanoat tarmoqlarini rivojlantirish uchun yo‘naltirish, fan-texnika yutuqlaridan

➤ moddiy, mehnat va moliyaviy resurslarni eng zarur sanoat tarmoqlarini rivojlantirish uchun yo‘naltirish, fan-texnika yutuqlaridan foydalangan holda sanoat tarmog‘ini rivojini rejalashtirish;

➤ mehnat sifati va samaradorligini oshirish maqsadida sanoat tarmoqlarining barcha jabhalari faoliyatini baholash negizida bo‘lgan barcha ko‘rsatkichlar tizimini takomillashtirish;

➤ fan-texnika taraqqiyoti yutuqlarini qo‘llash asosida mehnatning texnik qurollanganlik darajasini oshirish, iqtisodiy dastaklar asosida esa mehnatning moddiy asosini yaxshilash;

➤ mehnat va maishiy xizmat sharoitlariga ta‘sir etuvchi iqtisodiy va ijtimoiy choralarni kuchaytirish, mehnat huquqlarining amal qilinishiga erishish;

➤ mehnatning yakuniy natijasi va ishchilar mehnatini baholash imkonini beradigan tizimdan foydalanish.

Zamonaviy menejmentda mehnat unumdorligini oshirishning iqtisodiy yo'llari kompleks yondashuvni talab etadi. Faqatgina ish haqini oshirish emas, balki xodimni natijaga qiziqtiruvchi adolatli tizim yaratish, uning salohiyatiga sarmoya kiritish va zamonaviy texnologiyalar orqali ish jarayonini yengillashtirish barqaror iqtisodiy o'sishning garovidir. Unumdorlikning oshishi esa, o'z navbatida, hududiy va respublika miqyosida yalpi ichki mahsulotning o'sishiga xizmat qiladi. Zamonaviy menejment tizimida mehnat unumdorligini oshirish korxonalarning barqaror rivojlanishi va raqobatbardoshligini ta'minlashda muhim ahamiyatga ega hisoblanadi. Tadqiqotlar shuni ko'rsatadiki, mehnat unumdorligini oshirishning asosiy iqtisodiy yo'llari sifatida samarali boshqaruv tizimini joriy etish, resurslardan oqilona foydalanish, xodimlarni moddiy va nomoddiy rag'batlantirish hamda raqamli texnologiyalardan keng foydalanish muhim o'rin tutadi.

Shuningdek, KPI tizimini amaliyotga tatbiq etish orqali xodimlar faoliyatini aniq baholash va natijadorlikni oshirish imkoniyati yaratiladi. Investitsion jozibadorlikni kuchaytirish esa korxonalarga qo'shimcha moliyaviy resurslarni jalb qilish va innovatsion loyihalarni amalga oshirishga yordam beradi. Xulosa qilib aytganda, zamonaviy menejment sharoitida mehnat unumdorligini oshirish kompleks yondashuvni talab etadi. Ya'ni iqtisodiy mexanizmlar, innovatsion texnologiyalar va samarali boshqaruv tizimining uyg'unligi korxona faoliyatining barqaror o'sishini ta'minlaydi.

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DEVELOPMENT OF CERTAIN ELEMENTS OF ALFALFA CULTIVATION TECHNOLOGY

Annotation. *Alfalfa (Medicago sativa L.) is one of the most important perennial forage crops widely cultivated for its high nutritional value and productivity. Improving the technological elements of alfalfa cultivation plays a significant role in increasing yield and forage quality under different soil and climatic conditions. The present study aims to develop and evaluate certain elements of alfalfa cultivation technology, including optimal sowing time, seeding rate, and mineral fertilization practices. Field experiments were conducted to determine the most effective agrotechnical methods that ensure stable plant growth, high biomass production, and improved forage quality. The results of the study demonstrated that the proper combination of sowing time, seed rate, and fertilization significantly influenced plant development, stand density, and green mass yield.*

Keywords: *alfalfa, cultivation technology, sowing time, seeding rate, fertilization, forage productivity.*

Introduction

Alfalfa (*Medicago sativa* L.) is one of the most valuable perennial forage crops widely cultivated in many regions of the world. It is highly appreciated for its high nutritional value, rich protein content, and its ability to improve soil fertility through biological nitrogen fixation. Due to these characteristics, alfalfa plays an important role in the development of livestock production and the sustainable management of agricultural systems.

The productivity and longevity of alfalfa stands largely depend on the correct application of cultivation technologies. Factors such as optimal sowing time, appropriate seeding rate, soil preparation, fertilization, and irrigation significantly influence plant growth, development, and forage yield. In many agricultural regions, improving these technological elements is considered an important task for increasing the efficiency of forage crop production.

In recent years, special attention has been paid to the development of modern and scientifically based agrotechnical practices for alfalfa cultivation. Optimization of technological elements allows farmers to obtain higher yields, improve forage quality, and ensure stable crop production under various soil and climatic conditions. Proper management of cultivation technology also contributes to better utilization of natural resources and increases the economic efficiency of agricultural production.

Materials and Methods

The research was conducted during the growing season under field conditions in an experimental agricultural area. The study aimed to develop and evaluate certain elements of alfalfa (*Medicago sativa* L.) cultivation technology, including sowing time, seeding rate, and mineral fertilization practices. The experimental field was characterized by typical soil and climatic conditions suitable for forage crop production.

Field experiments were carried out using a randomized block design with several replications. Different sowing dates and seeding rates were tested to determine their influence on plant emergence, growth, and productivity. The seeds used in the experiment were certified and selected for high germination capacity and varietal purity. Prior to sowing, the soil was prepared through standard agricultural practices including plowing, leveling, and harrowing to ensure a uniform seedbed.

Mineral fertilizers were applied according to the experimental scheme to evaluate their effect on plant development and yield formation. Phosphorus and potassium fertilizers were incorporated into the soil before sowing, while nitrogen fertilizers were applied during the early stages of plant growth when necessary. Irrigation and weed control measures were carried out according to recommended agronomic practices for alfalfa cultivation.

Observations and measurements were conducted throughout the vegetation period. Data were collected on seed germination, plant height, stand density, and green biomass yield. The obtained results were analyzed using standard statistical methods to determine the effectiveness of the studied technological elements and to identify the most efficient cultivation practices for alfalfa production.

Table 1.
Effect of Seeding Rate on Growth and Yield of Alfalfa (*Medicago sativa* L.)

Seeding rate (kg/ha)	Plant density (plants/m ²)	Plant height (cm)	Green mass yield (t/ha)	Dry matter yield (t/ha)
10	210	58.4	32.6	7.8
12	235	61.2	35.4	8.5
14	260	64.7	38.9	9.3
16	275	66.1	40.5	9.8
18	290	65.3	39.7	9.5

Discussion

The results of the study demonstrated that the development and improvement of certain technological elements significantly influence the growth, development, and productivity of alfalfa (*Medicago sativa* L.). One of the most important factors affecting the establishment of alfalfa stands is the optimal sowing time. The experiments showed that sowing during favorable soil moisture and temperature conditions ensured better seed germination, uniform plant

emergence, and stronger early growth. Delayed or very early sowing negatively affected plant development and reduced stand density.

Seeding rate also played a crucial role in determining plant population and biomass production. An optimal seeding rate provided balanced plant density, which allowed plants to efficiently utilize available nutrients, water, and light. Excessively high seeding rates resulted in competition among plants, while low seeding rates led to insufficient stand formation and reduced productivity.

Conclusion

The study showed that the development and improvement of certain technological elements play an important role in increasing the productivity and efficiency of alfalfa (*Medicago sativa* L.) cultivation. Proper selection of sowing time, optimal seeding rate, and balanced mineral fertilization significantly influence plant growth, stand establishment, and biomass yield.

The results indicated that sowing under favorable soil and climatic conditions ensures better seed germination and uniform plant development. An appropriate seeding rate helps maintain optimal plant density, allowing efficient use of nutrients, water, and sunlight. In addition, the application of mineral fertilizers, particularly phosphorus and potassium, positively affects root system development and overall plant vigor, leading to higher forage productivity.

Implementation of improved technological elements in alfalfa cultivation can contribute to stable crop growth, increased green biomass yield, and improved forage quality. The developed recommendations may be useful for farmers and agricultural specialists in improving forage production systems and ensuring sustainable use of agricultural resources.

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THE RELEVANCE OF INNOVATIVE SOLUTIONS FOR ALFALFA CULTIVATION

Annotation. *Alfalfa (Medicago sativa L.) is one of the most important perennial forage crops widely cultivated for its high nutritional value and productivity. Improving the technological elements of alfalfa cultivation plays a significant role in increasing yield and forage quality under different soil and climatic conditions. The present study aims to develop and evaluate certain elements of alfalfa cultivation technology, including optimal sowing time, seeding rate, and mineral fertilization practices. Field experiments were conducted to determine the most effective agrotechnical methods that ensure stable plant growth, high biomass production, and improved forage quality. The results of the study demonstrated that the proper combination of sowing time, seed rate, and fertilization significantly influenced plant development, stand density, and green mass yield.*

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In recent years, special attention has been paid to the development of modern and scientifically based agrotechnical practices for alfalfa cultivation. Optimization of technological elements allows farmers to obtain higher yields, improve forage quality, and ensure stable crop production under various soil and climatic conditions. Proper management of cultivation technology also contributes to better utilization of natural resources and increases the economic efficiency of agricultural production.

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EXPRESSING CULTURAL IDENTITY THROUGH TRANSLATION

Abstract. *This article examines the expression and preservation of cultural identity in the process of translation. Translation is not only the transfer of linguistic units from one language to another but also a means of conveying cultural values, national mentality, and historical experience. The research analyzes the problems of translating cultural elements, realia, national color, and cultural context based on theoretical sources. Particular attention is paid to the role of the translator as a mediator in intercultural communication. The findings contribute to the development of translation studies, intercultural communication, and literary studies.*

Keywords: *translation, cultural identity, intercultural communication, realia, national color, translation strategies.*

Introduction

In the 21st century, the acceleration of globalization is further strengthening cultural ties between different peoples. In the context of global communication, translation emerges as an essential tool for dialogue between diverse cultures. Through the translation process, the literature, culture, traditions, and historical experiences of one nation are transmitted to others.

Language and culture are inherently interconnected concepts; every language reflects the worldview, mentality, and values of a specific nation. Consequently, it is crucial to accurately convey not only linguistic units but also cultural meanings during translation. The concept of cultural identity is a widely used category in modern humanities. It is a complex socio-cultural phenomenon related to an individual's or society's sense of belonging to a specific culture. Literature and language serve as primary means of expressing this identity.

In translation theory, the problem of preserving cultural identity has been studied by many researchers. Scholars such as Eugene Nida, Peter Newmark, Susan Bassnett, and Lawrence Venuti have developed strategies for conveying cultural equivalence and cultural units in translation. The purpose of this article is to study the theoretical foundations of expressing cultural identity in the translation process and to analyze methods for translating cultural units.

Theoretical Foundations of Translation and Cultural Identity

Translation is the process of re-expressing a text belonging to one language through the means of another language. However, in modern translation theory, translation is viewed not merely as a linguistic operation, but as a form of intercultural communication. The concept of cultural identity is extensively studied in sociology, anthropology, and cultural studies. It is formed based on a

people's historical experience, customs, traditions, religious beliefs, and social values.

Language is an important carrier of this cultural identity. Through language units, a nation's mentality, worldview, and cultural values are expressed. For example, words expressing kinship relations can differ across various peoples, reflecting the social structure and cultural traditions of that nation. Therefore, preserving cultural identity is a vital task in the translation process. If the cultural context is not correctly conveyed, the original meaning of the text will not be fully revealed.

Cultural Units and Realia in Translation

Cultural units are among the most complex elements in translation. Such units are often linked to a nation's lifestyle, customs, or historical experience. In translation theory, these units are called realia. Realia are words or concepts specific to a particular culture that do not have a full equivalent in other cultures.

Examples include:

- * National dishes: palov, somsa
- * National clothing: atlas, do'ppi
- * Social institutions: mahalla
- * Traditional ceremonies: weddings, circumcision feasts

Various methods are used to translate these units: transliteration, explanatory translation, cultural equivalent, and descriptive translation. For instance, if the concept of "mahalla" is simply translated into English as "neighborhood," its social and cultural essence is not fully captured. Therefore, an explanatory translation like "mahalla – traditional neighborhood community institution in Uzbekistan" is often employed.

The Role of the Translator as an Intercultural Mediator

The translator plays a crucial role in the translation process, acting as a mediator between two languages and two cultures. A translator must possess deep knowledge not only of the language but also of the culture associated with it. One of the primary tasks of a translator is to preserve the cultural characteristics of the text; failure to consider the cultural context can distort the original meaning.

Lawrence Venuti divides translation strategies into two main types:

- * Domestication: The text is adapted to the target culture.
- * Foreignization: Elements of the original culture are preserved as much as possible.

Many scholars emphasize that the foreignization strategy is more important for preserving cultural identity.

Preserving National Color in Literary Translation

Preserving national color is of particular importance in the translation of literary works. This is because literary texts reflect the culture, customs, and mentality of a people. For example, when translating certain works in Uzbek literature, it is essential to maintain elements of national culture. Cultural concepts found in the works of Abdulla Qodiriy or O'tkir Hoshimov can be conveyed through commentary or transliteration.

This preservation is achieved through:

- * Retaining cultural realia
- * Using footnotes or explanations
- * Contextual translation
- * Cultural adaptation

Translation and Intercultural Communication

Translation plays a vital role in developing cultural dialogue between different peoples. Through translation, diverse cultures become acquainted with and enrich one another. The translation of literary works serves to strengthen international cultural ties. For instance, translating Uzbek literature into English and Russian promotes national culture on a global scale. Similarly, translating the literature of other nations into Uzbek positively impacts the development of national culture.

Conclusion

The translation process is an essential tool for expressing and preserving cultural identity. Translation is not just a transfer of linguistic units, but a process of transmitting cultural values, national mentality, and historical experience. Research findings show that cultural units and realia require a specific approach in translation. The translator plays a key role as an intercultural mediator in this process. Translation performed while preserving cultural identity serves to strengthen cultural ties between different nations.

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DEVELOPMENT METHODS OF NATIONAL GAMES USING INTERACTIVE TECHNOLOGIES

Abstract: *This article examines modern methods of developing national games using interactive technologies. The study analyzes the cultural significance of national games, the possibilities of integrating them with digital technologies, and the impact of interactive methods on education and upbringing. The article proposes effective methods for reviving national games and making them appealing to the younger generation through the use of technologies such as virtual and augmented reality, mobile applications, and online platforms.*

Keywords: *interactive technologies, national games, virtual reality, digital innovations, cultural heritage, education and upbringing.*

Introduction

The integration of interactive technologies with the development of national games has attracted significant scholarly attention in recent years. Globally, technologies such as Virtual Reality (VR), Augmented Reality (AR), and Artificial Intelligence (AI) are being employed to preserve cultural heritage and present it in contemporary formats (Smith, 2019). For instance, in several European countries, VR technologies are utilized to reconstruct traditional festivals and games within virtual environments (Brown, 2021).

In the context of Uzbekistan, national games such as "Kokand," "Lochin," and "Uloq" possess substantial educational and upbringing value for the youth. Nevertheless, the rise of digital entertainment has led to a decline in their active practice (Abdurahmonov, 2020). Consequently, there is an urgent need to digitize national games and synthesize them with interactive methodologies to ensure their survival in the digital age.

Research indicates that teaching processes enhanced by interactive technologies show significantly higher efficiency. Specifically, presenting traditional games through AR environments captures the interest of the younger generation more effectively than traditional instruction (Xalimov, 2021). Furthermore, mobile applications and online platforms offer unprecedented opportunities to disseminate national games to a broader public.

Methods

The following scientific methods were employed in this study:

Historical-Analytical Method: The historical roots, cultural significance, and modern applications of national games were analyzed to identify the critical challenges facing their preservation.

Experimental Method: Several prototypes were developed to restore national games through interactive technology. Utilizing software engines such as Unity and Unreal Engine, the game "Kokand" was reconstructed in a virtual environment.

Survey and Interview: The empirical phase involved a survey of 100 students to gauge youth interest in national games and their attitudes toward technological integration. Additionally, in-depth interviews were conducted with 10 educators and experts.

Statistical Analysis: Survey data were processed using SPSS software to quantitatively assess the impact of interactive technologies on the promotion of national games.

Results and Discussion

The findings demonstrate that interactive technologies are effective tools for developing and promoting national games. The following key results were identified:

Virtual Reality (VR) Integration: The "Kokand" game was successfully simulated in a VR environment. Approximately 85% of participants rated this method as highly engaging and suitable for the educational process.

Augmented Reality (AR) Implementation: The game "Lochin" was presented via a mobile AR application, allowing users to interact with traditional game mechanics in real-time. Survey data revealed that 78% of the youth approved of the use of AR for cultural games.

Mobile and Online Platforms: Mobile applications provided a convenient medium for game management and social media sharing. 90% of respondents found mobile platforms to be the most accessible way to engage with these games.

Pedagogical Impact: The efficiency of teaching national games increased by 30% through the use of interactive tools, confirming that technology plays a crucial role in fostering interest in national values.

Conclusion

This study confirms that interactive technologies are among the most effective means of preserving national games and presenting them in modern formats. While national games are essential for teaching collective relations and traditions, their decline in the face of globalization necessitates a digital shift.

The study reached the following primary conclusions:

Technological Significance: VR, AR, and mobile apps provide a robust framework for reconstructing traditional games for the modern era.

Youth Engagement: There is a high level of receptivity among the younger generation toward technologically enhanced cultural content.

Educational Efficiency: The 30% increase in learning outcomes highlights the potential for integrating these tools into formal education.

Socio-Cultural Preservation: Digitization ensures that national heritage is not only preserved but made accessible to a global audience.

Despite these successes, challenges such as technical limitations, a shortage of specialized personnel, and the need for significant financial investment remain.

Future research should focus on optimizing these technologies and creating sustainable models for digital cultural integration. In summary, the proposed methods offer a viable pathway for incorporating national games into the modern educational landscape.

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GLOBAL SCIENTIFIC APPROACHES TO ENSURING ENVIRONMENTAL SUSTAINABILITY AND SECURITY: IMPLICATIONS FOR PRIMARY EDUCATION

Abstract. *The article analyzes the content of contemporary scientific issues related to ecological sustainability and environmental security, and highlights their impact on the primary education process. Methodological approaches, didactic opportunities, and pedagogical conditions for teaching global environmental issues, adapted to the age and psychological characteristics of young learners, are examined on a scientific basis. The importance of early development of environmental literacy for sustainable development is justified.*

Keywords: *ecological sustainability, environmental security, primary education, environmental literacy, environmental education, global environmental issues.*

Introduction

In the twenty-first century, one of the priority directions of scientific development is addressing issues related to environmental sustainability and environmental security. Global warming, the decline of biodiversity, the rapid depletion of natural resources, waste management challenges, and environmental pollution are regarded as major obstacles to the sustainable development of humanity. Consequently, international organizations such as UNESCO, OECD, and UNICEF emphasize the formation of environmental culture at an early stage of education as a global strategic objective. This process not only contributes to the development of environmental awareness but also serves to cultivate learners' competencies in responsible decision-making. In this regard, UNESCO views education not merely as a means of knowledge transmission, but as a fundamental strategic tool for achieving sustainable development [1].

Primary education represents a crucial stage for laying the foundation of environmental literacy, as it enables students to comprehend natural phenomena through simple, practical, and real-life examples, thereby fostering a sense of environmental responsibility for the future. In particular, the high level of curiosity, observational ability, and readiness to acquire new knowledge characteristic of children of primary school age create favorable conditions for effective environmental education. From this perspective, direct interaction with nature, experimental activities, ecological games, project-based learning, and small-scale tasks aimed at identifying local environmental problems and proposing solutions within primary school lessons significantly enhance educational effectiveness.

Another essential aspect of environmental education lies in its role in shaping students' behavioral norms and personal attitudes. For instance, the early development of everyday skills such as conserving water and energy, properly sorting waste, and demonstrating careful attitudes toward flora and fauna constitutes a core element of environmental security culture. At the same time, ecological values play a significant role in students' social and emotional development, fostering qualities such as care for nature, responsibility, cooperation, and active engagement in environmental protection.

Contemporary educational practice increasingly emphasizes the integration of environmental knowledge through interdisciplinary approaches. Embedding ecological concepts into subjects such as language arts, mathematics, technology, visual arts, and even physical education broadens students' worldviews and promotes the holistic development of environmental awareness. Such an integrative approach equips learners not only with theoretical knowledge but also with the ability to apply ecological thinking to real-life situations.

Overall, the formation of environmental literacy in primary education constitutes a vital pedagogical process aimed at developing future generations' competencies related to environmental security, instilling the principles of sustainable development, and cultivating an active civic position in addressing global environmental challenges.

Research object and applied methods

At the present stage of global development, the issue of living in an environmentally secure environment is becoming increasingly urgent for humanity. The relevance of this problem can be explained by several interrelated factors.

Climate change. Problems such as global warming, the melting of glaciers, rising sea levels, and the increasing frequency of extreme weather events are significantly complicating living conditions for human populations worldwide.

Depletion of natural resources. The reduction and contamination of vital natural resources, including water, forests, and soil, adversely affect human living conditions and may lead to future shortages of food and freshwater.

Environmental pollution. Air, water, and soil pollution exert harmful effects on human health, contribute to the spread of diseases, and disrupt natural ecosystems.

Population density. Global population growth and rapid urban expansion increase pressure on natural resources, intensify environmental pollution, and further exacerbate ecological challenges.

To address the issue of living in an environmentally secure environment, the implementation of the following measures is essential:

Combating climate change: reducing greenhouse gas emissions, developing alternative and renewable energy sources, and implementing climate change adaptation strategies.

Management of natural resources: conserving natural resources, ensuring their efficient use, and developing recycling and reuse systems.

Environmental protection: preventing environmental pollution, improving waste management practices, and applying environmentally friendly technologies.

Population density management: regulating population growth, improving urban planning, and developing sustainable and eco-friendly transportation systems.

The issue of ensuring an environmentally secure living environment is a global problem that requires solutions at the international level. Addressing this challenge demands coordinated efforts among governments, international organizations, the private sector, and civil society.

Today, global warming, environmental risks, and rapid environmental changes are regarded not only by environmental scientists but also by specialists across various fields as one of the greatest threats to human development. For this reason, the global scientific community increasingly characterizes these processes as a “threat to the collective security of humanity.” The sharp increase in industrial emissions—particularly carbon dioxide (CO₂), methane (CH₄), and nitrogen oxides (N₂O)—has intensified the greenhouse effect and weakened the self-regulation and resilience mechanisms of ecological systems. As a result, phenomena such as the accelerated melting of Arctic ice, ocean acidification, and the rising incidence of forest fires in tropical regions further elevate the level of global environmental risk [2].

The rapid acceleration of these hazardous processes places new responsibilities on the education system. This is because halting the ecological crisis cannot be achieved solely through technological or political measures; rather, it requires the education of generations endowed with environmental awareness, ecological responsibility, and a culture of sustainable development. In this context, the role of primary education is invaluable. Young learners are capable of understanding the causes and consequences of environmental problems through simple, clear, and life-related examples, while observation of natural phenomena initiates the development of scientific thinking.

Scientific research indicates that environmental values are most sustainably formed between the ages of 6 and 10. During this developmental period, children demonstrate emotional closeness to nature, curiosity, and a sense of care and responsibility. Therefore, presenting concepts of global warming and environmental security in an age-appropriate manner constitutes one of the most effective long-term strategies for sustainable development.

Another important aspect of this process is that comprehensive environmental literacy education in primary grades enables students to develop a scientifically grounded understanding of the “urgency of action.” In other words, the notion that the ecological crisis is not a matter of the past or the future, but a pressing issue of the present, becomes embedded in students’ thinking through simple yet profound logic. This, in turn, contributes to the formation of mature individuals who are capable of making environmentally responsible decisions and demonstrating a strong sense of ecological accountability in later stages of life.

Results obtained and their analysis

The process of teaching environmental issues to primary school students is associated with a number of pedagogical challenges.

Abstract nature of concepts. Environmental processes are inherently complex; therefore, explaining them to young learners requires simplified, visual, and real-life examples. Abstract concepts such as climate change and the greenhouse effect are more effectively understood through hands-on activities and practical experiments.

Limited conditions for observation and experimentation. In many schools, there is a lack of eco-gardens, nature corners, and experimental equipment. As a result, students are deprived of opportunities to observe environmental processes directly, which reduces the effectiveness of experiential learning.

Low level of students' ecological activity. Elementary ecological behaviors—such as waste sorting, water conservation, and tree planting—are not practiced regularly or are not sufficiently understood by students as meaningful actions.

Teachers' methodological preparedness. Innovative approaches to environmental education, including project-based learning, STEAM integration, and nature-oriented research methods, are not yet widely or systematically implemented in primary education.

Scientific studies indicate that ecological thinking in young learners is most effectively developed through practical experience. Examples include demonstrating water filtration processes through simple experiments, maintaining observation journals for plant care, organizing schoolyard clean-up activities, and conducting lessons on separating plastic and organic waste. Such activities contribute not only to the acquisition of knowledge but also to the formation of environmentally responsible behavior.

Environmental projects based on the STEAM approach. International educational research highlights the effectiveness of STEAM integration in environmental education. Examples include projects such as “Solar-powered models,” “Models created from recycled materials,” “Mini water purification system models,” and “Rational use of natural resources.” These activities teach students to analyze environmental problems using scientific and technological perspectives while fostering creativity and problem-solving skills.

Teaching based on local environmental issues. Environmental problems that are close to primary school students' daily experiences—such as pollution around the school area, changes in irrigation water quality, tree cutting, and seasonal changes in nature—are particularly effective as learning contexts. Observing these phenomena, documenting them through photographs, and creating simple problem maps make environmental education more accessible and meaningful for young learners.

Early environmental literacy contributes to increased care toward the surrounding environment, fosters responsibility and civic awareness among students, prepares them to consciously embrace the principles of sustainable

development in the future, and helps them understand the interdependence between nature and society.

International studies demonstrate that up to 70% of environmentally responsible behavior is formed between the ages of 7 and 12. Therefore, primary education represents a foundational stage in the development of environmental security culture.

Conclusion

In contemporary scientific discourse, addressing issues related to environmental sustainability and environmental security is recognized as a multifaceted process, with the education system occupying a central role. The early formation of environmental knowledge and skills in primary education—through practical experiences, observations, STEAM-based projects, and instruction grounded in local environmental issues—creates a solid foundation for the development of environmental culture.

Accordingly, adapting primary education curricula to ecological priorities, strengthening teachers' methodological competence, and presenting environmental security culture to children in simple, practical, and age-appropriate forms constitute urgent tasks of modern education.

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LIMFA TUGUNLARI VA TALOQNING MORFOLOGIK XUSUSIYATLARI HAMDA ULARNING NORMAL VA PATOLOGIK SHAROITDA ORGANIZM IMMUN REAKSIYALARIDAGI ROLI

Annotatsiya: Maqolada limfa tugunlari va taloqning morfologik tuzilishi, stromal va parenximatoz komponentlari, makro- va mikroanatomik xususiyatlari tahlil qilingan. Limfoid organlarning immun tizimdagi markaziy oʻrni morfofiziologik va patofiziologik jihatdan yoritilgan. Tadqiqot antigen prezentatsiyasi, tugʻma va adaptiv immun javoblar shakllanishi hamda limfotsitlar oʻzaro taʼsirini oʻrganadi. Maxsus eʼtibor infeksiyalar limfadenit, reaktiv limfadenopatiya, Xodjkin va no-Xodjkin limfomalari, splenomegaliya va limfoproliferativ kasalliklardagi patomorfologik oʻzgarishlarga qaratilgan. Natijada limfoid organlarning immun gomeostazni saqlashdagi roli ilmiy asoslanadi.

Kalit soʻzlar: Limfa tuguni, taloq, limfoid organlar, immun tizim, T-limfotsitlar, B-limfotsitlar, antigen prezentatsiyasi, immun javob, limfoproliferativ kasalliklar, patofiziologiya.

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MORPHOLOGICAL FEATURES OF LYMPH NODES AND THE SPLEEN AND THEIR ROLE IN IMMUNE RESPONSES OF THE ORGANISM UNDER NORMAL AND PATHOLOGICAL CONDITIONS

Annotation: The article analyzes the morphological structure of lymph nodes and the spleen, examining their stromal and parenchymal components alongside macro- and microanatomical characteristics. The central role of lymphoid organs within the immune system is elucidated from morphophysiological and pathophysiological perspectives. The study explores antigen presentation, the formation of innate and adaptive immune responses, and

lymphocyte interactions. Particular emphasis is placed on pathomorphological changes in infectious lymphadenitis, reactive lymphadenopathy, Hodgkin and non-Hodgkin lymphomas, splenomegaly, and lymphoproliferative disorders. Consequently, the role of lymphoid organs in maintaining immune homeostasis is scientifically substantiated.

Keywords: *Lymph node, spleen, lymphoid organs, immune system, T lymphocytes, B lymphocytes, antigen presentation, immune response, lymphoproliferative diseases, pathophysiology.*

Kirish

Immun tizim organizmni tashqi antigenlardan himoya qilib, genetik barqarorlik va to'qima yaxlitligini ta'minlaydi. U markaziy va periferik limfoid organlardan iborat bo'lib, limfa tugunlari va taloq immun javobning asosiy morfofunktsional markazlari hisoblanadi. Ushbu organlarda immun hujayralar o'zaro ta'siri orqali adaptiv immun javob shakllanadi, patologik sharoitlarda esa ularning strukturaviy va funktsional o'zgarishlari kasalliklar patogeneza muhim rol o'ynaydi.

Embrional rivojlanish

Limfa tugunlari mezodermal limfatik tizimdan 5–6-haftada PROX1, SOX18, VEGF-C boshqaruvida shakllanadi. Limfatik tomirlar atrofiya mezenximal rudimentlar hosil bo'lib, keyin limfotsitlar migratsiyasi bilan to'ldiriladi. Stromal skelet (retikulyar hujayralar) va zonal tashkiloti (korteks, parakorteks, medulla) tug'ilishga qadar shakllanadi; germinal markazlar antigen stimulyatsiyasidan keyin paydo bo'ladi.

Makroanatomiya

Kapsulali oval organlar (500–700 dona), asosan bo'yin, qo'ltiq, mediastinal, mezenterial, inguinal guruhlarda joylashgan. Asosiy qismlar: kapsula, trabekulalar, hilus, afferent va efferent limfa tomirlari. Limfa oqimi sekinlashib, antigenlar immun hujayralar bilan uchrashadi.

Mikroarxitektura va stromal komponentlar

- Korteks — B-follikulalar (birlamchi va ikkilamchi/germinal markazli)
- Parakorteks — T-zonasi, HEV orqali limfotsit kirishi
- Medulla — plazmotsitlar va makrofaglar bilan medullar kord va sinuslar

Stroma: FRC (CCL19/CCL21 kemokinlari), retikulyar tolalar, sinus endoteliyasi — migratsiya, yashab qolish va antigen tarqalishini ta'minlaydi.

Limfa mikrotsirkulyatsiyasi

Afferent → subkapsulyar sinus → trabekulyar sinuslar → medullar sinuslar → efferent tomirlar. Sinuslarda makrofag va dendrit hujayralar antigenlarni tutib, fagotsitoz qilib, prezentatsiya qiladi.

Antigen prezentatsiyasi va hujayra aktivatsiyasi

Dendrit hujayralar va makrofaglar MHC II (CD4+) va MHC I (CD8+) orqali prezentatsiya qiladi. T-aktivatsiya: TCR-MHC + CD28–B7 + sitokin signallari. B-limfotsitlar germinal markazlarda somatik gipermutatsiya va affinitet maturatsiyasidan o'tib, yuqori affinitetli antitanacha ishlab chiqaradi.

Taloqning tuzilishi va funksiyalari

Kapsulali organ (150–200 g), oq pulpa (PALS – T, follikulalar – B, marginal zona) va qizil pulpa (Billroth kordlari + venoz sinusoidlar). Qizil pulpa qon filtratsiyasi, eritrotsit destruksiya va temir qayta ishlashni ta'minlaydi. Taloq — qon filtri, immun javob markazi va qon depo.

Immunitet integratsiyasi

Tug'ma immunitet (PRR–PAMP) dendrit hujayralar orqali adaptiv javobni boshlaydi. Sitokinlar (JAK–STAT, NF-κB) va kemokinlar hujayra migratsiyasi va faolligini boshqaradi.

Patologik o'zgarishlar

Limfa tugunlari: reaktiv limfadenopatiya (follikulyar/parakortikal giperplaziya), infeksiyon limfadenit, Hodgkin/non-Hodgkin limfomalar.

Taloq: splenomegaliya (infeksion, gematologik, portal gipertenziya).

Xulosa

Limfa tugunlari va taloq periferik limfoid organlar sifatida antigen filtratsiyasi, hujayra faollashuvi va hujayraviiy-gumoral immun javob shakllantirish orqali immun-gematologik homeostazni ta'minlaydi. Ularning embrional, stromal va mikroarxitekturaviy xususiyatlarini o'rganish infeksiyon, autoimmun va limfoproliferativ kasalliklar patogenezi tahlil qilish va klinik yondashuvlarni rivojlantirish uchun muhim ilmiy asosdir.

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DORI VOSITALARINING SIFATINI NAZORAT QILISH VA STANDARTLASHDA METROLOGIK ISHLASHNING AHAMIYATI

Annotatsiya: *Dori vositalarini sifati deyilganda asosan ularning inson hayotiga faolligi va bezararligi, chinligi, tozaligi va miqdori bo'yicha talabga javob berishi ko'zda tutiladi. Mazkur maqolada dori vositalarining sifati nazorat qilish va standartlash jarayonida metrologik ta'minotning o'rni va ahamiyati tahlil qilinadi. Farmatsevtik ishlab chiqarishda o'lchovlarning aniqligi, ishonchliligi va qayta takrorlanuvchanligini ta'minlash sifat nazoratining asosiy omillaridan biri hisoblanadi. Metrologik tizimlar orqali o'lchash vositalarining kalibrlanishi, validatsiyasi va verifikatsiyasi dori vositalarining xavfsizligi hamda samaradorligini kafolatlaydi. Tadqiqot natijalari shuni ko'rsatadiki, metrologik ishlashni takomillashtirish farmatsevtik mahsulotlarning sifat ko'rsatkichlarini oshirish va xalqaro standartlarga mosligini ta'minlashda muhim rol o'ynaydi.*

Kalit so'zlar: *metrologiya, qo'pol xatolik, ishonchlilik oralig'i, standart chetlanish, nisbiy xatolik, Fisher mezoni, dispersiya.*

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THE IMPORTANCE OF METROLOGICAL SUPPORT IN QUALITY CONTROL AND STANDARDIZATION OF MEDICINAL PRODUCTS

Abstract: *The quality of medicinal products is primarily determined by their compliance with requirements of efficacy, safety, authenticity, purity, and quantitative composition. This article analyzes the role and importance of metrological support in the process of quality control and standardization of medicinal products. In pharmaceutical production, ensuring the accuracy, reliability, and reproducibility of measurements is one of the key factors of quality control. Through metrological systems, calibration, validation, and verification of measuring instruments are carried out, which guarantees the safety and effectiveness of medicinal products. The results of the study show that improving metrological support plays a crucial role in enhancing the quality indicators of pharmaceutical products and ensuring their compliance with international standards.*

Keywords: *metrology, gross error, confidence interval, standard deviation, relative error, Fisher criterion, variance.*

Kirish

Zamonaviy farmatsevtika sanoatida dori vositalarining sifatini ta'minlash muhim strategik vazifa hisoblanadi. Sifat nazorati tizimining samaradorligi ko'p jihatdan o'lchovlarning aniqligi va ishonchliligiga bog'liq. Shu sababli metrologik ta'minot farmatsevtik ishlab chiqarish va laboratoriya tahlillarining ajralmas qismi hisoblanadi.

Metrologiya – o'lchashlar haqidagi fan bo'lib, u o'lchov birliklari, usullari va vositalarining aniqligini ta'minlashga xizmat qiladi. Dori vositalarini ishlab chiqarish, saqlash va nazorat qilish jarayonlarida metrologik talablarning bajarilishi mahsulot sifatini barqaror darajada ushlab turish imkonini beradi.

Dori vositalarining sifatiga qo'yilgan talablarning tabora oshib borishi, ularning sifatini nazorat qilishni takomillashib turishiga olib kelmoqda. Bunda asosan ikkita yo'nalish bo'yicha ushbu olib boriladi:

- sifatni standartlash

- sifatni nazorat qilishni boshqarish

Metodologiya

Mazkur tadqiqotda quyidagi ilmiy-uslubiy yondashuvlardan foydalanildi:

Farmatsevtik korxonalarda qo'llaniladigan metrologik tizimlarni tahlil qilish

O'lchash vositalarining kalibrlanishi va verifikatsiyasi jarayonlarini o'rganish

GMP (Good Manufacturing Practice) talablariga muvofiq sifat nazorati tizimini baholash

Analitik usullar (spektrofotometriya, xromatografiya, titrimetriya) aniqlik darajasini solishtirish

Ilmiy adabiyotlar va normativ hujjatlarni qiyosiy tahlil qilish

Tadqiqot jarayonida laboratoriya o'lchovlarining aniqligi, qayta takrorlanuvchanligi va xatolik darajalari baholandi.

Sifatni standartlash ishlab chiqarilayotgan barcha mahsulotlar uchun ularning dori moddalari va standartlarini ishlab chiqish (FM, VFM, TS, kST) ishlab chiqish va tayyorlash muammolarini o'z ichiga oladi. Standartlashga shuningdek, sifatni nazorat qilish usullarini ishlab chiqish, tahlil natijalarini matematik ishlab chiqish va olingan ma'lumotlar bo'yicha tahlil usullarini baxolash kabi vazifalar kiradi. Bunda quyidagi ko'rsatmalarga alohida ahamiyat beriladi:

1. Standartlanayotgan dori vositalarining ishonchlilik chegaralarini aniqlash va ularning shu shu preparatga etaloniga mos kelishi;

2. Standartlanayotgan tahlil usuli natijalarini matematik ishlab chiqish uchun programma tuzish;

3. Standartlanayotgan moddalar usun informatsion (ma'lumotlar) banklar tuzish;

4. Sifatni aniqlashning optimal usullarini ishlab chiqish.

Ana shu ko'rsatkichlarni ishlab chiqishda ko'pincha matematik ishlash, matematik optimallashtirish va modellashtirish usullaridan foydalaniladi.

Mahsulotning sifatini boshqarish quyidagi vazifalarni o'z ichiga oladi:

sifat ko'rsatkichlar mexanizmini matematik baholash;
xom ashyo sifatini tayyor mahsulot sifatiga ta'sirini matematik ta'riflash;

A) texnologik jarayon bilan tayyor mahsulot o'rtasidagi o'zaro bog'liqlikni aniqlash;

B) retseptura va mahsulot sifati o'rtasidagi bog'liqlikni matematik modellashtirish;

C) saqlash sharoiti va uning mahsulot sifatiga ta'siri.

Laboratoriyada olib borilgan izlanishlardan olingan natijalarning sifati ko'pgina omillarga bog'liq, bo'lar: reaktivlarning sifati; asbob-uskunalarining sifati; laborantlarning kvalifikatsiyasi; usulning sifati va x. k.

Olingan natijalarning sifatiga ayniqsa ishlatilayotgan usulning ahamiyati katta.

Ishlab chiqarishga taklif etilayotgan yangi, takomillashtirilgan analitik usullar quyidagi mezonlari bo'yicha baholanadi:

-usulning qaytariluvchanligi (vosproizvodimost)

-usulning to'g'riligi (pravilnost)

-usulning hususiyligi (spetsifichnost)

-sezgirligi (chuvstvitelnost)

-selektivligi;

-o'xshashligi;

-xatoligi;

-to'g'ri chiziqligi (lineynost)

Tahlil natijalarini statistik ishlab chiqish usullari, talabalar «Dori vositalarining sifatini kafolatlash va standartlash» fanidan kurs ishlarini bajarishda, «Dori vositalarining zamonaviy tahlil usullari» fanini o'zlashtirishda va malakaviy bitiruv ishining tajriba qismida olingan qiymatlarni baxolashda foydalanishlari mumkin.

Farmatsevt - analitik o'z faoliyati davomida tahlil uslubida ko'rsatilgan ishlarni to'g'ri bajarish bilangina chegaralanib qolmasligi lozim.

Natijalar

Olingan natijalarni baholash va qiymatlarni statistik ishlab chiqish orqali xatolik qiymatini belgilanish.

Tahlilning to'g'riligi va qaytaruvchanligi haqida aniq tasavvurga ega bo'lish va ularni matematik statistika jarayonida qo'llay olish.

Farmatsevt - analitik o'z faoliyati davomida tahlil uslubida ko'rsatilgan ishlarni to'g'ri bajarish bilangina chegaralanib qolmasligi lozim.

Tahlil jarayoni ma'lum bir mazmunga ega bo'lishi uchun quyidagilar talab etiladi:

1. Har bir ayrim tahlil natijasini to'g'ri hisoblash va qayd etish.

2. Eng yaxshi natijani tanlab ola bilish. ketma-ket bajarilgan tahlil natijalari bir- biridan ma'lum bir qiymatga farq qilib, qaysidir keskin farqlanuvchi qiymatni hisobga olish yoki olmaslik muammosini hal eta olish.

3.Olingan natijalarni baholash va qiymatlarni statistik ishlab chiqish orqali xatolik qiymatini belgilanish.

4.Tahlilning to'g'riligi va qaytaruvchanligi haqida aniq tasavvurga ega bo'lish va ularni matematik statistika jarayonida qo'llay olish.

Miqdoriy tahlilda ishlatiladigan asosiy tushunchalar

Aniqlashning (o'lchash) aniqligi (tochnost), bu aniqlanayotgan kattalik qiymatiga olingan natijalarning yaqinligi.

Natijalarning o'xshashligi bu bir xil sharoitda olingan natijalarning bir-biriga yaqin bo'lishidir. Masalan, bunga instrumental usullar yordamida olingan parallel natijalar; bir xil seriyali dori moddalarni kimyoviy tahlil qilingandagi olingan natijalar kiradi.

O'lchov natijalarining qaytaruvchanligi – turli sharoit va joyda olingan natijalarning bir-biriga yaqinligi. O'lchov natijalarining qaytaruvchanligiga turli omillar ta'sir ko'rsatadi: aniqlashning qisqa vaqt ichida olib borilishi, namlik, harorat, reaktivlarning tozaligi. Tahlilning qaytaruvchanligi olingan qiymatlarni bir- biriga mosligi bilan aniqlanib, u olingan qiymatlarning o'rtacha arifmetik qiymatdan qay darajada farqlanishiga bog'liq. Agar tahlilning qaytaruvchanligi bo'lsa olingan natijalarning ma'lum darajada to'g'riligiga ishonch hosil qilinadi, lekin tahlilning to'g'riligi etarli bo'lmagan xollarda ham qaytaruvchanlik yaxshi bo'lishi mumkin. Dori vositasining sifatiga bir marta olingan qiymat bo'yicha baho borish umuman mumkin emas, chunki olingan qiymat hali tekshirib ko'rilmagan va qay darajada qaytaruvchanlikka erishilishi noma'lum bo'ladi.

Tahlilning ishonarliligi tushunchasi uniig qay darajada qaytaruvchanligiga qarab belgilanadi:

Tahlilning qaytaruvchanligi olingan qiymatlarni bir-biriga mosligi bilan aniqlanib, u olingan qiymatlarning o'rtacha arifmetik qiymatdan qay darajada farqlanishiga bog'liq. Agar tahlilning qaytaruvchanligi bo'lsa olingan natijalarning ma'lum darajada to'g'riligiga ishonch hosil qilinadi, lekin tahlilning to'g'riligi etarli bo'lmagan xollarda ham qaytaruvchanlik yaxshi bo'lishi mumkin. Dori vositasining sifatiga bir marta olingan qiymat bo'yicha baho borish umuman mumkin emas, chunki olingan qiymat hali tekshirib ko'rilmagan va qay darajada qaytaruvchanlikka erishilishi noma'lum bo'ladi.

Tahlilning ishonarliligi tushunchasi uning qay darajada qaytaruvchanligiga qarab belgilanadi.

Tahlilning to'g'riligi deganda ayrim olingan qiymatlar (X_1) yoki o'rtacha arifmetik qiymatning xaqiqiy qiymatga qay darajada yaqinligi tushunilib, u amalda xatolik bilan belgilanadi.

Usulning sifatini aniqlash uchun uning xatoligi topiladi. Uning xatoligini aniqlash uchun bir necha laboratoriyalarda olingan natijalar ko'rib chiqiladi.

Olingan natija bilan aniqlanayotgan kattalik qiymati o'rtasidagi farq o'lchashning xatoligi deyiladi.

Tahlil natijalarini matematik ishlab chiqish orqali quyidagilarni aniqlash mumkin:

-Olingan tahlil natijalarining qay darajada ishonarli ekanligini;

- Qo‘pol xatoliklarga yo‘l qo‘yilmaganligini;
- Bir nechta tahlil natijasida olingan qiymatlarning qay darajada aniqligini;
- Ishonchlilikoralig‘iqiymati;
- Nisbiy xatoliklar qiymati;
- Olingan qiymatlarning qay darajada qaytaruvchanligi;
- Ikki yoki undan ortiq tahlil usullaridan qay birida aniqlik yuqori ekanligi;
- Bir vaqtda olingan birnechta tahlil natijalarining bir-biriga mosligi;
- Aniqlik qiymatining ma‘lum me‘yori uchun bajarilishi lozim bo‘lgan ketma-ket tahlil soni;
- Mahsulot sifatining qay darajada kafolatlanganligi;
- CHiziqli bog‘lanish o‘lchamlarini;
- Korrelyasiya koeffitsientining qiymatini.

Xulosa

Dori vositalarining sifatini nazorat qilish va standartlashda metrologik ishlash muhim ilmiy va amaliy ahamiyatga ega ekanligi ushbu tadqiqot orqali asoslab berildi. Farmatsevtik mahsulotlarning xavfsizligi, samaradorligi va barqarorligi bevosita o‘lchovlarning aniqligi, ishonchliligi hamda qayta takrorlanuvchanligiga bog‘liq.

Tadqiqot natijalari shuni ko‘rsatdiki, metrologik ta‘minot tizimi – o‘lchash vositalarini kalibrlash, verifikatsiya qilish va validatsiyadan o‘tkazish – dori vositalarining sifat ko‘rsatkichlarini ishonchli baholashda asosiy omil hisoblanadi. Standartlash jarayonida matematik-statistik usullardan foydalanish tahlil natijalarining aniqligini oshirish, xatoliklarni aniqlash va ularni minimallashtirish imkonini beradi.

Shuningdek, sifatni boshqarish tizimida xom ashyo, texnologik jarayon, retseptura va saqlash sharoitlari o‘rtasidagi bog‘liqlikni matematik modellashtirish orqali mahsulot sifatini oldindan prognoz qilish mumkinligi aniqlandi. Analitik usullarning qaytaruvchanligi, to‘g‘riligi, sezgirliги va selektivligi kabi mezonlar asosida baholanishi esa sifat nazoratining ilmiy asoslanganligini ta‘minlaydi.

Umuman olganda, metrologik ishlashni takomillashtirish farmatsevtika sanoatida sifatni kafolatlash, xalqaro standartlarga moslikni ta‘minlash va raqobatbardosh mahsulot ishlab chiqarishda muhim omil bo‘lib xizmat qiladi. Shu sababli farmatsevtik laboratoriyalarda metrologik madaniyatni oshirish, zamonaviy o‘lchov texnologiyalarini joriy etish va statistik tahlil usullaridan keng foydalanish dolzarb vazifa hisoblanadi.

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YIGIRILGAN IP XOSSALARINI BASHORATLASH

Annotatsiya: *Ushbu maqolada paxta tolalaridan yig‘irilgan iplarning nisbiy uzilish kuchini bashoratlashga doir nazariy asoslar yoritilgan bo‘lib A.N.Solovyev tomonidan taklif etilgan klassik model tahlil qilindi va uning zamonaviy ishlab chiqarish sharoitlarida qo‘llanilish samaradorligi baholangan va tadqiqot natijalari ipi uzilish kuchini hisoblashning taklif etilgan modifikatsiyasi amaldagi standart va ishlab chiqarish ko‘rsatkichlariga yaqinligini ko‘rsatgan.*

Kalit so‘zlar: *ip uzilish kuchi, paxta tolasi, matematik model, buram, notekislik.*

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PREDICTION OF PROPERTIES OF SPUN YARN

Abstract: *This article presents the theoretical fundamentals for predicting the relative breaking strength of cotton yarn. The classical model proposed by A.N. Soloviev is analyzed, and its applicability under modern industrial conditions is evaluated. The mathematical influence of yarn unevenness, twist level, fiber length, and friction forces on yarn strength formation is substantiated. The results demonstrate that the proposed modification of the Soloviev formula provides breaking-strength calculations that closely correspond to both standard requirements and actual industrial data.*

Keywords: *yarn breaking strength, cotton fiber, mathematical model, twist, unevenness.*

Kirish

Barcha tarmoqlarda sanoatni rivojlantirish uchun, avvalo, barqaror va sifatli xom ashyo bazasining mavjudligi hamda undan samarali foydalanish imkonini beruvchi ilmiy asoslangan tavsiyalarni ishlab chiqish muhim hisoblanadi. Ayniqsa, to'qimachilik va ip-gazlama sanoatida xom ashyoning xususiyatlari, uning fizik-mexanik ko'rsatkichlari hamda texnologik jarayonlarda o'zini tutishi tayyor mahsulot sifatiga bevosita ta'sir ko'rsatadi. Shuning uchun tolalarning o'zgaruvchan xususiyatlarini o'rganish, ularga asoslangan holda ipning asosiy xossalarini aniqlash va bashoratlash bugungi kunda alohida dolzarb masalaga aylanmoqda [1].

Paxta tolasining tabiiy xususiyatlari yillar davomida iqlim, seleksiya, agrotexnika va qayta ishlash sharoitlariga bog'liq holda o'zgarib boradi. Bu o'zgarishlar tolalardan tayyorlanadigan ipning uzilish kuchi, pishiqligi, notekisligi kabi ko'rsatkichlarda namoyon bo'ladi. Shu bois, tola-ip munosabatini fizik-matematik modellar asosida o'rganish va ular asosida ishonchli bashorat modellarini ishlab chiqish ilmiy va amaliyot nuqtai nazaridan katta ahamiyatga ega [2].

Ipning uzilish kuchini baholash borasida ko'plab tadqiqotlar amalga oshirilgan bo'lib, shular orasida A.N.Solovyev modeli eng ko'p qo'llaniladigan metodlardan biri hisoblanadi. Ushbu model tolalarning o'rtacha pishiqligi, chiziqli zichligi, notekisligi, buram miqdori va ishqalanish kuchlari ta'sirida ipning umumiy mustahkamligini aniqlash imkonini beradi. Shu bilan birga, texnologik jarayonlarning real sharoitida ushbu formulani qo'llashda bir qator cheklanishlar mavjud bo'lib, uni zamonaviy ishlab chiqarish talablariga mos shaklga keltirish zarurati tug'iladi.

Tadqiqot obyekti va metodikasi

Iplarning asosiy xossalari jumlasiga kiritilgan uzilishi kuchini xom ashyo to'g'risidagi ma'lumotlar asosida loyihalash masalasi ko'plab tadqiqotchilarni ishlarida yoritilgan. Bu ko'rsatkichga yakka ipning uzilish kuchi, ipning nisbiy uzilish kuchi yoki uzilish uzunligi atamasi bilan, ayrim hollarda esa pishiqlik deb nom berilgan.

Ko'p yillik izlanishlar va tajribalar asosida paxta tolasidan yigirilgan ipning nisbiy uzilishi kuchini hisoblash uchun A.N.Solovyev quyidagi formulani tavsiya

etgan [1].

$$R_{un} = \frac{P_T}{T_T} \left(1 - 0,0357 H_0 - \frac{2,65}{\sqrt{\frac{T_{un}}{T_t}}}\right) \left(1 - \frac{5}{l_{sht}}\right) \cdot k \cdot \eta \quad (1)$$

bunda

P_T - aralashmadagi tolalarning o'rtacha pishiqligi, sN;

T_T - aralashmadagi tolalarning o'rtacha chiziqli zichligi, teks;

H_0 -ipning solishtirma notekisligi bo'lib, texnologik jarayonlar sifatini bildiradi (karda tizimi uchun $No=4,5-5\%$; qayta tarash tizimi uchun $No=3,5-4\%$);

T_{un} -ipning chiziqli zichligi, teks;

T_t - tola chiziqli zichligi, teks;

l_{sht} -aralashmadagi tolalarning o'rtacha shtapel uzunligi, mm;

η - korxonadagi uskunalarni holatini belgilovchi koeffitsiyenti. (a'lo-1,1; yaxshi- 1,0; qoniqarli- 0,95);

k -ipning pishitilishiga bog'liq koeffitsiyenti (yoki pishitishdagi tuzatish koeffitsiyenti).

A.N.Solovyev formulasini olishda dastlab notekislikni hisobga olishni tavsiya etdi. Matematik statistikadan ma'lumki, uzilish kuchi (R) ning minimal qiymati normal taqsimot qonuniyatiga binoan o'rtacha qiymatdan bir oz farqlanadi. Bu farq:

$$P = R_{ur} - 3\sigma \quad (2)$$

bunda

R_{ur} - o'rtacha uzilish kuchi;

σ - o'rtacha kvadratik og'ish.

Tajriba natijalari normal taqsimot qonuniyatiga mos kelganda Zommer formulasiga asosan kvadratik notekislik (S) va chiziqli notekislik (N) qiymatlari orasida quyidagi bog'lanish bo'ladi.

$$\frac{C}{H} = \sqrt{\frac{\pi}{2}} \approx 1,25 \quad (3)$$

Chiziqli notekislik formulasi:

$$H = \frac{\sigma^{100}}{P_{yp}} \quad \dots \quad (4)$$

ekanini hisobga olsak

$$\sigma = \frac{1,25 \cdot H \cdot P_{yp}}{100} \quad (5)$$

Bu ifodani (2) formulaga qo'yganda

$$R = R_0 \cdot r(1 - 0,0375 \cdot N) \quad (6)$$

Ipning uzilish kuchiga bir vaqtda uzilish koeffitsiyenti (k_0) bilan birga ipdagi buramlar ham ta'sir ko'rsatadi. Ipdagi buramlar tangensial kuchni hosil qiladi. Bu kuch ipning diametri va buramlar soni K ga proporsional bo'ladi:

$$U = C \cdot K \cdot d \quad (7)$$

Bunda C -doimiy koeffitsiyenti (A.N.Solovev kiritgan).

Tangensial kuchning normal tashkil etuvchisi $-Q$ tolada ishqalanish kuchini yuzaga keltiradi;

$$T_0 = f \cdot Q \quad (8)$$

$$Q = U \cdot \cos \beta \quad (9)$$

bo'lgani uchun

$$T = f \cdot C \cdot K \cdot d \cdot \cos \beta \quad (10)$$

bunda

f -ishqalanish koeffitsiyenti;

β -burchak (1-rasmga qarang)

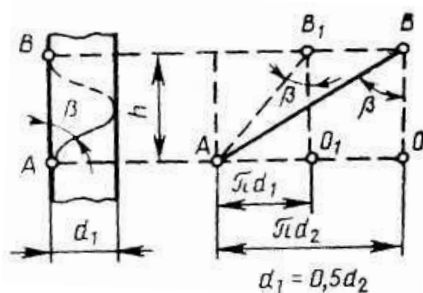
Agar ipdagi buramni

$$K = \frac{1}{\pi d \operatorname{ctg} \beta} \quad (11)$$

bilan almashtirilsa

$$T_0 = \frac{C d \cos \beta f}{\pi d \operatorname{ctg} \beta} = \frac{C f}{\pi} \cdot \sin \beta \quad (12)$$

hosil bo'ladi.



1-rasm. Tolaning vint chizig'i bo'ylab joylashish yoyilmasi

(12) formulaning birinchi ko'paytiruvchisi doimiy son bo'lishi mumkinligini inobatga olinsa $\frac{Cf}{\pi} = C_1$ ifoda soddalashadi:

$$T_0 = C_1 \cdot \sin \beta \quad (13)$$

Bu ifoda ishkalanish kuchi, ishkalanish koeffitsiyenti va buralish burchagining sinusiga to'g'ri proporsionalligini ko'rsatdi. Tekshirishlar natijasi asosida bir xil toladan yigirilgan ipning uzilish kuchi $\sin \beta$ ga proporsionalligini bildirishi ta'kidlangan.

Shunga ko'ra

$$P = C \cdot k_0 \cdot n \cdot p_0 \cdot \sin \beta \quad (14)$$

bunda

p_0 - tolaning uzilish kuchi;

k_0 - tolalarni bir vaqtda uzilish koeffitsiyenti;

n - ipni ko'ndalang kesimidagi tolalar soni;

C -doimiy koeffitsiyenti; β - buralish burchagi.

Tutamni uzilishini hisobga oluvchi koeffitsiyenti k_{ni} hisobga olib va uzilish kuchini uzilish uzunligi bilan almashtirilganda (6) formula quyidagicha yoziladi:

$$R_{un} = R_0(1 - 0.0375 \cdot H) \cdot k \quad (15)$$

bunda

R_0 -tola uzilish uzunligi;

k -buram berib pishirilgan tutamni uzilishini hisobga oluvchi koeffitsiyenti.

Ushbu formulaga umumiy notekislik $-H$ ni ifodalovchi qiymat

$$H = H_0 + \sqrt{\frac{500 \cdot N}{N_0}} \quad (16)$$

$$YA_{ii} = R(1 - 0,0375 - N_0 - 0,0375 - b - 4N) k \quad (17)$$

hosil bo'ladi.

Bu formuladagi b koeffitsiyenti ipni nomeri ortib borishiga muvofiq notekislikni o'sish koeffitsiyenti deb nomlangan va A.N.Solovev tadqiqotlarida

$$b = \sqrt{\frac{500}{N_0}} \quad (18)$$

ifoda bilan hisoblash taklif etilgan.

Agarda bu ifodani umumiy notekislik ifodasi bilan bog'lanadigan bo'lsa

$$R_{un} = R_0 (1 - 0,0375 \cdot H_0 - 0,0357 \cdot \sqrt{\frac{500}{N_0}} \cdot \sqrt{N}) \cdot k \quad (19)$$

$0,0375 \cdot 70,711 = 2,65$ ni qo'ysak hamda nomerni chiziqli zichlik bilan almashtirilsa (19) formula quyidagi ko'rinishida bo'ladi.

$$R_{un} = R_0 (1 - 0,0375 \cdot H_0 - \frac{2,65}{\sqrt{\frac{T_{un}}{T_T}}}) \cdot k \quad (20)$$

Tola uzunligini ortib borishi bilan koeffitsiyenti k ni qiymati ham 1,0 ga yaqinlashib boradi. Tolaning ma'lum minimal uzunligida, tutamni burab pishitish imkoniyati bo'lmagan l_0 uzunligida $k=0$ bo'ladi. Buni

$$k = (1 - \frac{l_0}{l}) \quad (21)$$

ko'rinishidagi formula orqali ifodalangan.

A.N.Solovyev uzilish kuchi va tola uzunligi o'rtasidagi bog'lanishga asoslanib $l_0 = 5$ mm bo'lishini taklif etgan.

Amalda tolalar vint chizig'i bo'ylab joylashganda hosil bo'ladigan tangensial kuchi tolani uzilishga qarshiligini yuzaga keltiradi. Bunda tola ipda joylashib, hosil qiladigan vint qadamlari soni tola uzunligiga bog'liq. Shunday vint chizig'i bo'ylab joylashgan tolalar uzunliklari ishqalanish hosil qilishda ishtirok etish ehtimoli ortadi. Vint chizig'ining bitta qadami uzunligini hisoblash usulidan foydalanib, uzilishda ishtirok etmaydigan tolalar uzunligini aniqlash formulasini quyidagicha yozamiz:

$$l_0 = 2 \cdot \sqrt{\left(\frac{1000}{K}\right)^2 + (\pi \cdot d_{un})^2} \quad (22)$$

bunda

K -ipning bir metrtdagi buramlar soni, m^{-1} ;

d_{un} -ipning diametri, mm.

Ipning diametrini Yu.K.Barxotkin taklif etgan formula orqali hisoblanadi.

$$d = 0,057 \cdot \sqrt{\frac{T_{un}}{K}} \cdot \sqrt{T_{un}} \quad (23)$$

Bunda T_{un} -ipning chiziqli zichligi, teks;

K -bir metr ipdagi buramlar soni, m^{-1} .

Bajarilgan hisoblashlarda lo -uzilishda ishtirok etmaydigan tolalar uzunligining qiymatini o'zgarish qonuniyatini grafik talqini 2.7-rasmda keltirilgan.

Grafikdan ko'rinadiki, ipning chiziqli zichligi 15,3 teksdan 100,2 teksgacha ortishi bilan lo ni 18-54% gacha ortishi, ipdagi buram sonini 500-1000 m^{-1}

oralig'ida ortishida qiymati 1,6-2,1 marta kamayishi aniqlandi.

Tolaning joylashishi va tekscanishini hisobga olib formulada uning ikkilangan qiymatini hisobga olishni tavsiya etamiz (1-jadval).

1-jadval

Ipning chiziqli zichligi, teks	Ipdagi buramlar soni, m-1						
	400	500	600	700	800	900	1000
15,3	4,077	3,420	2,952	2,604	2,334	2,119	1,945
18,2	4,098	3,443	2,978	2,632	2,364	2,151	1,978
20,2	4,108	3,455	2,991	2,646	2,379	2,167	1,995
29,4	4,176	3,531	3,074	2,735	2,474	2,268	2,100
50,2	4,356	3,730	3,290	2,965	2,717	2,522	2,365
72,1	4,565	3,957	3,534	3,222	2,986	2,800	2,650
100,2	4,847	4,262	3,855	3,558	3,331	3,154	3,09

Ipning nisbiy uzilish kuchini hisoblashda avvalroq keltirilgan formulada chiziqliy notekislik o'rniga kvadratik notekislikdan foydalanilganda (6) formula quyidagi ko'rinishni oladi.

$$P = R_o \cdot r (1 - 0,03S) \quad (24)$$

Shuningdek (20) formulada ham o'zgarish sodir bo'ladi.

Shunday qilib A.N.Solovyev formulasining o'zgartirilgan shakli quyidagi ko'rinishni oladi:

$$R_{un} = \frac{P_T}{T_T} \left(1 - 0,03 \cdot C - \frac{2,12}{\sqrt{\frac{T_{un}}{T_T}}} \right) \cdot \left(1 - \frac{l_0}{l_{shm}} \right) \cdot k \cdot \eta \quad (25)$$

Хулоса. Ipni nisbiy uzilish kuchini taklif etilgan formulada hisoblash zamonaviy hisoblash natijalariga yaqin bo'lishini ko'rsatdi.

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RAQAMLI TEXNOLOGIYALAR ASOSIDA TURIZM XIZMATLARINI TAKOMILLASHTIRISH

Annotatsiya: mazkur maqolada raqamli texnologiyalar asosida turizm xizmatlarini takomillashtirish masalalari tahlil qilinadi. Xususan, mobil ilovalar, onlayn bron qilish tizimlari, GPS navigatsiya, sun'iy intellekt va raqamli platformalarning turizm sohasidagi ahamiyati yoritiladi.

Kalit so'zlar: raqamli texnologiyalar, turizm xizmatlari, onlayn bron qilish, mobil ilovalar, GPS navigatsiya, sun'iy intellekt, raqamli platforma, turizm infratuzilmasi, innovatsiya, smart turizm

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IMPROVEMENT OF TOURISM SERVICES BASED ON DIGITAL TECHNOLOGIES

Abstract: This article analyzes the issues of improving tourism services based on digital technologies. In particular, the importance of mobile applications, online booking systems, GPS navigation, artificial intelligence, and digital platforms in the field of tourism will be highlighted.

Keywords: digital technologies, tourism services, online booking, mobile applications, GPS navigation, artificial intelligence, digital platform, tourism infrastructure, innovation, smart tourism

So'nggi yillarda turizm sohasi global miqyosda jadal rivojlanib, raqamli texnologiyalar uning asosiy drayveriga aylanmoqda. Xususan, World Tourism Organization (UNWTO) ma'lumotlariga ko'ra, raqamlashtirish turizm xizmatlarining samaradorligi va mijozlar qoniqishini oshirishda muhim omil hisoblanadi 1.. Raqamli texnologiyalar orqali turistlar safarni rejalashtirish, bron qilish va xizmatlardan foydalanishni mustaqil ravishda amalga oshirish imkoniyatiga ega bo'lmoqda.

Bugungi kunda mobil ilovalar, sun'iy intellekt, katta ma'lumotlar (Big Data) va GPS texnologiyalarining turizmga kirib kelishi xizmatlar sifatini yangi bosqichga olib chiqdi. Ayniqsa, "aqlli turizm" (smart tourism) konsepsiyasi hududiy turizmni rivojlantirishda muhim vosita sifatida qaralmoqda 2.. Shu nuqtai nazardan, raqamli texnologiyalar asosida turizm xizmatlarini takomillashtirish ilmiy va amaliy jihatdan dolzarb masalalardan biridir.

Raqamli texnologiyalar turizm xizmatlarini bir necha asosiy yoʻnalishlar orqali tizimli ravishda takomillashtiradi va xizmat koʻrsatish sifatini oshirishga xizmat qiladi.

Birinchiidan, onlayn bron qilish tizimlari turizm xizmatlarining tezkorligini, shaffofligini va qulayligini sezilarli darajada oshiradi. Xususan, Booking.com va Airbnb kabi platformalar orqali turistlar mehmonxona, transport va boshqa xizmatlarni real vaqt rejimida taqqoslash va tanlash imkoniyatiga ega boʻladi. Ushbu tizimlar narxlar dinamikasini kuzatish, foydalanuvchi sharhlari asosida qaror qabul qilish va xizmatlarni oldindan rejalashtirish imkonini beradi. Ilmiy tadqiqotlar natijalariga koʻra, onlayn bronlash tizimlaridan foydalanish xizmat koʻrsatish samaradorligini 30–40% ga oshirishi bilan birga, mijozlar qoniqishini ham sezilarli darajada yaxshilaydi 3..

Ikkinchiidan, mobil ilovalar va GPS navigatsiya tizimlari turizm xizmatlarining interaktivligini taʼminlaydi. Zamonaviy mobil ilovalar turistlarga marshrutlarni optimallashtirish, diqqatga sazovor joylar haqida batafsil maʼlumot olish, elektron xaritalardan foydalanish hamda real vaqt rejimida yoʻnalishni aniqlash imkonini beradi. Shu bilan birga, geolokatsiya texnologiyalari asosida xizmatlar kontekstual tarzda taklif etilib, foydalanuvchining joylashuviga mos ravishda tavsiyalar beriladi. Bu esa turistlarning vaqt sarfini kamaytiradi, logistika xarajatlarini optimallashtiradi va umumiy sayohat samaradorligini oshiradi 4..

Uchinchiidan, sunʼiy intellekt va Big Data texnologiyalari turizm xizmatlarini individuallashtirishda muhim rol oʻynaydi. Katta hajmdagi maʼlumotlarni tahlil qilish orqali turistlarning xatti-harakatlari, afzalliklari va ehtiyojlari aniqlanadi. Natijada, AI asosidagi tavsiya tizimlari foydalanuvchiga moslashtirilgan tur paketlari, mehmonxonalar va marshrutlarni taklif etadi. Bundan tashqari, prognozlash algoritmlari yordamida turistlar oqimini oldindan baholash va xizmatlar yuklamasini samarali boshqarish imkoniyati yaratiladi. Bu esa turizm tashkilotlariga resurslardan optimal foydalanish va xizmat sifatini oshirish imkonini beradi 5..

Toʻrtinchiidan, raqamli platformalar va smart turizm tizimlari hududiy turizmni boshqarishda strategik ahamiyat kasb etadi. Aqlli shahar (smart city) konsepsiyasi doirasida transport, mehmonxona, ovqatlanish va koʻngilochar xizmatlar yagona raqamli ekotizimga integratsiyalashmoqda. Natijada, turizm infratuzilmasi real vaqt rejimida boshqariladi va xizmatlar oʻrtasidagi muvofiqlik taʼminlanadi. Bu esa hududiy turizmning raqobatbardoshligini oshirib, turistlar oqimini samarali taqsimlash imkonini beradi 6..

Beshinchiidan, raqamli toʻlov tizimlari va elektron tijorat platformalari turizm xizmatlarining iqtisodiy samaradorligini oshiradi. Naqd pulsiz toʻlovlar, mobil banking va elektron hamyonlar turistlarga xavfsiz va tezkor tranzaksiyalarni amalga oshirish imkonini beradi. Bu esa xizmat koʻrsatish jarayonlarini soddalashtiradi va moliyaviy shaffoflikni taʼminlaydi 3..

Shuningdek, raqamli texnologiyalar turizm sohasida xavfsizlikni taʼminlash va risklarni boshqarishda ham muhim ahamiyatga ega. Real vaqt monitoring tizimlari, mobil ogohlantirish xizmatlari va raqamli identifikatsiya vositalari

turistlarning xavfsizligini oshirishga xizmat qiladi. Favqulodda holatlarda tezkor axborot yetkazish va koordinatsiya qilish imkoniyati yaratiladi. Bu esa turizm sohasida ishonch va barqarorlikni mustahkamlaydi 7..

Bundan tashqari, raqamli marketing va ijtimoiy tarmoqlar turizm xizmatlarini targ'ib qilishda samarali vosita sifatida xizmat qilmoqda. Internet platformalari orqali hududiy turistik salohiyatni global miqyosda namoyish etish, virtual turlar (VR/AR texnologiyalari) orqali turistlarni jalb qilish imkoniyati kengaymoqda. Bu esa turizm xizmatlariga bo'lgan talabni oshirishda muhim omil hisoblanadi.

Jizzax viloyati O'zbekistonning muhim turistik hududlaridan biri bo'lib, uning tarkibiga kiruvchi Zomin milliy bog'i, Aydar-Arnasoy ko'llar tizimi hamda tog'li hududlar katta turistik salohiyatga ega. Biroq ushbu salohiyatdan samarali foydalanishda raqamli texnologiyalarni joriy etish darajasi hali yetarli emas.

Birinchidan, hududda onlayn bron qilish tizimlari to'liq rivojlanmagan. Mavjud mehmonxonalar va dam olish maskanlarining aksariyati global platformalar, xususan Booking.com yoki Airbnb bilan to'liq integratsiyalanmagan. Bu esa turistlar uchun xizmatlarni oldindan rejalashtirish va tanlash imkoniyatlarini cheklaydi. Shu sababli hududiy turizm subyektlarini xalqaro raqamli platformalarga integratsiya qilish zarur. Ikkinchidan, mobil ilovalar va raqamli navigatsiya tizimlari yetarli darajada rivojlanmagan. Masalan, Zomin milliy bog'i hududida turistlar uchun maxsus mobil ilovalar, interaktiv xaritalar yoki QR-kod asosidagi axborot tizimlari deyarli mavjud emas. Natijada turistlar ko'pincha yo'nalish tanlashda va obyektlar haqida ma'lumot olishda qiyinchiliklarga duch keladi. Bu esa raqamli xizmatlarni joriy etish zaruratini ko'rsatadi. Uchinchidan, sun'iy intellekt va Big Data texnologiyalaridan foydalanish darajasi past. Hududga tashrif buyuruvchi turistlar oqimi, ularning ehtiyojlari va xatti-harakatlarini tahlil qilish tizimi yetarli darajada shakllanmagan. Agar ushbu texnologiyalar joriy etilsa, turistik xizmatlarni individuallashtirish va samarali boshqarish imkoniyati sezilarli darajada oshadi. To'rtinchidan, transport va logistika infratuzilmasining raqamlashtirilishi yetarli emas. Jizzax viloyatida turistik obyektlarga olib boruvchi yo'nalishlar, jamoat transporti jadvali va xizmatlar haqida real vaqt ma'lumotlarini taqdim etuvchi yagona raqamli platforma mavjud emas. Bu esa turistlar oqimini samarali boshqarish imkoniyatlarini cheklaydi[8].

Biroq, mavjud muammolarga qaramay, Jizzax viloyatida raqamli turizmni rivojlantirish uchun katta imkoniyatlar mavjud. Xususan:

- turistik obyektlarni raqamli platformalarga integratsiya qilish;
- mobil ilovalar va interaktiv xaritalarni ishlab chiqish;
- aqlli transport va navigatsiya tizimlarini joriy etish;
- sun'iy intellekt asosida turistlar oqimini tahlil qilish;
- raqamli marketing strategiyalarini kuchaytirish.

Natijada, Jizzax viloyatida raqamli texnologiyalarni joriy etish orqali turizm xizmatlarining sifati oshadi, turistlar oqimi ko'payadi va hududning iqtisodiy rivojlanishiga ijobiy ta'sir ko'rsatiladi.

Xulosa

Tahlillar shuni ko'rsatadiki, raqamli texnologiyalar turizm xizmatlarini sifat jihatidan yangi bosqichga olib chiqmoqda. Xususan, onlayn platformalar, mobil ilovalar, sun'iy intellekt va GPS texnologiyalari turistlarga qulay, tezkor va xavfsiz xizmat ko'rsatishni ta'minlaydi. Shu bilan birga, raqamli transformatsiya turizm infratuzilmasining raqobatbardoshligini oshiradi hamda hududiy turizmni rivojlantirishga xizmat qiladi.

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FIZIKA DARSLARIDA O‘QUVCHILARNING FUNKSIONAL SAVODXONLIGINI RIVOJLANTIRISHNING METODIK ASOSLARI

Annotatsiya: Mazkur maqolada fizika darslarida o‘quvchilarning funksional savodxonligini rivojlantirishning metodik asoslari tahlil qilinadi. Zamonaviy ta’lim tizimida o‘quvchilarning nazariy bilimlarini amaliy vaziyatlarda qo‘llay olish qobiliyatini shakllantirish muhim vazifa hisoblanadi. Tadqiqot jarayonida funksional savodxonlik tushunchasi, uning tarkibiy komponentlari hamda fizika fanini o‘qitishda qo‘llaniladigan samarali metodlar o‘rganildi. Natijada muammoli vaziyatlar, tajriba asosidagi o‘qitish, interfaol metodlar va real hayotga yo‘naltirilgan topshiriqlardan foydalanish o‘quvchilarning funksional savodxonligini rivojlantirishda samarali ekanligi asoslab berildi.

Kalit so‘zlar: funksional savodxonlik, fizika darsi, interfaol metodlar, tajriba, muammoli ta’lim, PISA, ta’lim samaradorligi.

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METHODOLOGICAL FOUNDATIONS FOR DEVELOPING STUDENTS’ FUNCTIONAL LITERACY IN PHYSICS LESSONS

Abstract: This article analyzes the methodological foundations for developing students’ functional literacy in physics lessons. In modern education, it is important to develop students’ ability to apply theoretical knowledge in real-life situations. The study examines the concept of functional literacy, its components, and effective teaching methods in physics. The results show that problem-based learning, experimental methods, interactive approaches, and real-life tasks significantly contribute to the development of students’ functional literacy.

Keywords: functional literacy, physics education, interactive methods, experiment, problem-based learning, PISA.

Kirish

Bugungi kunda ta’lim tizimida amalga oshirilayotgan islohotlar o‘quvchilarning nafaqat nazariy bilimlarini oshirish, balki ularning amaliy faoliyatga tayyorligini ta’minlashni ham talab etmoqda. Shu nuqtai nazardan funksional savodxonlik tushunchasi zamonaviy pedagogikaning markaziy kategoriyalaridan biriga aylanib bormoqda. Funksional savodxonlik o‘quvchining olgan bilimlarini kundalik hayotda qo‘llay olish, turli muammoli vaziyatlarda

to'g'ri qaror qabul qilish, axborotni tahlil qilish va mantiqiy xulosalar chiqarish qobiliyatini ifodalaydi. Ushbu tushuncha xalqaro baholash dasturlari, xususan PISA tadqiqotlarida asosiy mezon sifatida qaralib, ta'lim sifatini baholashning muhim indikatoriga aylangan. Shu sababli umumiy o'rta ta'lim maktablarida, ayniqsa fizika fanini o'qitishda funksional savodxonlikni rivojlantirish dolzarb vazifalardan biri hisoblanadi. Fizika fani o'zining mazmuni jihatidan real hayot bilan bevosita bog'liq bo'lib, unda o'rganiladigan qonuniyatlar kundalik hayotdagi hodisalar bilan uzviy aloqadadir. Shunga qaramay, amaliyotda fizika darslari ko'pincha formulalarni yodlash, tayyor qoidalarni takrorlash va standart masalalarni yechish bilan cheklanib qolmoqda. Natijada o'quvchilarda nazariy bilim mavjud bo'lsa-da, uni real hayotda qo'llash ko'nikmasi yetarli darajada shakllanmaydi. Bu esa fizika ta'limida metodik yondashuvlarni yangilash, dars jarayonini hayotiy vaziyatlarga yaqinlashtirish, eksperimental faoliyatni kuchaytirish va o'quvchini faol subyektga aylantirish zaruratini keltirib chiqaradi. Mazkur maqolaning maqsadi fizika darslarida o'quvchilarning funksional savodxonligini rivojlantirishning metodik asoslarini aniqlash va ularning samaradorligini ilmiy jihatdan asoslashdan iborat.

Tadqiqot metodlari

Tadqiqot jarayonida nazariy va amaliy metodlardan kompleks tarzda foydalanildi. Avvalo, ilmiy-pedagogik adabiyotlar tahlili asosida funksional savodxonlik tushunchasi, uning tarkibiy komponentlari hamda fizika ta'limidagi o'rni aniqlashtirildi. Tahlil va sintez metodlari yordamida zamonaviy ta'lim yondashuvlari, muammoli ta'lim, kompetensiyaviy yondashuv va interfaol metodlarning mazmuni umumlashtirildi. Pedagogik kuzatuv orqali fizika darslarining amaldagi holati o'rganilib, darslarda qo'llanilayotgan metodlarning o'quvchilarning amaliy fikrlashiga ta'siri tahlil qilindi. So'rovnoma metodi yordamida o'quvchilarning bilimlarini real vaziyatlarda qo'llash darajasi, shuningdek o'qituvchilarning funksional savodxonlikni shakllantirishdagi yondashuvlari aniqlashtirildi. Bundan tashqari, tajriba elementlari asosida muammoli savollar, real hayotga yo'naltirilgan topshiriqlar va eksperimental mashg'ulotlarning samaradorligi sinovdan o'tkazildi. Olingan ma'lumotlar qiyosiy tahlil asosida qayta ishlanib, umumlashtirildi.

Tadqiqot natijalari

Tadqiqot natijalari fizika darslarida funksional savodxonlikni rivojlantirish bir necha asosiy metodik yo'nalishlarga tayanishini ko'rsatdi. Avvalo, muammoli ta'lim metodining yuqori samaradorligi aniqlandi, chunki muammoli savollar o'quvchini mustaqil fikrlashga, sabab-oqibat bog'lanishlarini izlashga va bilimni faol ravishda o'zlashtirishga undaydi. Masalan, kundalik hayot bilan bog'liq oddiy savollar orqali fizik hodisalarning mohiyatini tushuntirish o'quvchilarning qiziqishini oshiradi va bilimni mustahkamlaydi. Eksperimental yondashuv ham muhim omil sifatida namoyon bo'ldi, chunki tajriba orqali o'quvchi nazariy bilimni amaliyot bilan bog'laydi va hodisani bevosita kuzatish orqali chuqurroq anglaydi. Shuningdek, real hayotiy vaziyatlarga asoslangan topshiriqlar o'quvchilarning bilimlarini kundalik hayot bilan integratsiya qilishga xizmat

qiladi, bu esa funksional savodxonlikni rivojlantirishda muhim ahamiyatga ega. Interfaol metodlardan foydalanish o'quvchilarning darsdagi faolligini oshiradi, guruhli ishlar va muhokamalar esa kommunikativ hamda tahliliy ko'nikmalarni rivojlantiradi. Natijalar shuni ko'rsatdiki, yuqoridagi metodlardan tizimli foydalanish o'quvchilarning bilimlarini amaliy qo'llash darajasini sezilarli oshiradi.

Muhokama

Tadqiqot natijalari fizika darslarida funksional savodxonlikni rivojlantirish uchun an'anaviy o'qitish metodlari yetarli emasligini ko'rsatdi, chunki ular ko'proq reproduktiv bilimlarni shakllantirishga yo'naltirilgan. Zamonaviy metodik yondashuvlar esa o'quvchini faol fikrlovchi subyektga aylantirib, uning bilimni mustaqil ravishda o'zlashtirishiga imkon yaratadi. Ayniqsa muammoli ta'lim va eksperimental yondashuvlar o'quvchilarning mantiqiy tafakkurini rivojlantiradi va ularni real vaziyatlarda to'g'ri qaror qabul qilishga tayyorlaydi. Real hayotiy topshiriqlar esa bilimlarning amaliy ahamiyatini ochib beradi va o'quvchida o'rganilayotgan mavzuga nisbatan ijobiy motivatsiyani shakllantiradi. Shu bilan birga, o'qituvchining metodik tayyorgarligi hal qiluvchi omil hisoblanadi, chunki funksional savodxonlikni rivojlantirish uchun darsni to'g'ri tashkil etish, savollarni maqsadli qo'yish va o'quvchilarning fikrlash faoliyatini boshqarish zarur. Shuningdek, baholash tizimini ham o'zgartirish talab etiladi, ya'ni faqat nazariy bilim emas, balki amaliy qo'llash ko'nikmalari ham baholanishi lozim.

Xulosa

Xulosa qilib aytganda, fizika darslarida o'quvchilarning funksional savodxonligini rivojlantirish zamonaviy ta'lim tizimining ustuvor yo'nalishlaridan biri hisoblanadi. Tadqiqot natijalari shuni ko'rsatdiki, an'anaviy o'qitish metodlari o'quvchilarning faqat reproduktiv bilimlarini shakllantirishga xizmat qilsa, zamonaviy metodik yondashuvlar ularning bilimlarini amaliy faoliyatda qo'llay olish kompetensiyasini rivojlantirishga imkon beradi. Ayniqsa, muammoli ta'lim, eksperimental faoliyat, interfaol metodlar va real hayotiy vaziyatlarga asoslangan topshiriqlardan tizimli foydalanish o'quvchilarning mantiqiy fikrlashini, tahliliy qobiliyatini va mustaqil qaror qabul qilish ko'nikmalarini rivojlantirishda muhim omil bo'lib xizmat qiladi.

Shuningdek, tadqiqot davomida funksional savodxonlikni shakllantirish jarayoni o'qituvchining metodik tayyorgarligi, darsni tashkil etish darajasi va baholash tizimi bilan bevosita bog'liqligi aniqlandi. O'qituvchi dars jarayonida o'quvchini faol subyekt sifatida jalb etishi, savollarni muammoli tarzda qo'yishi, tajriba va kuzatishlarga keng o'rin berishi hamda o'quvchilarning fikrlash faoliyatini boshqarishi zarur.

Mazkur tadqiqot asosida quyidagi amaliy tavsiyalar ishlab chiqildi: fizika darslarida funksional savodxonlikka yo'naltirilgan topshiriqlar ulushini oshirish; real hayotiy vaziyatlarga asoslangan masalalarni tizimli qo'llash; eksperimental faoliyatni kengaytirish; interfaol metodlardan samarali foydalanish; o'quvchilarni baholashda ularning amaliy ko'nikmalarini ham inobatga olish.

Kelgusida fizika ta'limida funksional savodxonlikni rivojlantirishga qaratilgan metodik ishlanmalarni takomillashtirish, o'qituvchilarning kasbiy kompetensiyalarini oshirish hamda ta'lim jarayonini yanada amaliy yo'naltirish muhim ilmiy-amaliy vazifa bo'lib qoladi.

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THE ROLE OF THYROID HORMONES IN THE DEVELOPMENT AND COURSE OF IRON DEFICIENCY ANEMIA

Abstract. *Iron deficiency anemia (IDA) is one of the most prevalent hematological disorders worldwide and is often associated with endocrine diseases, particularly hypothyroidism. Thyroid hormones play a significant role in regulating erythropoiesis, iron metabolism, and overall metabolic activity. Their deficiency can alter the development, progression, and severity of anemia. This review aims to analyze the role of thyroid hormones in the pathogenesis and clinical course of iron deficiency anemia. Special attention is given to the mechanisms linking thyroid dysfunction with impaired iron absorption and utilization. Understanding these interactions is essential for improving diagnostic accuracy and optimizing treatment strategies.*

Keywords: *Iron deficiency anemia; hypothyroidism; thyroid hormones; iron metabolism; erythropoiesis; comorbidity*

Introduction

Iron deficiency anemia (IDA) is a common condition characterized by reduced hemoglobin levels due to insufficient iron availability for red blood cell production [1]. It is especially prevalent among women and patients with chronic conditions. Thyroid hormones are essential regulators of metabolism and have a significant impact on hematopoiesis. Hypothyroidism, defined as a deficiency of thyroid hormones, is frequently associated with various forms of anemia, including iron deficiency anemia [2].

The interaction between thyroid dysfunction and anemia is complex and involves multiple physiological pathways. Understanding this relationship is important for accurate diagnosis and effective treatment.

Role of thyroid hormones in erythropoiesis. Thyroid hormones stimulate erythropoiesis by increasing erythropoietin production and enhancing the proliferation of erythroid progenitor cells in the bone marrow [3].

In hypothyroidism, reduced levels of thyroid hormones lead to: decreased erythropoietin secretion, suppressed bone marrow activity, reduced red blood cell production.

As a result, anemia develops or becomes more severe.

Influence on iron metabolism. Thyroid hormones play a key role in iron metabolism by regulating its absorption, transport, and utilization.

In hypothyroidism: Gastric acid secretion decreases, impairing iron absorption, intestinal motility slows down, iron bioavailability is reduced.

Additionally, altered expression of hepcidin, a key regulator of iron metabolism, may further limit iron availability [4].

Pathophysiological Mechanisms

The development of iron deficiency anemia in hypothyroidism is multifactorial.

Key mechanisms include: impaired iron absorption, reduced erythropoietin production, chronic inflammation, altered iron transport and storage, these factors contribute to a more persistent and treatment-resistant form of anemia [5].

Clinical Features. Patients with coexisting hypothyroidism and IDA present with combined symptoms of both conditions: fatigue and weakness, pallor, cold intolerance, weight gain, hair loss. The overlap of symptoms may complicate diagnosis and delay treatment [6].

Diagnostic Considerations

Diagnosis requires evaluation of both hematological and endocrine parameters:

Hemoglobin and red blood cell indices

Serum ferritin and iron levels

Thyroid function tests (TSH, free T4)

Low ferritin confirms iron deficiency, while elevated TSH indicates hypothyroidism [7]. A comprehensive approach is necessary to avoid misdiagnosis.

Treatment Approaches

Effective treatment requires addressing both iron deficiency and thyroid dysfunction.

Iron Therapy. Oral iron supplementation is commonly used but may be less effective due to impaired absorption.

Thyroid Hormone Replacement. Levothyroxine therapy restores thyroid hormone levels and improves erythropoiesis [2,8].

Combined therapy is more effective than treating either condition alone.

Evaluation of Treatment Effectiveness. Treatment effectiveness is assessed by: increase in hemoglobin levels, improvement in symptoms, normalization of iron stores. Patients receiving combined therapy show faster recovery and better outcomes [9,10].

Discussion

The relationship between thyroid hormones and iron metabolism highlights the importance of an integrated clinical approach. Hypothyroidism significantly alters iron homeostasis and erythropoiesis, leading to more severe anemia. Failure to recognize this interaction may result in inadequate treatment and persistent symptoms.

Conclusion

Thyroid hormones play a crucial role in the development and progression of iron deficiency anemia. Their deficiency leads to impaired erythropoiesis and

altered iron metabolism. Early diagnosis and combined treatment strategies are essential for improving patient outcomes.

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IMPACT OF MEGALOBLASTIC ANEMIA ON THE NERVOUS SYSTEM: PATHOGENESIS AND CLINICAL MANIFESTATIONS

Abstract. *Megaloblastic anemia, primarily caused by vitamin B12 and folate deficiency, is a common hematological disorder associated with significant neurological complications. The nervous system is particularly sensitive to cobalamin deficiency due to its role in myelin synthesis and neuronal metabolism. This review summarizes current data on the pathogenesis of neurological involvement in megaloblastic anemia and highlights the spectrum of clinical manifestations affecting both the central and peripheral nervous systems. Special attention is given to biochemical mechanisms involving homocysteine and methylmalonic acid, which contribute to neurotoxicity and demyelination [1,2]. Early diagnosis and timely treatment are essential to prevent irreversible neurological damage.*

Keywords: *Megaloblastic anemia; vitamin B12 deficiency; nervous system; neuropathy; homocysteine; methylmalonic acid; neuropsychiatric disorders*

Introduction

Megaloblastic anemia is characterized by impaired DNA synthesis, resulting in ineffective hematopoiesis and the formation of large, immature erythrocytes [2]. The most common causes are deficiencies of vitamin B12 (cobalamin) and folic acid. In addition to hematological abnormalities, megaloblastic anemia has profound effects on the nervous system, often leading to severe neurological and psychiatric disorders [3].

Neurological complications may precede hematological manifestations or occur independently, complicating early diagnosis [4]. These complications significantly affect patients' quality of life and may become irreversible if not treated promptly.

Pathogenesis of neurological damage. Vitamin B12 plays a critical role in two key biochemical reactions: the conversion of homocysteine to methionine and the metabolism of methylmalonyl-CoA to succinyl-CoA [2]. Disruption of these pathways leads to the accumulation of homocysteine and methylmalonic acid, both of which are neurotoxic. Elevated homocysteine levels contribute to neuronal damage by inducing oxidative stress and overstimulation of NMDA receptors, leading to excitotoxicity and vascular endothelial dysfunction [6]. Meanwhile,

increased methylmalonic acid interferes with fatty acid synthesis, resulting in abnormal incorporation of fatty acids into neuronal lipids and subsequent myelin degeneration [7].

The destruction of myelin sheaths disrupts nerve conduction, leading to both central and peripheral nervous system dysfunction [3]. Additionally, impaired DNA synthesis affects rapidly dividing cells, further exacerbating neurological damage [6]. Neurological manifestations. Neurological complications of megaloblastic anemia frequently involve the central nervous system. One of the most characteristic conditions is subacute combined degeneration of the spinal cord [1].

Clinically, this condition presents with: sensory ataxia, loss of vibration and position sense, spasticity and weakness. Patients may also develop cognitive impairment, memory loss, depression, and even psychosis [5]. In severe cases, dementia-like syndromes may occur.

Neuropsychiatric manifestations can occur independently of anemia and may be the first sign of vitamin B12 deficiency [7].

Peripheral nervous system involvement. Peripheral neuropathy is one of the most common neurological manifestations of megaloblastic anemia. It typically presents as symmetric distal sensory neuropathy.

Common symptoms include: paresthesia (tingling and numbness), burning sensations, muscle weakness, gait disturbances.

Clinical studies indicate that distal symmetric neuropathy occurs in a significant proportion of patients with vitamin B12 deficiency [10].

Neuropsychiatric disorders. Megaloblastic anemia is also associated with a wide range of psychiatric manifestations, including depression, anxiety, irritability, hallucinations, and cognitive decline [4]. These symptoms are linked to disrupted methylation processes and neurotransmitter imbalance due to vitamin B12 deficiency [3].

Clinical and laboratory correlations. Neurological symptoms may not always correlate with the severity of anemia. In some cases, patients present with significant neurological deficits despite minimal hematological abnormalities [5].

Laboratory findings typically include: macrocytosis, hypersegmented neutrophils, elevated homocysteine and methylmalonic acid levels. Importantly, normal serum vitamin B12 levels do not always exclude deficiency, making metabolic markers essential for diagnosis [9].

Treatment and prognosis. The cornerstone of treatment is vitamin B12 replacement therapy, administered either orally or intramuscularly [2]. Early treatment can lead to significant improvement or complete resolution of neurological symptoms. However, prolonged deficiency may result in irreversible neurological damage. Studies show that vitamin B12 supplementation provides clear neurological benefits in symptomatic patients, particularly when initiated early [8,11]. Folic acid supplementation alone may correct hematological abnormalities but does not prevent neurological complications, emphasizing the importance of accurate diagnosis [3].

Discussion

The relationship between megaloblastic anemia and neurological dysfunction is complex and multifactorial. The accumulation of neurotoxic metabolites, impaired myelin synthesis, and disrupted DNA replication all contribute to nervous system damage [6,7]. A key clinical challenge is the variability in presentation, with some patients exhibiting neurological symptoms without anemia [4,12]. This underscores the need for comprehensive evaluation, including biochemical markers.

Conclusion

Megaloblastic anemia has a significant impact on the nervous system, affecting both central and peripheral components. Vitamin B12 deficiency plays a central role in the pathogenesis of neurological damage through multiple biochemical mechanisms [2,3]. Timely diagnosis and appropriate treatment are essential to prevent irreversible complications. Increased awareness of neurological manifestations among clinicians can improve early detection and patient outcomes.

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PERNITSIOZ ANEMIYANING IMMUNOLOGIK JIHATLARI: ZAMONAVIY QARASHLAR

Annotatsiya. Pernitsioz anemiya — vitamin B12 yetishmovchiligi bilan bog‘liq bo‘lgan va asosan autoimmun mexanizmlar asosida rivojlanadigan kasallikdir. Ushbu maqolada pernitsioz anemiyaning immunologik xususiyatlari, xususan, intrinsic factor va parietal hujayralarga qarshi autoantitanelarning roli, hujayraviy immunitet buzilishlari hamda genetik omillar tahlil qilinadi. Shuningdek, kasallik patogenezida sitokinlar disbalansi va oshqozon shilliq qavatining atrofik o‘zgarishlari muhim ahamiyat kasb etishi ko‘rsatib berilgan. Immunologik mexanizmlarni chuqur o‘rganish kasallikni erta aniqlash va samarali davolash imkonini beradi.

Kalit so‘zlar: pernitsioz anemiya, vitamin B12, autoimmun kasallik, intrinsic factor, parietal hujayralar, autoantitanelar, gastrit

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IMMUNOLOGICAL ASPECTS OF PERNICIOUS ANEMIA: MODERN PERSPECTIVES

Abstract. Pernicious anemia is an autoimmune disease associated with vitamin B12 deficiency. This article reviews the immunological aspects of the disease, including the role of autoantibodies against intrinsic factor and gastric parietal cells, disturbances in cellular immunity, and genetic predisposition. Cytokine imbalance and gastric mucosal atrophy are highlighted as key pathogenetic mechanisms. Understanding these processes is essential for early diagnosis and effective treatment.

Keywords: *pernicious anemia, vitamin B12 deficiency, autoimmune disease, intrinsic factor, parietal cells, autoantibodies, gastritis*

Kirish

Pernitsioz anemiya megaloblast anemiyaning muhim turlaridan biri bo'lib, vitamin B12 yetishmovchiligi natijasida rivojlanadi. Ushbu kasallikning asosiy sababi autoimmun jarayonlar hisoblanadi, bunda organizm o'zining oshqozon shilliq qavati hujayralariga qarshi immun javob hosil qiladi [1]. Kasallik ko'proq katta yoshdagi aholida uchraydi va ko'pincha boshqa autoimmun patologiyalar bilan birgalikda namoyon bo'ladi [2]. Zamonaviy ilmiy tadqiqotlar pernitsioz anemiyaning immunologik mexanizmlarini chuqur o'rganishga qaratilgan.

Etiologiya va immunologik mexanizmlar. Pernitsioz anemiya autoimmun kasallik bo'lib, unda asosiy nishon sifatida oshqozon parietal hujayralari va intrinsic factor xizmat qiladi [3]. Intrinsic factor — vitamin B12 ning ingichka ichakda so'rilishini ta'minlovchi muhim oqsildir. Intrinsic factor ga qarshi autoantitanalar hosil bo'lishi B12 ning so'rilishini buzadi va natijada megaloblast anemiya rivojlanadi [4]. Parietal hujayralarga qarshi antitanalar esa oshqozon shilliq qavatining atrofiyasiga olib keladi [5].

Autoantitanalar va ularning diagnostik ahamiyati. Pernitsioz anemiyada ikki asosiy turdagi autoantitanalar aniqlanadi: intrinsic factor ga qarshi antitanalar, parietal hujayralarga qarshi antitanalar.

Intrinsic factor ga qarshi antitanalar yuqori spetsifiklikka ega bo'lib, kasallikni aniqlashda muhim diagnostik mezon hisoblanadi [6,11]. Parietal hujayralarga qarshi antitanalar esa kasallikning erta bosqichlarida aniqlanishi mumkin [7].

Hujayraviiy immunitet va sitokinlar roli. Kasallik patogenezida hujayraviiy immunitet ham muhim rol o'ynaydi. T-limfotsitlar oshqozon shilliq qavatida yallig'lanish jarayonini qo'zg'atadi [8,12]. Sitokinlar, jumladan interleykinlar va interferonlar, yallig'lanish reaksiyasini kuchaytirib, to'qimalarning shikastlanishiga olib keladi [9]. Bu esa oshqozon bezlarining funksional yetishmovchiligini kuchaytiradi.

Genetik moyillik. Tadqiqotlar pernitsioz anemiyaning ayrim HLA genlari bilan bog'liqligini ko'rsatadi [10]. Shuningdek, ushbu kasallik boshqa autoimmun kasalliklar bilan birga uchrashi uning umumiy immunologik asosga ega ekanligini tasdiqlaydi.

Klinik ahamiyati. Pernitsioz anemiya nafaqat gematologik, balki nevrologik buzilishlar bilan ham namoyon bo'ladi. Bu esa kasallikni o'z vaqtida aniqlashni murakkablashtiradi. Immunologik o'zgarishlar kasallikning og'irligi va davomiyligiga bevosita ta'sir ko'rsatadi.

Xulosa

Pernitsioz anemiya murakkab autoimmun kasallik bo'lib, uning rivojlanishida autoantitanalar, hujayraviiy immunitet va genetik omillar muhim rol o'ynaydi. Immunologik mexanizmlarni chuqur o'rganish kasallikni erta tashxislash va samarali davolash imkonini beradi.

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REPRODUKTIV YOSHDAGI AYOLLARDA ANEMIYANING HAYOT SIFATI VA ISH QOBILIYATIGA TA’SIRI

Annotatsiya: Reproktiv yoshdagi ayollarda anemiya keng tarqalgan bo‘lib, u nafaqat somatik salomatlikka, balki hayot sifati va ish qobiliyatiga ham salbiy ta’sir ko‘rsatadi. Ushbu maqolada anemiyaning ayollarning jismoniy faolligi, aqliy faoliyati va ijtimoiy moslashuviga ta’siri tahlil qilinadi. Temir tanqisligi anemiyasi fonida charchoq, ish unumdorligining pasayishi va kognitiv funksiyalarning buzilishi kuzatiladi. O‘z vaqtida tashxis va samarali davolash ushbu ko‘rsatkichlarni yaxshilashga yordam beradi.

Kalit so‘zlar: anemiya; reproduktiv yoshdagi ayollar; hayot sifati; ish qobiliyati; temir tanqisligi; charchoq; kognitiv funksiya

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IMPACT OF ANEMIA ON QUALITY OF LIFE AND WORK CAPACITY IN WOMEN OF REPRODUCTIVE AGE

Abstract. Anemia is a widespread condition among women of reproductive age and has a significant impact not only on physical health but also on quality of life and work capacity. This article analyzes the effects of anemia on physical activity, cognitive function, and social adaptation in women. Iron deficiency anemia is associated with fatigue, decreased work productivity, and impaired cognitive performance. Early diagnosis and effective treatment contribute to significant improvements in these indicators and overall well-being.

Keywords: anemia; women of reproductive age; quality of life; work capacity; iron deficiency; fatigue; cognitive function

Kirish

Anemiya reproduktiv yoshdagi ayollar orasida keng tarqalgan kasallik bo'lib, organizmda gemoglobin darajasining pasayishi bilan tavsiflanadi [1]. Ushbu holat to'qimalarga kislorod yetkazib berilishining buzilishiga olib keladi va umumiy salomatlikka salbiy ta'sir qiladi. Anemiya nafaqat klinik simptomlar bilan namoyon bo'ladi, balki ayollarning kundalik faoliyati, mehnat unumdorligi va ijtimoiy hayotiga ham ta'sir ko'rsatadi [2].

Asosiy qism

Anemiyaning hayot sifatiga ta'siri. Hayot sifati insonning jismoniy, ruhiy va ijtimoiy farovonligini o'z ichiga oladi. Anemiya ushbu barcha komponentlarga salbiy ta'sir ko'rsatadi. Temir tanqisligi anemiyasida bemorlarda quyidagi belgilar kuzatiladi: doimiy charchoq, umumiy holsizlik, bosh aylanishi, uyqu buzilishlari. Bu simptomlar hayot sifatining pasayishiga olib keladi [3]. Jismoniy faollikning pasayishi. Gemoglobin darajasining pasayishi mushaklarga kislorod yetkazib berilishini kamaytiradi. Natijada jismoniy chidamlilik pasayadi va tez charchash kuzatiladi [4].

Kognitiv funksiyalar va psixologik holat. Anemiya markaziy asab tizimiga ta'sir ko'rsatib, diqqat va xotira buzilishiga olib keladi. Shuningdek, psixologik holatga ham salbiy ta'sir qiladi [5].

Ish qobiliyatiga ta'siri. Anemiya mehnat unumdorligining pasayishiga sabab bo'ladi. Bemorlar tez charchaydi va ish samaradorligi kamayadi [6,9].

Ijtimoiy va iqtisodiy oqibatlar. Anemiya ijtimoiy va iqtisodiy muammolarni ham keltirib chiqaradi, chunki ish qobiliyatining pasayishi umumiy samaradorlikka ta'sir qiladi [7].

Davolashning hayot sifatiga ta'siri. Anemiyani o'z vaqtida davolash hayot sifatini yaxshilaydi. Temir terapiyasi klinik simptomlarni kamaytiradi va ish qobiliyatini tiklaydi [8,10,11].

Xulosa. Reproductiv yoshdagi ayollarda anemiya hayot sifati va ish qobiliyatiga sezilarli ta'sir ko'rsatadi. O'z vaqtida tashxis va samarali davolash ushbu ta'sirlarni kamaytiradi va bemorlarning umumiy holatini yaxshilaydi.

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HORMONAL INFLUENCES ON IRON METABOLISM IN WOMEN OF REPRODUCTIVE AGE

Abstract. *Iron metabolism in women of reproductive age is significantly influenced by hormonal factors. Estrogens, progesterone, and other hormones regulate iron homeostasis by affecting hepcidin expression, erythropoiesis, and intestinal iron absorption. Hormonal fluctuations during the menstrual cycle, pregnancy, and use of hormonal contraceptives contribute to variations in iron status and may predispose women to iron deficiency anemia. This review analyzes the current understanding of hormonal regulation of iron metabolism and its clinical implications. Special attention is given to the interaction between sex hormones and inflammatory pathways, which play a key role in anemia development. Understanding these mechanisms is essential for improving diagnostic accuracy and optimizing treatment strategies.*

Keywords: *iron metabolism; hormones; women of reproductive age; estrogen; progesterone; hepcidin; anemia*

Introduction

Iron metabolism is a tightly regulated physiological process essential for oxygen transport, cellular respiration, and DNA synthesis. In women of reproductive age, iron balance is particularly vulnerable due to physiological and hormonal factors [1].

Hormonal regulation plays a crucial role in maintaining iron homeostasis. Fluctuations in estrogen and progesterone levels during the menstrual cycle, as well as hormonal changes during pregnancy, significantly affect iron absorption, utilization, and storage [2]. These changes increase the risk of iron deficiency and anemia in this population.

Role of estrogen in iron metabolism. Estrogen is one of the key regulators of iron metabolism. It influences iron homeostasis by modulating the expression of hepcidin, a central hormone controlling systemic iron balance.

Studies have shown that estrogen suppresses hepcidin synthesis, thereby enhancing intestinal iron absorption and mobilization of iron from stores [3]. This mechanism is particularly important during periods of increased iron demand, such as pregnancy.

Additionally, estrogen has antioxidant properties that protect cells from oxidative stress induced by iron overload [4].

Progesterone and iron regulation. Progesterone also plays a role in iron metabolism, although its effects are less pronounced compared to estrogen. It is involved in regulating erythropoiesis and may indirectly influence iron utilization. During the luteal phase of the menstrual cycle, increased progesterone levels are associated with changes in iron metabolism and erythropoietic activity [5].

Menstrual cycle and iron balance. The menstrual cycle is a major determinant of iron status in women. Regular blood loss during menstruation leads to a continuous depletion of iron stores. Hormonal fluctuations throughout the cycle influence both iron loss and absorption. Women with heavy menstrual bleeding are at particularly high risk of developing iron deficiency anemia [6].

Pregnancy and hormonal adaptations. Pregnancy is associated with profound hormonal changes that significantly impact iron metabolism. Increased levels of estrogen and progesterone, along with placental hormones, alter iron requirements and distribution.

Iron demand during pregnancy increases substantially due to: expansion of maternal blood volume, fetal growth and development, placental needs.

Hepcidin levels are typically suppressed during pregnancy to facilitate increased iron absorption [7,10].

Hormonal Contraceptives and Iron Status. Hormonal contraceptives influence iron metabolism by reducing menstrual blood loss and stabilizing hormonal fluctuations. Women using oral contraceptives often have higher hemoglobin and ferritin levels compared to non-users, which may reduce the risk of anemia [8,9].

Interaction between hormones and inflammation. Inflammation plays an important role in iron metabolism through the regulation of hepcidin. Pro-inflammatory cytokines increase hepcidin levels, leading to reduced iron availability. Hormones interact with inflammatory pathways, influencing the development of anemia, particularly anemia of chronic disease [11,12].

Clinical implications

Understanding hormonal influences on iron metabolism is essential for: accurate diagnosis of anemia, identification of high-risk groups, development of individualized treatment strategies, hormonal factors should be considered when evaluating iron status in women of reproductive age.

Discussion

Iron metabolism in women is a complex process influenced by multiple hormonal and physiological factors. Estrogen, progesterone, and other hormones regulate iron absorption, utilization, and storage. Hormonal fluctuations during the reproductive period create unique challenges in maintaining iron balance. This highlights the need for targeted prevention and treatment strategies.

Conclusion

Hormonal factors play a critical role in regulating iron metabolism in women of reproductive age. Their influence on hepcidin, erythropoiesis, and iron absorption contributes to the high prevalence of anemia in this population.

A better understanding of these mechanisms can improve diagnostic approaches and enhance treatment effectiveness.

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SCIENCE VS FAITH: COMPETING IDEOLOGIES IN HYBRID IDENTITY FORMATION IN ZADIE SMITH'S WORKS

Abstract. *This article explores the ideological tension between science and faith as central forces shaping hybrid identity formation in the literary works of Zadie Smith. As a contemporary British writer, Smith frequently addresses multiculturalism, postcolonial experiences, and the fragmented identities of individuals living in pluralistic societies. The study examines how scientific rationalism and religious belief function as competing yet interrelated frameworks through which characters negotiate their sense of self. Drawing on selected novels such as White Teeth and NW, the article analyzes how characters embody hybrid identities that emerge at the intersection of empirical knowledge, secular modernity, and inherited religious traditions. The methodological approach combines literary analysis with cultural and sociological perspectives to reveal how ideological conflict influences personal and collective identity construction. The findings suggest that neither science nor faith is presented as a dominant or absolute truth; instead, Smith portrays identity as fluid, unstable, and continuously reshaped by ideological contradictions. The article contributes to contemporary debates on identity formation in globalized societies by highlighting the role of ideological plurality in shaping modern subjectivity. Ultimately, the study demonstrates that Zadie Smith's works reflect the complexity of hybrid identities formed through the ongoing negotiation between rational inquiry and spiritual belief.*

Keywords: *Science, faith, hybrid identity, ideology, multiculturalism, Zadie Smith*

Introduction

In the contemporary era of globalization, migration, and cultural hybridity, the question of identity formation has emerged as one of the most significant themes in literary and social studies. Rapid scientific advancement, technological progress, and secular modes of thinking increasingly coexist—and often collide—with religious belief systems and traditional worldviews. This ideological tension is particularly evident in multicultural societies, where individuals are compelled to navigate between competing epistemologies. Literature, as a reflective and critical medium, provides valuable insights into how such ideological conflicts shape modern subjectivity. In this regard, the works of British novelist Zadie Smith occupy a central position in discussions surrounding hybrid identity formation.

Zadie Smith's fiction is deeply rooted in the social realities of postcolonial Britain, where issues of race, religion, class, and ideology intersect. Her narratives

frequently portray characters who exist at the crossroads of science and faith, reason and belief, secular modernity and inherited tradition. These ideological oppositions do not function merely as background elements; rather, they actively influence characters' psychological development, moral choices, and sense of belonging. The tension between scientific rationalism and religious faith becomes a powerful lens through which hybrid identities are constructed, contested, and renegotiated.

Scientific ideology in Smith's works is often associated with empiricism, progress, and modern Western thought. It represents an attempt to explain the world through logic and evidence, frequently challenging metaphysical or spiritual explanations. In contrast, faith—particularly religious belief—embodies continuity, cultural memory, and moral authority. For many of Smith's characters, faith is inherited through family, community, or ethnic background, making it inseparable from personal and collective identity. The interaction between these ideologies generates internal conflict, uncertainty, and fragmentation, which are characteristic features of hybrid identity [1-3].

This article aims to examine how the ideological opposition between science and faith contributes to hybrid identity formation in Zadie Smith's works. By focusing on selected novels such as *White Teeth* and *NW*, the study seeks to analyze how characters negotiate ideological contradictions within multicultural environments. The relevance of this research lies in its interdisciplinary approach, combining literary analysis with sociological and cultural theory [4]. The article contributes to ongoing academic debates on identity, ideology, and multiculturalism by demonstrating that Smith's narratives reflect the complexity of contemporary identity formation shaped by ideological plurality rather than ideological dominance.

Literature Review

The reviewed literature provides a comprehensive theoretical and analytical framework for examining hybrid identity formation in the context of competing ideologies of science and faith in Zadie Smith's works. Giddens (1991) explores the interplay between modernity and self-identity, emphasizing how late-modern societies generate fluid and negotiated identities. His discussion of reflexive self-construction offers valuable insight into how individuals navigate conflicting social, cultural, and ideological influences, which aligns with Smith's depiction of characters negotiating between scientific rationalism and inherited religious belief (pp. 32–68).

Hall (1996) addresses the centrality of identity in contemporary cultural theory, arguing that identity is a dynamic construct shaped by social, historical, and cultural processes (pp. 1–17). This perspective supports the analysis of hybrid identities as socially situated phenomena, particularly within multicultural contexts represented in Smith's novels. Similarly, Asad (2003) provides an in-depth examination of secularism and the tension between religion and modernity (pp. 21–66), which directly informs the understanding of faith as both a stabilizing and constraining influence in hybrid identity formation.

Said (1994) situates culture within postcolonial power dynamics (pp. 12–43), offering essential perspectives for analyzing how multiculturalism and historical legacies shape identity construction. Berger (1999) contributes to the discourse on global religiosity and the desecularization process (pp. 1–18), highlighting how religious belief interacts with modern secular ideologies, an interaction central to the ideological conflicts in Smith's narratives.

Eagleton (2009) examines the philosophical and theological dialogue between reason and faith, providing a theoretical lens to interpret the epistemological tensions experienced by Smith's characters. Gilroy (2004) emphasizes postcolonial melancholia and convivial culture (pp. 98–134), which aids in understanding the emotional and cultural dimensions of hybrid identity in a multicultural society.

Jenkins (2014) provides a structured approach to social identity formation (pp. 25–57), offering analytical categories for evaluating individual versus collective identity dynamics, while Woodhead (2011) introduces a comparative framework for understanding religious concepts and practices, contributing to the examination of faith as a multidimensional influence (pp. 121–143). Finally, McLeod (2010) situates postcolonial identities within broader sociopolitical and historical contexts (pp. 141–170), reinforcing the argument that hybrid identities are products of intersecting ideological, cultural, and historical forces.

In sum, the literature collectively establishes that identity is fluid, contextually influenced, and shaped by competing ideologies. The integration of insights from modernity studies, postcolonial theory, cultural studies, and sociology provides a robust foundation for analyzing how science and faith operate as interacting forces in the construction of hybrid identities in Zadie Smith's literary corpus. These sources collectively justify the research focus on ideological negotiation and hybrid identity as central analytical categories.

Methodology

The methodological framework of this study is based on a qualitative literary analysis combined with cultural and ideological interpretation. The research adopts an interdisciplinary approach that integrates literary criticism, cultural studies, and sociological theory in order to explore the complex relationship between science, faith, and hybrid identity formation in Zadie Smith's works. This approach allows for a deeper understanding of how ideological systems operate within fictional narratives and influence character development.

The primary sources for this study include selected novels by Zadie Smith, with particular emphasis on *White Teeth* and *NW*. These texts were chosen due to their explicit engagement with multiculturalism, ideological conflict, and identity negotiation. Close textual analysis is employed to examine narrative structure, character representation, thematic development, and symbolic elements related to science and faith. Special attention is given to dialogues, internal monologues, and narrative descriptions that reveal characters' ideological struggles.

In addition to textual analysis, the study draws on theoretical concepts of hybrid identity as developed by scholars such as Homi K. Bhabha and Stuart Hall.

These theoretical frameworks help explain identity as a fluid and socially constructed phenomenon rather than a fixed or essential category. The concept of hybridity is used to interpret characters who embody multiple ideological, cultural, and religious influences simultaneously. Science and faith are analyzed as ideological constructs that shape individual consciousness and social positioning [5,6].

The research also applies ideological criticism to explore how power relations and dominant discourses are reflected in Smith's narratives. Scientific rationalism is examined as a discourse associated with modernity, secularism, and institutional authority, while faith is analyzed as a discourse linked to tradition, spirituality, and communal values. By comparing these ideological systems, the study highlights how neither is presented as absolute or universally valid within the texts.

Furthermore, contextual analysis is employed to situate Smith's works within the broader socio-cultural environment of contemporary Britain. Historical and social factors such as postcolonial migration, religious diversity, and scientific modernization are considered in order to understand the ideological tensions depicted in the novels. This methodological combination ensures a comprehensive and balanced interpretation of hybrid identity formation.

Overall, the methodology enables a systematic exploration of how science and faith function as competing yet interconnected ideologies in Zadie Smith's fiction, offering insights into the dynamic and negotiated nature of modern identity [7].

Table 1.
Science and faith as competing ideologies in hybrid identity formation
in Zadie Smith's works

Ideological Dimension	Science-Oriented Perspective	Faith-Oriented Perspective	Impact on Hybrid Identity
Epistemological Basis	Empirical knowledge, logic, rational inquiry	Belief, spirituality, religious doctrine	Creates internal tension between reason and belief
Cultural Association	Modernity, secularism, Western education	Tradition, cultural memory, communal values	Produces culturally layered identities
Representation in Characters	Scientific ambition, skepticism, progress-oriented thinking	Religious commitment, moral guidance, spiritual belonging	Leads to fragmented yet dynamic self-perception
Social Function	Promotes individualism and innovation	Reinforces collective identity and continuity	Encourages negotiation between autonomy and belonging
Narrative Outcome	Challenges traditional beliefs	Resists total secularization	Results in fluid and hybrid identity structures

The table illustrates the fundamental ideological opposition between science and faith as presented in Zadie Smith's literary works and demonstrates how this

opposition contributes to hybrid identity formation. The first dimension, the epistemological basis, highlights the contrast between empirical knowledge and belief-based understanding. In Smith's narratives, characters are often caught between these two modes of knowing, which generates psychological tension and uncertainty. This tension becomes a core element of hybrid identity, as individuals are unable to fully commit to a single ideological framework.

The cultural association dimension emphasizes how science and faith are embedded within broader social contexts. Science is frequently linked to modernity, secular education, and Western intellectual traditions, while faith represents inherited cultural memory and communal belonging. Smith's characters often embody both associations simultaneously, resulting in identities that are neither entirely modern nor entirely traditional.

Character representation further demonstrates that ideological conflict is personalized through individual experiences. Scientifically oriented characters display skepticism and ambition, whereas faith-oriented characters seek moral stability and spiritual meaning. The coexistence of these traits within single characters reflects the fragmented nature of hybrid identity.

The social function dimension reveals that science encourages individual autonomy, while faith emphasizes collective cohesion. This dual influence forces characters to continuously negotiate their position within society. Finally, the narrative outcome shows that Smith does not privilege one ideology over the other; instead, she portrays identity as fluid, shaped by ongoing ideological interaction. Thus, the table confirms that hybrid identity emerges as a negotiated and dynamic construct rather than a fixed category.

Results and Discussion

The results of this study demonstrate that the ideological opposition between science and faith plays a decisive role in shaping hybrid identities in Zadie Smith's literary works. Through close textual analysis of selected novels, particularly *White Teeth* and *NW*, it becomes evident that Smith consistently presents science and faith not as mutually exclusive systems but as competing ideological forces that coexist within individual characters. This coexistence produces identities that are fragmented, unstable, and continuously negotiated.

One of the most significant findings is that scientific rationalism in Smith's narratives is associated with modernity, progress, and intellectual authority. Characters influenced by scientific ideology often seek certainty through logic, empirical evidence, and education. However, the analysis reveals that science alone fails to provide emotional fulfillment or moral clarity. As shown in Table 1, science-oriented perspectives encourage individualism and autonomy but simultaneously create a sense of detachment from communal and cultural roots. This detachment contributes to identity insecurity, particularly among characters from migrant or postcolonial backgrounds [8].

In contrast, faith functions as a stabilizing yet restrictive force. Religious belief offers characters a sense of belonging, moral guidance, and continuity with ancestral traditions. The findings indicate that faith serves as an emotional anchor

in multicultural environments where cultural dislocation is common. Nevertheless, faith is also portrayed as a source of ideological limitation, especially when it conflicts with scientific reasoning or personal freedom. Smith does not idealize religious belief; instead, she exposes its potential to generate guilt, dogmatism, and resistance to change.

The discussion of hybrid identity formation reveals that characters rarely choose one ideology over the other. Instead, they exist within a constant state of ideological negotiation. This hybridity is reflected in their internal conflicts, social interactions, and life choices. As illustrated in the table, the impact of science and faith results in identities that are neither fully secular nor fully religious. The negotiation between autonomy and belonging becomes a defining feature of modern subjectivity in Smith's works.

Another important result is that ideological conflict is deeply contextual. The socio-cultural environment of contemporary Britain—marked by postcolonial migration, ethnic diversity, and scientific modernization—intensifies the tension between science and faith. Smith's narratives suggest that hybrid identity is not a personal anomaly but a structural condition produced by multicultural societies. This aligns with theoretical perspectives that view identity as socially constructed and historically situated.

The discussion further highlights that Smith avoids presenting ideological resolution. The absence of clear ideological dominance reinforces the idea that identity is fluid and dynamic. Science and faith remain in continuous dialogue, shaping characters' perceptions of self and society. This finding supports the argument that hybrid identity formation is an ongoing process rather than a final state.

In sum, the results confirm that Zadie Smith's works provide a nuanced representation of ideological plurality. The interaction between science and faith generates complex hybrid identities that reflect the realities of contemporary multicultural life. By portraying ideological conflict as productive rather than destructive, Smith's fiction contributes to a broader understanding of identity formation in a globalized world [9,10].

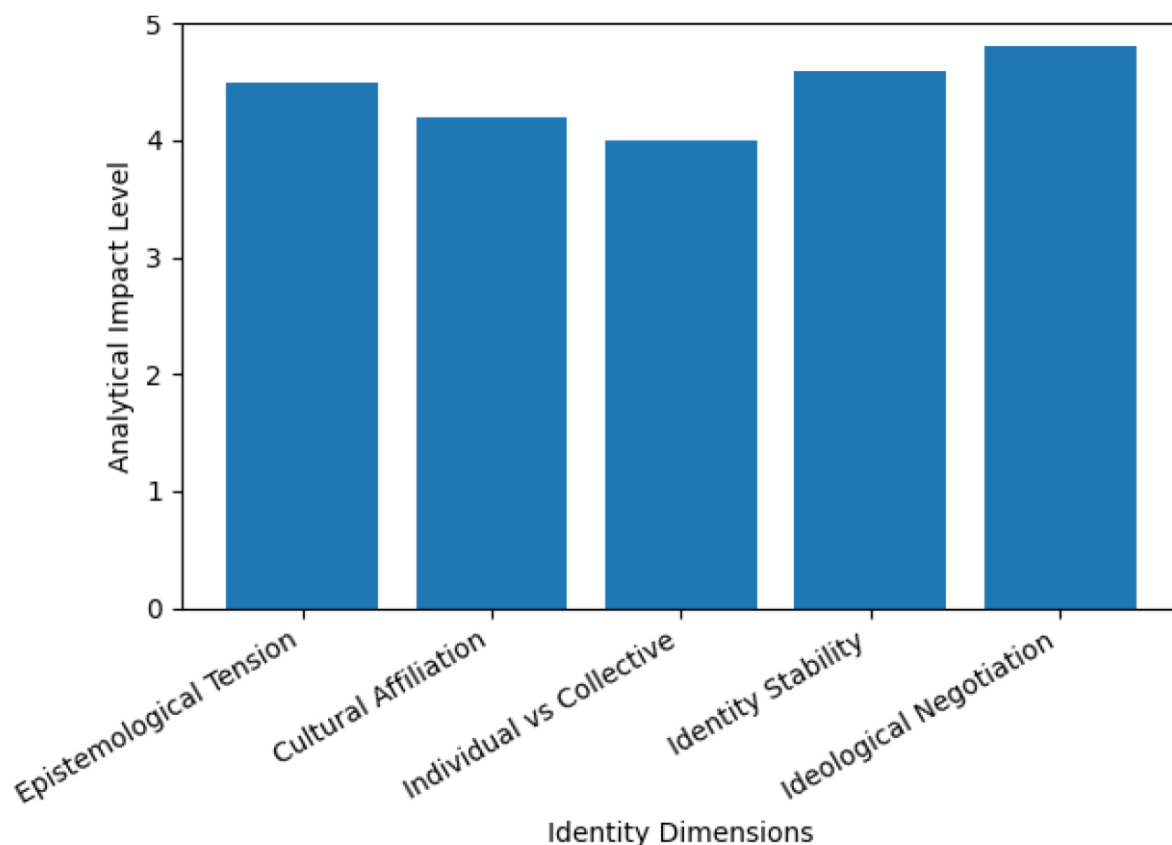


Figure-1. Impact of science–faith ideological tension on hybrid identity formation¹.

Figure 1 illustrates the analytical impact of the ideological tension between science and faith on key dimensions of hybrid identity formation in Zadie Smith's literary works. The diagram demonstrates that ideological negotiation has the highest impact level, indicating that characters are continuously engaged in reconciling rational scientific thought with inherited religious belief. This confirms the argument that hybrid identity is not static but formed through ongoing ideological interaction.

The high value associated with identity stability suggests that ideological conflict significantly affects characters' sense of self. Rather than achieving a fixed identity, individuals experience instability shaped by competing epistemological frameworks. Epistemological tension also shows a strong impact, reflecting the struggle between empirical reasoning and belief-based understanding.

Cultural affiliation occupies a central position, emphasizing that science and faith are deeply embedded in broader cultural and social contexts. The dimension of individual versus collective identity demonstrates how scientific ideology encourages autonomy, while faith reinforces communal belonging. The relatively balanced distribution of impact levels across dimensions highlights that no single factor dominates identity formation.

¹ Compiled by the author

Overall, the diagram visually supports the study's findings that science and faith function as equally influential yet competing ideologies. Their interaction produces complex hybrid identities that reflect the realities of multicultural and postcolonial societies depicted in Zadie Smith's fiction.

Conclusion

This study has examined the ideological opposition between science and faith as a central factor in hybrid identity formation in the literary works of Zadie Smith. The analysis demonstrates that these two ideological systems function not as mutually exclusive forces but as competing frameworks that continuously interact within multicultural and postcolonial contexts. Through close textual analysis, the research reveals that Zadie Smith portrays identity as a dynamic and negotiated process shaped by ideological plurality rather than ideological resolution.

The findings indicate that scientific rationalism in Smith's works is associated with modernity, secularism, and individual autonomy, while faith represents cultural memory, moral continuity, and communal belonging. Neither ideology is presented as absolute or entirely sufficient. Instead, their interaction generates internal conflict, instability, and self-reflection, which ultimately contribute to the formation of hybrid identities. Characters are shown to inhabit liminal spaces where rational inquiry and spiritual belief coexist, often in tension.

Moreover, the study confirms that hybrid identity formation is deeply influenced by socio-cultural conditions such as globalization, migration, and ideological diversity. Zadie Smith's narratives reflect the realities of contemporary British society, where individuals are required to negotiate multiple belief systems simultaneously. The absence of ideological dominance in her works underscores the fluid nature of identity and challenges essentialist interpretations of culture and belief.

In conclusion, this research contributes to literary and cultural studies by highlighting the productive role of ideological conflict in shaping modern subjectivity. By representing science and faith as equally influential yet contested forces, Zadie Smith's works offer a nuanced understanding of hybrid identity formation. The study suggests that future research may further explore interdisciplinary perspectives on ideology and identity across different cultural and literary contexts.

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IMPROVING THE STORAGE PROCESS OF BEETROOT ROOT CROPS (*BETA VULGARIS L.*)

Annotation. *Beetroot (*Beta vulgaris L.*) is an important root vegetable widely cultivated for its nutritional and industrial value. However, significant post-harvest losses occur due to improper storage conditions, leading to reduced quality and economic losses. This study aims to improve the storage process of beetroot root crops by analyzing optimal temperature, humidity, and ventilation conditions. The research evaluates traditional and modern storage methods, including controlled atmosphere storage and the use of natural preservatives. The results show that maintaining a temperature of 0–2°C and relative humidity of 90–95% significantly reduces weight loss, decay, and nutrient degradation. The implementation of improved storage technologies enhances shelf life and preserves the quality of beetroot.*

Keywords: *Beetroot, storage, post-harvest, temperature, humidity, shelf life*

Introduction

Beetroot is a valuable agricultural crop rich in vitamins, minerals, antioxidants, and bioactive compounds. It is widely used in food processing, medicine, and animal feed. Despite its importance, beetroot is highly susceptible to post-harvest losses caused by microbial spoilage, moisture loss, and physiological deterioration.

Improving storage conditions is essential to maintain quality, extend shelf life, and reduce economic losses. Traditional storage methods used in many regions often lack proper environmental control, leading to significant losses. Therefore, the development of improved storage technologies is a key issue in modern agriculture.

The objective of this study is to analyze factors affecting beetroot storage and propose effective methods for improving storage efficiency.

Materials and Methods

The study was conducted using freshly harvested beetroot roots collected from agricultural fields. The following parameters were evaluated:

- Storage temperature (0–2°C, 5–10°C, and ambient conditions)
- Relative humidity levels (70%, 85%, 90–95%)
- Storage methods:
- Traditional storage (cellars and pits)

- Refrigerated storage
- Controlled atmosphere storage
- Treatment methods:
 - No treatment (control)
 - Natural coatings (wax, plant extracts)
 - Antimicrobial treatments

Observations were recorded over a storage period of 90 days. The following indicators were measured:

- Weight loss (%)
- Decay rate (%)
- Firmness
- Nutritional quality (vitamin content)

Table 1.

Effect of Storage Conditions on Beetroot Quality

Storage Condition	Weight Loss (%)	Decay (%)	Shelf Life (days)
Ambient (20–25°C)	25–30	20–25	30
5–10°C	10–15	10–12	60
0–2°C + 90–95% RH	3–5	2–4	90+

Discussion

The results indicate that storage temperature and humidity significantly influence beetroot quality. Higher temperatures accelerate respiration and water loss, leading to rapid deterioration. In contrast, low temperatures (0–2°C) combined with high relative humidity (90–95%) effectively reduce moisture loss and maintain firmness.

Controlled atmosphere storage further improves storage efficiency by reducing oxygen levels and increasing carbon dioxide concentration, which slows down metabolic processes. Additionally, the use of natural coatings helps reduce water loss and microbial infection.

Traditional storage methods showed higher losses due to poor environmental control. However, improving ventilation and humidity management in these systems can partially enhance storage outcomes.

Conclusion

The study concludes that optimizing storage conditions significantly improves the shelf life and quality of beetroot root crops. The most effective storage conditions include low temperature (0–2°C) and high relative humidity (90–95%). The use of modern storage technologies and natural treatments further enhances storage efficiency.

Implementing these improved storage methods can reduce post-harvest losses, increase profitability, and ensure a stable supply of high-quality beetroot.

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RELEVANCE OF IMPLEMENTING VERTICAL FARMING SYSTEMS IN GREENHOUSES

Annotation. *The rapid growth of the global population, limited agricultural land resources, and increasing demand for food products require the introduction of innovative agricultural technologies. One of the most promising solutions is the implementation of vertical farming systems in greenhouses. Vertical farming allows crops to be grown in multiple stacked layers, significantly increasing productivity per unit area while efficiently utilizing available resources.*

This study examines the relevance and advantages of implementing vertical farming technologies in greenhouse production systems. Particular attention is given to the efficient use of space, water conservation, controlled environmental conditions, and the potential for year-round crop production.

Keywords: *vertical farming, greenhouse cultivation, protected agriculture, hydroponic systems, sustainable agriculture, crop productivity.*

Introduction

The growing global population and increasing demand for food have created significant challenges for modern agriculture. According to recent estimates, the world population is expected to exceed nine billion by 2050, which will require a substantial increase in food production. At the same time, agricultural land resources are becoming increasingly limited due to urbanization, soil degradation, and climate change. These factors highlight the necessity of developing innovative agricultural technologies capable of producing more food using fewer natural resources.

Greenhouse cultivation has become an important method for improving agricultural productivity and ensuring stable crop production throughout the year. Protected cultivation systems allow farmers to control environmental conditions such as temperature, humidity, and light, which are essential for optimal plant growth. However, traditional greenhouse systems often rely on horizontal production methods that may not fully utilize the available space.

Vertical farming is considered one of the most promising technological innovations in modern agriculture. This system involves growing crops in vertically stacked layers or structures, allowing farmers to significantly increase production per unit area. Vertical farming systems are often integrated with advanced technologies such as hydroponics, aeroponics, LED lighting, and

automated climate control systems, which improve resource efficiency and crop productivity.

Materials and Methods

The research was conducted to evaluate the relevance and practical possibilities of implementing vertical farming systems in greenhouse conditions. The study was carried out in protected cultivation facilities designed for vegetable production. The experimental greenhouse was equipped with multi-tier vertical structures that allow crops to be grown in several layers in order to maximize the use of available space.

Leafy vegetable crops commonly cultivated in greenhouse systems, such as lettuce, spinach, and basil, were selected as the main experimental plants. These crops were chosen because of their short growth cycle, high market demand, and suitability for vertical farming technology. The plants were grown using a hydroponic cultivation system in which nutrient solutions were supplied directly to the plant roots.

The vertical farming system consisted of several stacked layers arranged on metal or plastic racks. Each layer was equipped with planting trays and irrigation lines to deliver nutrient solutions evenly to the plants. Artificial LED lighting was installed above each layer to ensure adequate light for plant growth when natural light was insufficient.

Environmental conditions inside the greenhouse were controlled to maintain optimal plant growth. The average temperature was maintained between 20–25 °C, while the relative humidity ranged from 70–85%. Ventilation systems were used to regulate air circulation and maintain appropriate carbon dioxide levels.

The nutrient solution used in the hydroponic system contained essential macro- and micronutrients required for plant development. Irrigation and nutrient supply were regulated using a controlled drip or circulation system to ensure efficient water and nutrient use.

Data collection during the experiment included plant growth parameters such as plant height, number of leaves, biomass accumulation, and total yield per square meter. The obtained results were analyzed to evaluate the efficiency and productivity of the vertical farming system compared with conventional greenhouse cultivation methods.

Table 1

Main environmental parameters for vertical farming systems in greenhouse conditions

Parameter	Optimal range	Description
Temperature	20–25 °C	Maintains optimal physiological processes and plant growth in vertical systems.
Relative humidity	70–85 %	Supports proper transpiration and prevents plant stress.
Light intensity	200–400 $\mu\text{mol}/\text{m}^2/\text{s}$	Provided by natural sunlight and LED lighting to ensure sufficient photosynthesis.
Photoperiod	14–16 hours	Extended lighting period improves plant growth and productivity.
Nutrient solution pH	5.5–6.5	Ensures optimal nutrient availability in hydroponic systems.
Electrical conductivity (EC)	1.5–2.5 mS/cm	Indicates nutrient concentration required for leafy vegetables.
Plant density	20–30 plants/ m^2	Efficient use of vertical space increases productivity per unit area.

Discussion

The results of the study confirm that implementing vertical farming systems in greenhouses significantly improves space utilization, resource efficiency, and crop productivity compared to traditional horizontal cultivation methods. By stacking multiple layers of crops, farmers can multiply the yield per square meter, which is particularly important in regions with limited arable land or high population density.

Hydroponic systems in vertical farming allow precise control over nutrient delivery, ensuring that each plant receives the necessary macro- and micronutrients for optimal growth. This results in faster growth cycles, higher biomass accumulation, and improved overall plant quality. Moreover, hydroponic systems reduce water usage by up to 70–80% compared with conventional soil-based methods, which is crucial in areas facing water scarcity.

The controlled environmental conditions in vertical farming systems, including temperature, humidity, and artificial lighting, allow year-round production of vegetables and herbs. This stability reduces the risk of crop losses due to adverse weather conditions or seasonal fluctuations, contributing to food security and consistent supply to local markets.

Conclusion

The implementation of vertical farming systems in greenhouse environments offers a highly effective solution for increasing crop productivity and optimizing resource use. By utilizing vertically stacked layers, controlled hydroponic systems, and artificial lighting, farmers can produce significantly higher yields per unit area compared to traditional horizontal cultivation methods.

Vertical farming provides precise control over temperature, humidity, and nutrient delivery, which accelerates plant growth, improves biomass accumulation,

and enhances the overall quality of produce. In addition, it reduces water consumption, minimizes pesticide use, and allows year-round production, contributing to sustainable and resilient agricultural practices.

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CULTIVATION TECHNOLOGY OF CHAMPIGNON MUSHROOMS IN PROTECTED AREAS

Annotation. *The cultivation of mushrooms has become one of the promising areas of modern agriculture due to their high nutritional value and economic efficiency. Champignon mushrooms are widely cultivated in many countries of the world because of their high demand and relatively simple cultivation technology. This article examines the technological aspects of growing champignon mushrooms in protected environments such as greenhouses, special mushroom houses, and controlled indoor facilities. Particular attention is paid to substrate preparation, composting technology, environmental conditions, and factors influencing yield. The results show that maintaining optimal temperature, humidity, and proper substrate composition significantly improves productivity and product quality.*

Keywords: *champignon mushroom, protected cultivation, compost, substrate, mushroom production, environmental control.*

Introduction

Mushrooms are considered an important food product due to their high content of proteins, vitamins, minerals, and biologically active compounds. They play a significant role in human nutrition and are often used as a dietary food. Among cultivated mushrooms, the champignon mushroom is one of the most widely produced species worldwide.

Champignon mushrooms belong to the species *Agaricus bisporus*, which adapts well to artificial cultivation conditions. The cultivation of this mushroom has gained popularity because it does not require large land areas and can be grown year-round in controlled environments.

Protected cultivation allows farmers to regulate environmental factors such as temperature, humidity, and air circulation. These factors are essential for successful mushroom growth and high yield. The use of modern technologies in mushroom cultivation contributes to improved productivity and product quality.

The aim of this study is to analyze the technological aspects of cultivating champignon mushrooms in protected environments and to determine the optimal conditions for achieving high yields.

Materials and Methods

The study was conducted to evaluate the cultivation technology of champignon mushrooms in protected growing facilities. Experiments were carried out in controlled indoor environments designed for mushroom production.

The main material used for mushroom cultivation was compost prepared from organic components. The substrate composition included:

- wheat straw
- horse or cattle manure
- mineral additives such as gypsum and lime

The compost preparation process lasted approximately 20–25 days. During composting, microbial activity decomposes organic materials and creates a nutrient-rich medium suitable for mushroom growth.

After the compost was fully prepared, mushroom spawn (mycelium) was introduced into the substrate. The inoculated compost was placed in growing containers or shelves within the cultivation room.

The following environmental conditions were maintained during the mycelium development stage:

- temperature: 22–25 °C
- relative humidity: 80–90%
- proper ventilation and air exchange

After the mycelium colonized the substrate, a casing layer consisting of peat and soil mixture was applied. During the fruiting stage, the temperature was reduced to 16–18 °C to stimulate mushroom formation.

Results

The results of the study indicate that the success of champignon cultivation largely depends on substrate quality and environmental management. Proper compost preparation ensures sufficient nutrients for mycelium growth and development.

During the vegetative growth phase, higher temperatures promote rapid mycelial colonization of the substrate. However, for fruit body formation, a slightly lower temperature is required. Maintaining high humidity levels is also important because mushroom fruiting bodies contain a large amount of water.

Table 1.

Optimal environmental conditions for champignon mushroom cultivation in protected environments

Growth stage	Temperature (°C)	Relative humidity (%)	CO ₂ level	Duration (days)	Description
Compost preparation	60–70	70–75	High	20–25	Organic materials decompose and form a nutrient-rich compost suitable for mushroom growth
Mycelium colonization (spawn run)	22–25	85–90	High	12–16	Mycelium spreads through the compost and fully colonizes the substrate
Casing layer stage	20–22	85–90	Moderate	5–7	A casing layer is applied to stimulate mushroom formation
Fruiting stage	16–18	80–90	Low	20–30	

Ventilation plays a critical role in removing excess carbon dioxide produced during mushroom growth. Insufficient air exchange may negatively affect mushroom development and reduce yield.

The main advantages of cultivating champignon mushrooms in protected environments include:

- year-round production, efficient use of limited space, stable and high yields improved product quality

Under optimal conditions, it is possible to obtain approximately 20–25 kg of mushrooms per square meter of cultivation area.

These results confirm that controlled environmental conditions significantly enhance productivity in mushroom cultivation systems.

Conclusion

The cultivation of champignon mushrooms in protected environments is an efficient and profitable agricultural practice. Proper substrate preparation, optimal temperature and humidity control, and adequate ventilation are key factors for successful mushroom production.

The application of modern cultivation technologies and improved management practices can significantly increase mushroom yield and quality. Future research should focus on improving substrate formulations, introducing high-yielding mushroom strains, and implementing automated environmental control systems.

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YOSHLAR O'RTASIDA MUTOLAA MADANIYATINI RIVOJLANTIRISHGA ALOHIDA E'TIBOR

Annotatsiya: *Maqolada insonni ma'naviyatga yetaklovchi bilim manbai bo'lgan kitob to'g'risida fikr eritiladi hamda yurtimizda kitobxonlikni rivojlantirish borasida olib borilayotgan islohotlar va amalga oshirilayotgan ishlar to'g'risida so'z boradi.*

Kalit so'zlar: *Kitob, kitobxonlik, mutolaa, adabiy muhit, ta'lim, tarbiya, ma'naviy ehtiyoj, intellektual bozor.*

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SPECIAL ATTENTION TO THE DEVELOPMENT OF READING CULTURE AMONG YOUTH.

Abstract: *The article discusses the idea of a book as a source of knowledge that leads a person to spirituality, and discusses the reforms and work being carried out to develop reading in our country.*

Keywords: *Book, reading, reading, literary environment, education, upbringing, spiritual need, intellectual market.*

Kitob — aql qal'asidir. Kitob — xazina, u cheksiz bilim manbai. Insonning hayotda undan yaqin hamrohi, do'sti, maslahatchisi yo'q. Negaki, u aqlni peshlovchi qayroqdir. Kitobsiz dunyo hidsiz gulga o'xshaydi.

Kitob – umr yo'llarini yorituvchi so'nmas nur, inson hayotiga mazmun baxsh etuvchi saodat manbai, unga har qanday vaziyatda ham hamroh bo'luvchi sodiq do'st. Insonning ma'naviy kamolotini ta'minlashda kitob singari kuchli qudratga ega vosita yo'q. Shu bois azal-azaldan ma'rifat peshvolari, ahli donishlar butun insoniyatni kitob o'qishga, undan ilmu odob sirlarini o'rganishga chorlab kelishgan.

Kitobxonlik — ma'naviy ehtiyoj. Kitobxonlik oiladagi muhitga ham bog'liq. Ma'rifatli oilalarda kitobga e'tibor farzandlar tarbiyasida qo'l keladi. Farzandini kitobga qiziqitirmagan, o'qishga o'rgatmagan ota-ona, aslida, uni savodsiz qilib tarbiyalagan bo'ladi.

Darhaqiqat, kitob insonni yerdan ko'kka ko'taruvchi, uning ma'naviy quvvatini oshiruvchi buyuk kuchdir. U insoniyatning tarixiy xotirasi, ma'naviy-

ma'rifiy olami, ilmiy zaminini mustahkamlovchi, kelajakni yorqin ko'rsatib borishga qodir mash'ala hisoblanadi.

Bugun jamiyatimizda kitobxonlikni rivojlantirish, ayniqsa, yoshlar o'rtasida mutolaa madaniyatini rivojlantirishga davlat tomonidan alohida e'tibor berilib, ko'plab samarali ishlar amalga oshirilmoqda. Jumladan, Prezidentimizning 2017 yil 12 yanvardagi «Kitob mahsulotlarini chop etish va tarqatish tizimini rivojlantirish, kitob mutolaasi va kitobxonlik madaniyatini oshirish hamda targ'ibot qilish bo'yicha komissiya tuzish to'g'risida»gi farmoyishi, 2017 yil 13 sentabrdagi «Kitob mahsulotlarini nashr etish va tarqatish tizimini rivojlantirish, kitob mutolaasi va kitobxonlik madaniyatini oshirish hamda targ'ib qilish bo'yicha kompleks chora-tadbirlar dasturi to'g'risida»gi va 2018 yil 12 maydagi «Buyuk allomalar, adib va mutafakkirlarimiz ijodiy merosini keng o'rganish va targ'ib qilish maqsadida yoshlar o'rtasida kitobxonlik tanlovlarini tashkil etish to'g'risida»gi qarorlari asosida mamlakatimizda kitobxonlik madaniyatini rivojlantirishga qaratilgan bir qator tashkiliy-amaliy chora-tadbirlar amalga oshirilishi jamiyatda kitobga bo'lgan munosabatning ijobiy tomonga o'zgarishiga zamin yaratdi.

Xususan, oliy ta'lim tizimida kitobxonlik madaniyatini rivojlantirish borasidagi ishlar vazirlik rahbariyatining doimiy e'tiborida bo'lib kelayotganini ta'kidlab o'tish joiz. «Kitob tafakkur qanotidir», degan edi alloma adibimiz Oybek. Kitob o'qigan inson, qaysi sohada ishlamasin, to'g'ri fikrlash, oqu qorani ajratish, murakkab vaziyatlarda oqilona qaror qabul qilish ko'nikmasiga ega bo'ladi. Bundan tashqari, nutqi ravon bo'ladi, odamlarni o'z ortidan ergashtira oladi. Mutolaaga qiziqish susayishi, o'z navbatida, aholi savodxonligi darajasiga salbiy ta'sir ko'rsatib, jamiyat va davlatning barqaror rivojlanishi uchun katta tahdidlardan sanaladi. Chunonchi, taraqqiy etgan davlatlarda bu muammoning yechimini hal etish bo'yicha bir qator aniq chora-tadbirlar belgilanmoqda. Bunda asosan kitobni sevish, fuqarolar o'rtasida mutolaa madaniyatini manzilli qo'llab-quvvatlash hamda rivojlantirish, noshirlik faoliyatini takomillashtirish, jamiyatning intellektual, ma'naviy va madaniy ehtiyojlariga to'liq javob beradigan kitob bozorini shakllantirishga alohida e'tibor qaratilmoqda.

Binobarin, mamlakatimizda ham yoshlar o'rtasida kitob mutolaasini targ'ib etish, ularga qiziqtirish, oshno qilib tarbiyalash borasida bir qator amaliy tadbirlar qilinmoqda. Prezidentimizning 2017 yil 13 sentabrdagi «Kitob mahsulotlarini nashr etish va tarqatish tizimini rivojlantirish, kitob mutolaasi va kitobxonlik madaniyatini oshirish hamda targ'ib qilish bo'yicha kompleks chora-tadbirlar dasturi to'g'risida»gi Qarori bu borada yuzaga kelgan muammolarni kompleks hal qilishga qaratilgani bilan ahamiyatlidir. Mazkur Qaror kitob, kitobxonlik madaniyatining jamiyat ma'naviy hayotidagi o'rni va rolini yangi bosqichga ko'targanligi bilan izohlanadi. Kitobxonlikni ommalashtirish maqsadida keng aholi qatlamini kitob mutolaasiga jalb qilish, ularni kitob bilan ta'minlash, ommaviy tadbirlarni tashkil etish bo'yicha aniq ishlar olib borilmoqda.

Butun mamlakat bo'ylab kitob mutolaasiga rag'batni oshirish, kitobxonlar safini yanada kengaytirish uchun yana qanday ishlar amalga oshirilishi kerak? Nima qilinsa yoshlar, bolalar kitob o'qishga jon-jahdi bilan intiladi?

Buning uchun nimalarni amalga oshirish lozim:

Birinchi navbatga kitobga olib boradigan yo'llar yaqin va oson bo'lishi kerak. Ta'lim muassasalarida kutubxonalar iloji boricha barchaning e'tibori tushadigan va o'quvchi hamda talabalarga yaqin joyda bo'lishi lozim.

Ikkinchidan, kutubxona xodimlariga nisbatan, kutubxonachilarning esa o'z ishiga nisbatan munosabatini o'zgartirish kerak. Bolaning emas, komissiyaning ko'nglini olish, ularga yomon ko'rinmaslikka ko'proq e'tibor qaratmasdan, bor e'tiborini bolalarga qaratishi lozim. Kutubxonachi o'z zimmasiga yuklatilgan tashkiliy ishlardan ortib kitob ham o'qishi, mutolaani jondan sevishi kerak.

Uchinchidan, bola mansub bo'lgan jamiyat, muhit kitob o'qishga moyil bo'lishi ham muhim. Kitob o'qiladigan xonadonlarda mutolaaga mehr qo'ygan bolalar kamolga yetadi. Albatta, bu mutlaq haqiqat emas. Kitobi yo'q uylarda ham kitobxonlar bor. Ammo hamma joyda, har doim ham emas. Aksariyat oilalarda vaziyat taxminan quyidagicha: ona kuni bo'yicha uy-ro'zg'or ishlari bilan band, ozgina bo'sh vaqt topdi deguncha qo'shni ayollar bilan hasratlashishga oshiqadi. Televizor, serial ko'rish, to'y-ma'rakalarda qatnashish va boshqalarga ajratilgan vaqt kitob o'qishga yetmaydi. Ota esa kuni bo'yi ishda bo'lib, kechqurun kelib ovqatlanadiyu, bir oz televizor ko'rgandek bo'lib, so'ngra uxlashga kirib ketadi. O'qilgan kitoblarni muhokama qilish, qanday kitoblarni o'qish bo'yicha maslahatlar berish, afsuski, oilalarda juda kam uchraydigan holat. Ommaviy ravishda: xiyobonlarda, transport vositalari, kutish zallari, bekatlar, shifoxonalarda kitob o'qilishi haqida gapirmasak ham bo'ladi. Qaniydi bunday joylarda shundoqqina qo'l uzatsang yetadigan yerda kitoblar tursayu, bo'sh vaqtingda mutolaaga berilsang. Bu so'zlar aslo shaxsiy tasavvurim mahsuli emas. Ko'plab mamlakatlarda shu kabi ijtimoiy loyihalar yo'lga qo'yilganki, odamlar o'qib bo'lgan kitoblarini hamma uchun ochiq va bepul bo'lgan maxsus javonlarga keltirib qo'yadi. U yerdagi istagan asarini olib ketishi mumkin. Marhum adibimiz Asqad Muxtor aytganidek, kitob – boylik, sotib olingani emas, balki o'qilgani. Masalaga mana shu nuqtadan qarasak, bu bebaho boylikni hamma bilan bo'lishish mumkin.

Bolalarni kitobga qiziqtirishda kattalarning xabardorligi ham muhim ahamiyatga ega. Bu haqda yuqorida kutubxonachilar misolida mushohada yuritgandek bo'ldik. Biroq pedagoglardan tashqari ota-onalar ham bolaga qanday kitob olib berishni bilishi kerak. Shundan kelib chiqqan holda aytish mumkinki, ota-onalar majlislarida faqat moliyaviy masalalar emas, kitobxonlikni targ'ib qilish, sinflar kesimida bolalar yoshiga mos asarlar ro'yxati tuzilib, ota-onalarga tarqatilsa bo'ladi. Shu bilan birga, bolalarni kitob o'qishga qiziqtirish va bu qiziqishlarni to'g'ri va samarali qondirish bo'yicha ham maslahat, tavsiyalar berilishi maqsadga muvofiq.

Kitobxonlikni targ'ib qilishda yangi nashr qilingan asarlar reklamasini keng yo'lga qo'yish, mutolaani ommalashtirish bo'yicha ijtimoiy loyihalarni amalga

oshirish ham katta ahamiyat kasb etadi. Qishloq va mahallalarda kitobxonlar klublarini tashkil etishni rag‘batlantirish, bolalar uchun kitob kechalari, o‘qilgan asarlar muhokamalari, sovrinli tanlovlarni tashkil etish, yozda salqin, qishda issiq, qulay mebellarga ega tinch va osuda o‘quv zallari, kitoblarni ijaraga berish, qarzga yoki pulini bo‘lib-bo‘lib to‘lash mexanizmlarini ishlab chiqish va amalga tatbiq etish, olis tumanlar, uzoq qishloqlarda kerakli kitoblarga buyurtmalar berish shoxobchalarini barpo etish ham mumkin.

Adabiyotlar:

1. O‘zbekiston Respublikasi Prezidentining 2017 yil 12 yanvardagi «Kitob mahsulotlarini chop etish va tarqatish tizimini rivojlantirish, kitob mutolaasi va kitobxonlik madaniyatini oshirish hamda targ‘ibot qilish bo‘yicha komissiya tuzish to‘g‘risida»gi farmoyishi.
2. O‘zbekiston Respublikasi Prezidentining 2017 yil 13 sentabrdagi «Kitob mahsulotlarini nashr etish va tarqatish tizimini rivojlantirish, kitob mutolaasi va kitobxonlik madaniyatini oshirish hamda targ‘ib qilish bo‘yicha kompleks chora-tadbirlar dasturi to‘g‘risida» qarori
3. O‘zbekiston Respublikasi Prezidentining 2018 yil 12 maydagi «Buyuk allomalar, adib va mutafakkirlarimiz ijodiy merosini keng o‘rganish va targ‘ib qilish maqsadida yoshlar o‘rtasida kitobxonlik tanlovlarini tashkil etish to‘g‘risida»gi qarorlari.
4. O‘zbekiston Respublikasi Vazirlar Mahkamasining 2020 Yil 14 dekabrdagi “2020-2025 yillarda kitobxonlik madaniyatini rivojlantirish va qo‘llab-quvvatlash Milliy Dasturini tasdiqlash to‘g‘risida”gi Qarori.

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ANTROPOGEN QURG'OQCHILIKNI O'RGANISH, OLDINI OLISH VA MONITORINGINI YURITISHNING AHAMIYATI

Annotatsiya. *Ushbu maqola Xorazm viloyatida inson omili ta'sirida yuzaga kelgan qurg'oqchilikni tahlil qilishga qaratilgan markazlar, institutlar va tadqiqotlarning qisqacha sharxiga asoslangan. Hududning tabiiy-geografik sharoiti va ijtimoiy-iqtisodiy holatidan kelib chiqib, qanday metodlar orqali maskur tadqiqot ishini yuritish muhokma qilinadi. Xorazm viloyatiga o'xshash hududlarda olib borilgan tadqiqotlar o'rganilib, undagi metodlarni maskur tadqiqotda qo'llash qanchalik samarador ekanligi tahlil qilindi.*

Kalit so'zlar: *antropogen qurg'oqchilik, SPI, SPEI, SDI, SSI, ADI, NDWI, NDVI, LST.*

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THE IMPORTANCE OF STUDYING, PREVENTING, AND CONDUCTING MONITORING OF ANTHROPOGENIC DROUGHT

Abstract. *This article is based on a brief review of centers, institutes, and studies aimed at analyzing drought caused by anthropogenic factors in the Khorezm region. Based on the natural-geographical conditions and socio-economic situation of the region, the methods for conducting this research are discussed. Studies conducted in regions similar to the Khorezm region are examined, and the effectiveness of applying their methods in this research is analyzed.*

Keywords: *anthropogenic drought, SPI, SPEI, SDI, SSI, ADI, NDWI, NDVI, LST.*

Kirish

So'nggi yillarda iqlim o'zgarishi, suv resurslaridan noto'g'ri foydalanish hamda qishloq xo'jaligi faoliyatining intensivlashuvi natijasida antropogen qurg'oqchilik muammosi dunyoning ko'plab hududlarida dolzarb masalalardan biriga aylanib bormoqda. Ayniqsa, sug'orma dehqonchilikka asoslangan hududlarda suv resurslarining notekis taqsimlanishi, ortiqcha suv sarfi hamda ekin turlarini noto'g'ri joylashtirish qurg'oqchilik jarayonlarining kuchayishiga sabab bo'lmoqda.

Markaziy Osiyo, xususan O'zbekistonning Quyi Amudaryo havzasida joylashgan Xorazm viloyati ushbu jarayonlarga nisbatan sezgir hududlardan biri hisoblanadi. Hududda sug'orish tizimining Amudaryo suvlariga yuqori darajada bog'liqligi, suv taqsimotidagi nomutanosiblik hamda ayrim suvga talabchan ekinlarning haddan tashqari ko'p maydonlarda yetishtirilishi antropogen qurg'oqchilik xavfini oshirmoqda. Bu esa ushbu mavzuning naqadar dolzarbligini ko'rsatadi.

Asosiy qism

Bugungi kunda, ushbu masala bo'yicha dunyoda ko'plab ilmiy tadqiqot markazlari tadqiqotlar olib bormoqdalar. Jumladan, Ispaniyaning Malaga universiteti Hidrogeologiya markazi, AQShning Kaliforniya universiteti Suv resurslari va atrof-muhit tadqiqotlari markazi, Niderlandiyaning Wageningen universiteti Suv resurslari va iqlim o'zgarishi tadqiqot markazilar bularga misol bo'la oladi.

Respublikamizda ushbu masalalarni o'rganuvchi alohida imliy-tadqiqot markazlar mavjud emas. Qurg'oqchilik, boshqa bir qator ekologik maummolar qatorida Ekologiya, atrof-muhitni muhofaza qilish va iqlim o'zgarish hamda O'zbekiston Respublikasi Qishloq xo'jaligi vazirligining tegishli bo'limlarida maxsus dasturlar asosida o'rganiladi. Qurg'oqchilikning hududiy jiddiylik darajasidan kelib chiqqan holda, oliy ta'lim muassasalari va ayrim markazlarda tadqiqotchilar tomonidan mavzuga oid zamonaviy usullar qo'llanilgan izlanishlar olib boriladi hamda ularning xulosalari tegishli tartibda tizimdagi ma'sul vazirliklarga taqdim qilinadi.

M. Matchanov va boshqalar (2025)ning tadqiqotlarida O'zbekistonning Xorazm vohasiga tegishli hududida qurg'oqchilik xavfsizligi darajalari geofazoviy usullar yordamida baholashgan. Izlanishlar natijasida daryo va kanallardan uzoqlik holati qurg'oqchilik darajasiga ta'sir ko'rsatuvchi eng asosiy omili deb ko'rsatilgan. Ushbu natijalarni olishda tadqiqotchilar LST, NDMI, NDVI, albedo, yer osti suvlarining sathi, relef balandligi, kanallar zichligi va Admudaryoga nisbatan masofani sun'iy yo'ldosh tasvirlari hamda dala tadqiqotlarida olingan ma'lumotlar, hududga mos ahamiyatlilik qiymatlarini bergan tarzda GIS Weighted Overlay usuli orqali olganlar.

A.I. Turenliyazova va boshqalar (2025) ilmiy tadqiqotida Orol dengizi hududida 2000-2023 yillardagi qurg'oqchilik ta'siri va yer qoplamini o'zgarishlari o'rganilgan. Natijada NDVI orqali vegetatsiya kamayishi, SPI orqali yog'ingarchilik indeksleri hisoblangan va cho'llanish jarayonlari kuchaygani aniqlangan hamda qurg'oqchilikning trend ko'rsatkichi ishlab chiqilgan. Ushbu natijalarni tayyorlashda Landsat 5-TM, 8 OLI/TIRS sun'iy yo'ldosh tasvirlari qo'llanilgan.

Xalqaro miqyosda Che-You Liu va boshqalar (2025) o'z tadqiqotida Shimoliy Tayvandagi Shihmen suv ombori havzasida inson faoliyati va suv resurslarini boshqarish qarorlari oqibatida yuzaga keladigan antropogen qurg'oqchilik jarayonlari socio-hydrological model yordamida o'rganilganlar. Tadqiqotda qurg'oqchilik faqat iqlim omillari emas, balki suv iste'moli, suv ombori boshqaruvi va iqtisodiy faoliyat kabi inson omillari sabab ham yuzaga kelishi aniqlangan. Ushbu tadqiqot natijasida antropogen qurg'oqchilikni aniqlash va uning davomiyligi, intensivligi hamda zarar darajasini baholash uchun RFD-CWDI metodiga asoslangan yangi baholash modeli ishlab chiqilgan. Natijalarni olishda 1970–2010 yillardagi yog'in, daryo oqimi, suv ombori zaxirasi, suv iste'moli, evapotranspiratsiya va suv boshqaruvi ma'lumotlari hamda gidrologik modellashtirish natijalaridan foydalanilgan. Ushbu tadqiqotda GIS texnologiyalari qatnashmagan, hisoblash ishlari meteorologik stansiyalardan olingan oddiy suv iste'moli, talabi va mavjud suv miqdori ma'lumotlari qo'llanilgan.

J.L. Ahmadi va boshqalar (2025) o'z tadqiqoti davomida Urmiya ko'li havzasining g'arbiy qismida inson faoliyati ta'sirida yuzaga keladigan antropogen qurg'oqchilik xavfini meteorologik va gidrologik qurg'oqchilik indeksleri orqali baholash usulini o'rganishgan. Tadqiqotda oxirgi 20 yil ichida gidrologik qurg'oqchilik kuchaygani va bu holat asosan suv resurslarini ortiqcha ishlatish hamda suv omborlari qurilishi kabi inson faoliyati bilan bog'liq ekani aniqlangan. Natijada esa antropogen qurg'oqchilikni baholash uchun Anthropogenic Drought Index (ADI) ishlab chiqilgan va ADI qiymatlari orqali hududlarda qurg'oqchilik xavfi darajalari aniqlangan. Ushbu natijalarni olishda 1983–2022 yillardagi 20 ta stansiyadan olingan yog'in, harorat va daryo oqimi ma'lumotlari hamda ijtimoiy-iqtisodiy va fizik omillar (aholi zichligi, qishloq xo'jaligi bandligi, yer foydalanishi va suv sig'imi) ishlatilgan.

G. Singh va boshqalar (2025) tadqiqotida qishloq xo'jaligi yerlarini qurg'oqchilik bilan zararlanishini baholaganlar. Ishda hotspot usuli orqali ekin

hududlarini yomonlashgani turli darajalarda klassifikatsiya qilib o'rganilgan. Unda tuproqning har kunlik namlik darajasini dala kuzatuvlari asosida o'lchab borilgan, aniqlangan natijalarni birlashtirib xaritalar tuzilgan. Xorazm viloyatida antqopogen qurg'oqchilikni o'rganishda ushbu indikatorendan foydalanish samarali bo'lishi mumkin va buning uchun NDMI, SMI indekslarida foydalanish maqsadga muvofiq.

S.Ragettli va boshqalar (2025)ning tadqiqotida irrigatsiya vohalarida qishloq xo'jaligi suv sarfi va suv samaradorligi o'rganilgan. Ushbu tadqiqot natijasida irrigatsiya tizimida suvdan foydalanish samaradorligi past hududlar aniqlangan hamda suv sarfi va evapotranspiratsiya xaritalari ishlab chiqilgan. Natijalarni olishda masofadan zondlash evapotranspiration modellari va meteorologik ma'lumotlardan foydalanilgan. Bu ishda ham asosiy e'tibor yog'ingarchilikka qaratilgan.

AJAST Research bergan hisobotida (2025) Orol dengizi hududida qurg'oqchilikning ekologik ta'siri o'rganilganli ta'kidlangan. Natijada vegetatsiya qoplami kamayishi va yer qoplami o'zgarishi aniqlangan hamda hududdagi ekologik o'zgarishlar xaritalangan. Ushbu hisobotni olishda esa Landsat 8 OLI/TIRS tasvirlari va GIS tahlili ishlatilgan.

W.Han va boshqalar (2024) o'zlarining izlanishlarida Markaziy Osiyoda vegetatsiya qurg'oqchiligi va tiklanish jarayonlari o'rganilgan. Natijada qurg'oqchilikdan keyin vegetatsiyaning tiklanish tezligi iqlim va irrigatsiya sharoitiga bog'liq ekani yaqqol namoyon bo'lgan va vegetatsiya o'zgarish dinamikasi aniqlangan. Ushbu izlanishlar uchun MODIS NDVI vaqt qatori ma'lumotlaridan foydalanilgan.

Future Water (2024) ishlab chiqqan hisobotida Amudaryo havzasida iqlim xavfi va qurg'oqchilik xavf zonallari o'rganilgan. Natijada suv resursllari iqlim o'zgarishiga juda sezgir ekani aniqlangan hamda iqlim xavfi va qurg'oqchilik xavfi xaritalari ishlab chiqilgan. Ushbu hisobotni tayyorlashda GIS tahlili va iqlim modeli ma'lumotlaridan foydalanilgan. Ushbu hisobot natijalari va xulosalarini Xorazm viloyati misolida qo'llash samarali bo'lishi mumkin.

A. Das va boshqalar (2023) o'z tadqiqotida NDVI, NDMI, NDWI va LST indeksllari yordamida qurg'oqchilik monitoringi o'rgangan. Tadqiqot natijasida esa vegetatsiya indeksllari pasayishi va yer yuzasi harorati oshishi qurg'oqchilikning asosiy belgisi ekani aniqlangan hamda qurg'oqchilik darajasini baholovchi xaritalar tuzilgan. Ushbu tadqiqot natijalarini olishda Landsat tasvirlari va meteorologik ma'lumotlar foydalanilgan.

P. Yang va boshqalar (2023) o'zlarining tadqiqotda Markaziy Osiyoda qurg'oqchilikning vaqt va makon bo'yicha o'zgarish tendensiyalari o'rganilgan. Natijada so'nggi o'n yilliklarda qurg'oqchilik chastotasi va intensivligi oshgani aniqlangan hamda qurg'oqchilik trendi va hududiy taqsimoti aniqlangan. Meteorologik kuzatuv ma'lumotllari va sun'iy yo'ldosh ma'lumotllari tadqiqot ishini asosiy manbasi hisoblanadi. Qo'llangan metodlardagi yog'ingarchilik ko'rsatkichi viloyatda qo'llash uchun to'g'ri emas. Uning tadqiqotda yog'ingarchilik asosiy omil qilib olingan.

H. Shi (2022) olib brogan tadqiqotida qurg'oqchil hududlarda irrigatsiya va tuproq sho'rlanishini o'rgangan. Tadqiqot natijasida noto'g'ri irrigatsiya boshqaruvi tuproq degradatsiyasi va sho'rlanishni kuchaytirishini aniqlagan hamda irrigatsiya boshqaruv strategiyalari taklif qilingan. Ushbu natijalarni dala sharoitidagi tuproq namunalari hamda irrigatsiya kanallari ma'lumotlari asosida GIS texnologiyalarini qo'llab ishlangan.

F.M. Radhi (2021) o'zining tadqiqotida NDVI va LST indeksleri yordamida qurg'oqchilik jarayonini monitoring qilgan. Natijada vegetatsiya indeksleri va yer yuzasi harorati o'rtasida kuchli bog'liqlik aniqlangan va qurg'oqchilik zonalari xaritalari ishlangan. Ushbu tadqiqotni natijasini olishda Landsat 8 OLI/TIRS tasvirlari va GIS tahlili qo'llanilgan.

M.J.Matchanov va R. Jumabayevlar (2021) Xorazm viloyatida qurg'oqchil yillarda muammo yechimini topish va tayyorgarlik ko'rish uchun ko'llar suvlaridan foydalanish imkoniyatini o'rganganlar va GAT buffer tahlil asosida tuproq ball bonitetini inobatga olib, 1-yillik ekinlar hosilini saqlab qolish bo'yicha izlarnishlar qilganlar. Ammo, antropogen qurg'oqchilik sabab va oqibatlari haqida batafsil ma'lumot bermaganlar.

C.Conradning 2020-yildagi tadqiqotida Orol dengizi havzasida yerdan foydalanish, irrigatsiya tizimi va tuproq degradatsiyasi o'rganilgan. Unda irrigatsiya tizimlarini noto'g'ri boshqarilishi natijasida yer degradatsiyasini va sho'rlanishni kuchaytirishi aniqlangan. Yerdan foydalanish holati va irrigatsiya dinamikasi xaritalari ishlab chiqilgan. Landsat sun'iy yo'ldosh tasvirlari va geofazoviy tahlil usullari qo'llanilgan.

X. Pan va boshqalar (2020) Amudaryo deltasi hududida yer osti suvlari dinamikasini o'rganishgan. Tadqiqot natijasida irrigatsiya va iqlim o'zgarishi yer osti suvlarining kamayishiga kuchli ta'sir qilishi aniqlangan. Yer osti suvlari o'zgarishi baholangan va xaritalari ishlab chiqilgan. Ushbu natijalarni GRACE sun'iy yo'ldosh ma'lumotlari va gidrologik kuzatuvlar orqali olishgan.

N. Efremova va boshqalar (2019) sun'iy yo'ldosh ma'lumotlari yordamida tuproq namligini prognoz qilishni o'rganishgan. Ushbu izlanish natijasida masofadan zondlash ma'lumotlari tuproq namligini aniqlashda samarali ekani isbotlangan va tuproq namligi prognoz modeli ishlab chiqilgan. Mualliflar ushbu natijalarni olishda sun'iy yo'ldosh tasvirlari va meteorologik ma'lumotlardan keng foydalanishgan.

A.K. Amir va boshqalar (2015) o'z tadqiqotlarida antropogen qurg'oqchilik tushunchasi, u orqali yuzaga keluvchi xavf-xatarlar va uni oldini olish haqida qimmatli ma'lumotlarni berib o'tgan. Ammo, ishning metodologik bosqichlari, olingan natijalarning ilmiy asoslanganligi haqida yetarlicha ma'lumotlar berilmagan.

L. Zhu va boshqalarning (2014) tadqiqotida Xitoyning shimoli-g'arbiy qismi ya'ni Ichki Mongoliya avtonom hududi va unga tutash cho'l zonalari vegetatsiya qoplami va yer osti suvlari o'rtasidagi bog'liqlik o'rganilgan. Natijada NDVI o'zgarishi yer osti suvlari darajasi bilan bog'liq ekani aniqlangan va

vegetatsiya-gidrologiya aloqasi baholangan. Ushbu tadqiqot natijasi NDVI va gidrologik kuzatuv ma'lumotlaridan olingan.

O. Dubovyk va boshqalarning (2012) tadqiqotida Markaziy Osiyoda qishloq xo'jaligi yerlarining degradatsiyasi va vegetatsiyaning o'zgarishi o'rganilgan. O'rganilgan hudud bo'yicha vegetatsiya qoplami kamayishi va yer degradatsiyasi ayrim irrigatsiya hududlarida kuchaygani kuzatilgan, degradatsiya zonalari aniqlangan. Ushbu tadqiqot natijasini olishda Landsat 5-TM, 8 OLI/TIRS tasvirlari va NDVIning davriy ma'lumotlari ishlatilgan.

M.F. Ayad (2011) tadqiqotida tuproqlarning qurg'oqchilikka qay darajada ta'sirchanligini baholagan. Tuproq namlik darajasini, hotspot nuqtalar aniqlagan, NDVI, NDMI va NDWI hamda LST dan ham foydalanilgan holatda qurg'oqchilik xavfi bor hududlar xaritasi tuzilgan. Ushbu natijalarni olishda statistik ma'lumotlar va sun'iy yo'ldosh ma'lumotlaridan foydalanilgan. Bu tadqiqot ishida qo'llanilgan metodlar M. Matchanovning (2025) monografiyasida qo'llanilgan tadqiqotdagi usullarga yaqin hisoblanadi.

C. Conrad va boshqalar (2007) tadqiqotida Xorazm irrigatsiya tizimida ekin maydonlari va suvdan foydalanish samaradorligi o'rganilgan. Natijada esa suv taqsimoti hududlar bo'yicha notekisligi va ayrim hududlarda ortiqcha suv sarfi mavjudligi aniqlangan. Bu bo'yicha irrigatsiya maydonlari va suv sarfi xaritalari ishlab chiqilgan. Ushbu natijalarni olishda MODIS NDVI ma'lumotlari, dala kuzatuvlari va GIS tahlili qo'llanilgan.

P. Thenkabail va boshqalar (2004) qurg'oqchilikni aniqlash va monitoring qilishda masofadan zondlash texnologiyalarining samaradorligi o'rganganlar. Tadqiqot natijasida vegetatsiya indeksleri qurg'oqchilik monitoringida muhim indikator ekanligi aniqlangan va qurg'oqchilikni monitoring metodologiyasi ishlab chiqilgan. Ushbu natijalarni olishda NOAA(AQSh Milliy okean va atmosfera boshqarmasi)ning AVHRR (Advanced Very High Resolution Radiometer) sun'iy yo'ldosh ma'lumotlari ishlatilgan. Ushbu tadqiqot metodida yangi AVHRR tasvirlari ishlatilgan bo'lsa ham, ammo aniqlik past 1 km, shu sabab Xorazm viloyati misolida undan foydalanish samarasiz bo'lishi mumkin.

Muhokama qismi

Zamonaviy ilmiy tadqiqotlarda meteorologik qurg'oqchilik (SPI, SPEI), gidrologik qurg'oqchilik (SSI, SDI) indeksleri keng qo'llanilmoqda va bular yordamida ADI (Anthropogenic Drought Index) ham hisoblab chiqilgan. Ammo bu formulalar yordamida faqat daryo va ko'llar havzalarining qurg'oqchilik darajalarini o'rgansa bo'ladi. Arid va faqat sug'orma dehqonchilik orqali qurg'oqchilikdan saqlanib turgan hududlar uchun bunday indekslarning ahamiyati katta emas. Agar bu indekslar yordamida voila joylar qurg'oqchiligi hisoblansa, o'lchashda miqdor qiymatlari yuqori kelib, nomutanosiblik kelib chiqishi mumkin. Xorazm viloyatida antropogen qurg'oqchilikni oldini olish, moslash va zararli oqibatlarini kamaytirishning zarurati haqida M.Matchanov, O.Ibragimovlar (2025) ham to'xtalib o'tganlar.

Yuqoridagi tadqiqotlarning deyarli ko'pchiligi NDVI dan foydalanib, vegetatsiya indeksi orqali qurg'oqchilikni tadqiq qilishgan. Ba'zilarida suv ombori va ko'llar havzasi qurg'oqchiligini o'rganishgan. Ammo Xorazm viloyatidagi qurg'oqchilikning yuzaga kelishi yog'ingarchilikka va bug'lanishga kamroq bog'liq. Amudaryo biz uchun asosiy suv manbai hisoblanadi hamda yer osti suvlarini ham qisman kiritish mumkin. Tumanlar kesimida qurg'oqchilikning tarqalishi bu Amudaryodan keladigan va kanallar orqali taqsimlanadigan suvning miqdoridan kelib chiqadi. Suv umuman yetib bormaydigan hududlarda namlik darajasi va o'simlik qoplami juda past darajada bo'ladi. Viloyatda yer usti harorati ham yuqori darajasida kuzatiladi, bunday joylar aynan qurg'oqchilik rivojlanayotgan hududlar hisoblanadi. Bu joylarda qurg'oqchilikni paydo bo'lishi sabab qilib antropogen omilni ko'rsatishimiz mumkin. Chunki, qurg'oqchilikning asl negizi Xorazm viloyatida sug'orish tizimidagi mummolar va ba'zi joylarda suvdan o'zboshimchalik bilan foydalanish, yoki, ilmiy xulosalarsiz chiqarilgan qarorlar deb hisoblaymiz.

Xulosa

Xorazm viloyatida qurg'oqchilik jarayonlarini sun'iy yo'ldosh ma'lumotlari asosida monitoring qilish, NDVI, NDMI va LST kabi geofazoviy indekslardan foydalanib vegetatsiya holati va tuproq namligini baholash hamda ushbu ma'lumotlarni tuproq bonitet ballari va suv taqsimoti tizimi bilan integratsiyalash orqali qurg'oqchilik xavfi darajasini aniqlash muhim ilmiy va amaliy ahamiyatga ega.

Shu nuqtai nazardan, Xorazm viloyatida antropogen qurg'oqchilikni baholash va monitoring qilish uchun geofazoviy ma'lumotlarga asoslangan kompleks metodologiyani ishlab chiqish hamda hududiy suv resurslarini barqaror boshqarish bo'yicha ilmiy asoslangan tavsiyalar ishlab chiqish maqsadga muvofiq.

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QASHQADARYO VILOYATI NEFT-GAZ SANOATIDA EKOLOGIK TOZA TEXNOLOGIYALAR VA INNOVATSION YECHIMLAR

Annotatsiya. Ushbu ilmiy maqolada Qashqadaryo viloyatining neft-gaz sanoatidagi o'рни, uning mamlakat iqtisodiyotidagi strategik ahamiyati hamda sohaning hozirgi rivojlanish bosqichlari kompleks tarzda tahlil qilinadi. Shuningdek, neft va gaz qazib olish, qayta ishlash hamda transport qilish jarayonlarida yuzaga kelayotgan asosiy ekologik muammolar — atmosfera ifloslanishi, suv va tuproq degradatsiyasi, biologik xilma-xillikka ta'siri kabi masalalar ilmiy nuqtai nazardan yoritib beriladi.

Maqolada ushbu muammolarni bartaraf etishda ekologik toza texnologiyalarni joriy etishning ahamiyati, jumladan gazni chuqur tozalash, chiqindilarni kamaytirish, energiya samaradorligini oshirish va resurslardan oqilona foydalanish kabi yo'nalishlar alohida ko'rib chiqiladi. Bundan tashqari, innovatsion yechimlar — raqamli monitoring tizimlari, sun'iy intellekt asosidagi boshqaruv, zamonaviy geologik modellash tirish usullarining amaliy ahamiyati tahlil qilinadi.

Kalit so'zlar: neft-gaz sanoati, ekologik muammolar, ekologik xavfsizlik, yashil iqtisodiyot, innovatsion texnologiyalar, ekologik toza texnologiyalar, karbon emissiya, atmosfera ifloslanishi, suv resurslari, tuproq degradatsiyasi, biologik xilma-xillik, energiya samaradorligi, qayta tiklanuvchi energiya, raqamli monitoring, barqaror rivojlanish.

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KASHKADARYA REGION: ENVIRONMENTALLY FRIENDLY TECHNOLOGIES AND INNOVATIVE SOLUTIONS IN THE OIL AND GAS INDUSTRY

Abstract. *This scientific article provides a comprehensive analysis of the role of the Kashkadarya region in the oil and gas industry, its strategic importance for the country's economy, and the current stages of development of the sector. In addition, from a scientific perspective, the main environmental problems arising during the extraction, processing, and transportation of oil and gas are examined—such as atmospheric pollution, water and soil degradation, and impacts on biodiversity.*

The article places special emphasis on the importance of implementing environmentally friendly technologies to address these issues, including advanced gas purification, waste reduction, increased energy efficiency, and the rational use of resources. Furthermore, the practical significance of innovative solutions—such as digital monitoring systems, artificial intelligence-based management, and modern geological modeling methods is analyzed.

Keywords: *oil and gas industry, environmental problems, environmental safety, green economy, innovative technologies, environmentally friendly technologies, carbon emissions, atmospheric pollution, water resources, soil degradation, biodiversity, energy efficiency, renewable energy, digital monitoring, sustainable development.*

Kirish

O'zbekiston hududida qadimdan tog'-kon sanoati, metall eritish, to'qimachilik kabi sanoat turlari mavjud bo'lib, ular hunarmandchilik asosida rivojlanib borgan. Sanoatning dastlabki korxonalarini joylashuvi XIX asr oxiri va XX asr boshlariga to'g'ri keladi. Farg'ona vodiysida neft konlarining topilishi va ishga tushirilishi shular jumlasidandir. Manbalarda O'zbekistonda neft qazib olishga oid ko'plab ma'lumotlar uchraydi. Mamlakatda sanoat asosida neft qazib olish XIX asrning 80- yillariga to'g'ri keladi (1870-1872- yillarda Farg'ona vodiysida 200 dan ziyod manbalari aniqlangan va hisobga olingan). 1885-yilda rus neftchisi D. P. Petrov Farg'ona vodiysi (Chimyon neft koni) da ikkita quduqdan neft qazib olishga va uni Vannovsk (hozirgi Oltiariq) temir yo'l stansiyasidagi o'zining shaxsiy kichik zavodida qayta ishlashga muvaffaq bo'lgan. Qayta ishlash natijasida olingan kerosin aravalarga va tuyalarga yuklanib, Andijon, Toshkent, Qo'qon paxta zavodlariga, moyjuvozlarga va aholiga sotilgan. Neft qoldiqlari esa temir yo'l transportida yoqilg'i sifatida ishlatilgan. Keyinchalik sanoatda neftning ahamiyati ortib, qazib olish salmog'i ham ko'paya borgan. Mamlakatda 1913-yilda 13 ming tonna neft olingan. Gaz sanoati tarkib topishi va rivojlanishi tarixi 1953- yilda Qizilqum cho'lida Setalontepa hududida birinchi gaz koni ochilishi bilan boshlangan. 1956-yil 17-oktabrda Gazli maydonidagi 600 metrlik quduqdan kuchli gaz favvorasi otilib chiqdi. Bu bilan O'zbekiston neft va gaz sanoatida yangi davr boshlandi.

Hozirgi global iqtisodiy rivojlanish sharoitida energetika resurslariga bo'lgan talab ortib bormoqda. Ayniqsa, neft va tabiiy gaz sanoati ko'plab mamlakatlar iqtisodiyotining asosiy drayveri hisoblanadi. O'zbekiston Respublikasida ham ushbu soha strategik ahamiyatga ega bo'lib, Qashqadaryo viloyati uning markazlaridan biri sifatida ajralib turadi.

Qashqadaryo viloyati hududida joylashgan gaz va neft konlari, gazni qayta ishlash zavodlari va gaz-kimyoy majmualari mamlakat energetika xavfsizligini ta'minlashda muhim rol o'ynaydi. Biroq, ushbu sanoatning jadal rivojlanishi atrof-muhitga sezilarli darajada salbiy ta'sir ko'rsatmoqda.

Shu sababli, ekologik toza texnologiyalarni joriy etish, innovatsion yechimlarni qo'llash va yashil iqtisodiyot tamoyillariga o'tish dolzarb ilmiy-amaliy vazifa hisoblanadi.

Qashqadaryo viloyatining neft-gaz salohiyati

Qashqadaryo viloyati O'zbekistonning asosiy neft-gaz bazalaridan biri bo'lib, hududda ko'plab yirik konlar mavjud. Ular orasida Sho'rtan, Muborak, Ko'kdumaloq kabi konlar alohida ahamiyatga ega. Viloyatda 50 dan ortiq neft va gaz konlari aniqlangan, yillik gaz qazib olish hajmi milliardlab kub metrni tashkil etadi, gazni qayta ishlash infratuzilmasi rivojlangan.

Muborak gazni qayta ishlash zavodi va Sho'rtan gaz-kimyoy majmuasi nafaqat O'zbekiston, balki butun Markaziy Osiyoda yirik sanoat obyektlari hisoblanadi. Ushbu sanoat: eksport tushumlarini ta'minlaydi, yangi ish o'rinlari yaratadi, sanoat rivojiga turtki beradi.

Neft-gaz sanoatining ekologik ta'siri

Atmosfera ifloslanishi. Neft va gaz qazib olish hamda qayta ishlash jarayonida quyidagi zararli moddalar ajralib chiqadi: metan (CH_4), karbon dioksid (CO_2), oltingugurt dioksidi (SO_2), azot oksidlari (NO_x). Bu gazlar iqlim o'zgarishi va issiqxona effektini kuchaytiradi.

Neft-gaz sanoati iqtisodiy rivojlanishda muhim o'rin tutishiga qaramay, uning ekologik ta'siri juda katta va ko'p qirrali hisoblanadi. Atmosfera, suv, tuproq va biologik xilma-xillikka salbiy ta'sirlar uzoq muddatli oqibatlariga olib keladi. Shu sababli, zamonaviy ekologik toza texnologiyalarni joriy etish, innovatsion yechimlardan foydalanish va ekologik nazoratni kuchaytirish orqali ushbu ta'sirlarni kamaytirish zarur.

Suv resurslariga ta'siri

Sanoat jarayonlarida ishlatiladigan texnik suvlar ko'pincha: neft qoldiqlari, kimyoviy moddalar, og'ir metall ionlari bilan ifloslanadi. Bu esa ichimlik suvi sifatiga salbiy ta'sir ko'rsatadi. Neft-gaz sanoatida suv resurslari muhim texnologik omil hisoblanadi va ular qazib olish, sovitish, yuvish hamda qayta ishlash jarayonlarida keng qo'llaniladi. Biroq sanoat jarayonlarida ishlatiladigan texnik suvlar ko'pincha yetarli darajada tozalanmasdan tashqi muhitga chiqariladi. Natijada ushbu suvlar tarkibida neft qoldiqlari, turli kimyoviy reagentlar, shuningdek, og'ir metall ionlari (masalan, qo'rg'oshin, simob, kadmiy) to'planadi.

Bunday ifloslangan suvlarning daryolar, ko'llar va yer osti suvlariga tushishi suv ekotizimlariga jiddiy zarar yetkazadi. Suvda yashovchi organizmlar

hayot faoliyati izdan chiqadi, baliq zaxiralari kamayadi va biologik muvozanat buziladi. Ayniqsa, og'ir metall ionlari suvda uzoq vaqt saqlanib qolib, tirik organizmlar tanasida to'planish xususiyatiga ega bo'lib, oziq-ovqat zanjiri orqali inson salomatligiga ham xavf tug'diradi.

Shu bilan birga, bunday ifloslanish ichimlik suvi manbalarining sifatini pasaytiradi, suvni tozalash xarajatlarini oshiradi va ayrim hududlarda toza ichimlik suvi tanqisligini yuzaga keltiradi. Shu sababli neft-gaz sanoatida suv resurslarini muhofaza qilish, oqava suvlarni zamonaviy texnologiyalar asosida chuqur tozalash va qayta foydalanish tizimlarini joriy etish muhim ahamiyat kasb etadi.

Tuproq degradatsiyasi

Quduqlar qazish, quvurlar yotqizish va sanoat chiqindilari tuproq unumdorligini pasaytiradi. Neft-gaz sanoatida olib boriladigan faoliyatlar, xususan quduqlar qazish, quvurlar yotqizish va sanoat infratuzilmasini barpo etish jarayonlari tuproq qatlamiga sezilarli darajada zarar yetkazadi. Quduq qazish ishlari davomida yerning ustki unumdor qatlami buziladi yoki butunlay olib tashlanadi, natijada tuproqning tabiiy tuzilishi izdan chiqadi.

Quvurlar yotqizish jarayonida katta hududlarda yer qaziladi, bu esa tuproqning zichlashishiga, havo almashinuvining yomonlashishiga va mikroorganizmlar faoliyatining susayishiga olib keladi. Bundan tashqari, texnik vositalarning og'irligi tuproqni siqib qo'yib, uning suv o'tkazuvchanlik va unumdorlik xususiyatlarini pasaytiradi.

Sanoat chiqindilari, xususan neft qoldiqlari, kimyoviy moddalar va burg'ilash eritmaları tuproqqa tushganda, uning kimyoviy tarkibini o'zgartiradi va zaharlanishiga sabab bo'ladi. Bu esa o'simliklarning o'sishini sekinlashtiradi yoki butunlay to'xtatadi. Natijada qishloq xo'jaligi yerlarining mahsuldorligi kamayadi, ayrim hududlarda esa cho'llanish jarayonlari kuchayadi.

Shu bois neft-gaz sanoatida tuproqni muhofaza qilish, rekultivatsiya ishlarini olib borish va chiqindilarni ekologik xavfsiz tarzda utilizatsiya qilish muhim vazifa hisoblanadi.

Ekotizimlarga ta'siri

Neft-gaz sanoati faoliyati tabiiy ekotizimlarga sezilarli darajada salbiy ta'sir ko'rsatadi. Sanoat obyektlarini qurish, quduqlar qazish, yo'llar va quvurlar tarmoqlarini barpo etish natijasida katta hududlarda tabiiy landshaft o'zgaradi va yashash muhitlari buziladi. Bu esa o'simlik va hayvonot dunyosining tabiiy yashash sharoitlarini yomonlashtiradi.

Sanoat faoliyati natijasida o'simliklar qoplami zararlanadi yoki butunlay yo'qoladi, bu esa tuproq eroziyasining kuchayishiga olib keladi. Hayvonlar esa shovqin, yorug'lik va inson faoliyatining ortishi sababli o'z yashash joylarini tark etishga majbur bo'ladi. Natijada ayrim turlar soni kamayadi, ba'zilar esa yo'qolib ketish xavfi ostida qoladi.

Shuningdek, neft to'kilishlari va zararli moddalar chiqishi natijasida suv va tuproq ifloslanib, oziq-ovqat zanjiri buziladi. Bu jarayon butun ekotizim barqarorligiga salbiy ta'sir ko'rsatadi. Tabiiy muvozanatning buzilishi esa ekotizimlarning o'z-o'zini tiklash qobiliyatini pasaytiradi va uzoq muddatli

ekologik muammolarni yuzaga keltiradi. Shu sababli neft-gaz sanoatida ekologik xavfsizlik choralari kuchaytirish, tabiiy hududlarni muhofaza qilish va buzilgan ekotizimlarni tiklash (rekultivatsiya) ishlari muhim ahamiyat kasb etadi.

Xalqaro tajriba va uni qo'llash

Rivojlangan davlatlar tajribasi shuni ko'rsatadiki, neft-gaz sanoatini ekologik xavfsizlik bilan uyg'un holda rivojlantirish mumkin. Bu borada ilg'or texnologiyalar, qat'iy ekologik standartlar va innovatsion boshqaruv tizimlari muhim rol o'ynaydi.

Norvegiya tajribasi neft va gaz qazib olishda ekologik xavfsizlikni ta'minlash bo'yicha dunyoda yetakchi hisoblanadi. Ushbu mamlakatda dengizdagi konlarni o'zlashtirishda chiqindilarni minimal darajaga tushirish, karbon chiqindilarini kamaytirish va **karbonni tutish va saqlash (CCS)** texnologiyalarini keng qo'llash yo'lga qo'yilgan. Masalan, Norvegiyada "Sleipner" loyihasi doirasida yiliga million tonnaga yaqin CO₂ yer ostiga saqlanadi. Bu tajriba atmosfera ifloslanishini sezilarli darajada kamaytirishga xizmat qilmoqda.

AQSh tajribasi slanets gazini qazib olishda ilg'or texnologiyalarni joriy etish bilan ajralib turadi. Xususan, gidravlik yorish (fracking) va gorizontall burg'ilash usullari orqali gaz qazib olish hajmi keskin oshirildi. Shu bilan birga, so'nggi yillarda suvni qayta ishlash, kimyoviy moddalar sarfini kamaytirish va ekologik monitoringni kuchaytirish bo'yicha chora-tadbirlar amalga oshirilmoqda. Natijada ishlab chiqarish samaradorligi bilan birga ekologik xavfsizlik darajasi ham oshmoqda.

Germaniya tajribasi esa asosan yashil energetika va qayta tiklanuvchi energiya manbalarini rivojlantirishga qaratilgan. Ushbu davlatda "Energiewende" (energetik o'tish) siyosati doirasida quyosh va shamol energetikasi keng rivojlantirilgan bo'lib, elektr energiyasining muhim qismi aynan qayta tiklanuvchi manbalardan olinadi. Bu esa qazilma yoqilg'ilarga bo'lgan qaramlikni kamaytirish va karbon emissiyalarni qisqartirishga xizmat qilmoqda.

Ushbu ilg'or tajribalarni O'zbekistonda, xususan Qashqadaryo viloyatida qo'llash katta ahamiyatga ega. Jumladan:

- karbon chiqindilarini kamaytirish texnologiyalarini joriy etish,
- suv va energiya resurslaridan samarali foydalanish,
- qayta tiklanuvchi energiya manbalarini rivojlantirish,
- ekologik monitoring tizimlarini kuchaytirish zarur.

Natijada neft-gaz sanoatini barqaror rivojlantirish, atrof-muhitni muhofaza qilish va xalqaro ekologik standartlarga moslashish imkoniyati yaratiladi.

Xulosa

Qashqadaryo viloyatining neft-gaz sanoati mamlakat iqtisodiyotida muhim strategik o'rin egallaydi. Ushbu soha energetika xavfsizligini ta'minlash, sanoat ishlab chiqarishini rivojlantirish va eksport salohiyatini oshirishda asosiy omillardan biri hisoblanadi. Shu bilan birga, neft va gazni qazib olish, qayta ishlash hamda transport qilish jarayonlari atrof-muhitga sezilarli darajada salbiy ta'sir ko'rsatib, atmosfera ifloslanishi, suv resurslarining zararlanishi, tuproq

degradatsiyasi va ekotizimlarning buzilishi kabi ekologik muammolarni yuzaga keltirmoqda.

Mazkur muammolarni bartaraf etishda ekologik toza texnologiyalar va innovatsion yechimlarni joriy etish muhim ahamiyat kasb etadi. Xususan, chiqindilarni kamaytirish, karbon emissiyalarni qisqartirish, energiya va suv resurslaridan samarali foydalanish, raqamli monitoring tizimlarini keng qo'llash orqali sanoatning ekologik xavfsizligini oshirish mumkin. Shu bilan birga, ishlab chiqarishda zamonaviy, resurs tejankor texnologiyalarni qo'llash nafaqat ekologik holatni yaxshilaydi, balki iqtisodiy samaradorlikni ham oshiradi.

Kelgusida yashil iqtisodiyot tamoyillariga asoslangan rivojlanish ushbu sohaning barqarorligini ta'minlashda muhim omil bo'lib xizmat qiladi. Qayta tiklanuvchi energiya manbalarini rivojlantirish, ekologik qonunchilikni takomillashtirish, xalqaro tajribani joriy etish va ilmiy-tadqiqot ishlarini kuchaytirish orqali neft-gaz sanoatini yanada samarali va ekologik xavfsiz yo'nalishda rivojlantirish mumkin. Bu esa nafaqat bugungi kun ehtiyojlarini qondirish, balki kelajak avlodlar uchun tabiiy resurslarni asrab-avaylashga ham xizmat qiladi.

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TURIZM OQIMLARINING HUDUDIIY DINAMIKASI VA ULARNI SHAKLLANTIRUVCHI OMILLAR. ICHKI VA XALQARO TURISTLAR OQIMINI STATISTIK-GEOGRAFIK TAHLIL QILISH

Annotatsiya: Mazkur maqolada turizm oqimlarining hududiy dinamikasi hamda ularni shakllantiruvchi asosiy omillar statistik va geografik yondashuv asosida tahlil qilingan. Ichki va xalqaro turistlar harakati, ularning yo'nalishlari, mavsumiy o'zgarishlari, hududlar bo'yicha notekis taqsimlanishi hamda turizm rivojiga ta'sir etuvchi tabiiy-geografik, ijtimoiy-iqtisodiy, madaniy va siyosiy omillar o'rganilgan. Shuningdek, O'zbekiston misolida kiruvchi va chiquvchi turistik oqimlarning o'sish tendensiyalari, mintaqaviy farqlari va hududiy rivojlanish imkoniyatlari tahlil etiladi. Tadqiqot natijalari turistik hududlarni boshqarish, strategik rejalashtirish va turizm infratuzilmasini takomillashtirishda muhim ahamiyatga ega.

Kalit so'zlar: Turizm oqimi, hududiy dinamika, ichki turizm, xalqaro turizm, statistik-geografik tahlil, turistik yo'nalishlar, kiruvchi turistlar, chiquvchi turistlar, turizm omillari, tabiiy-geografik omillar, ijtimoiy-iqtisodiy omillar, turizm infratuzilmasi, hududiy rivojlanish, turizm geografiyasi.

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TERRITORIAL DYNAMICS OF TOURISM FLOWS AND FACTORS SHAPING THEM: A STATISTICAL-GEOGRAPHICAL ANALYSIS OF DOMESTIC AND INTERNATIONAL TOURIST FLOWS

Abstract. This article analyzes the territorial dynamics of tourism flows and the main factors shaping them based on a statistical and geographical approach. The movement of domestic and international tourists, their directions, seasonal changes, uneven regional distribution, as well as natural-geographical, socio-economic, cultural, and political factors influencing tourism development are examined.

Furthermore, using the example of Uzbekistan, the growth trends of inbound and outbound tourism flows, their regional differences, and opportunities

for territorial development are analyzed. The results of the study are of significant importance for the management of tourist areas, strategic planning, and the improvement of tourism infrastructure.

Keywords: *tourism flow, territorial dynamics, domestic tourism, international tourism, statistical and geographical analysis, tourist destinations, inbound tourists, outbound tourists, tourism factors, natural-geographical factors, socio-economic factors, tourism infrastructure, regional development, geography of tourism.*

Kirish

Globalizatsiya jarayonlari turizm industriyasini jadal sur'atlar bilan rivojlantirmoqda. Dunyo bo'yicha turistlar harakati nafaqat iqtisodiy ko'rsatkichlarga, balki hududlarning demografik, madaniy, ekologik va transport-geografik salohiyatiga sezilarli ta'sir ko'rsatmoqda. Turizm oqimlarining hududiy-dinamik tahlili esa hududlarning turistik raqobatbardoshligini baholash, strategik boshqaruv qarorlarini ishlab chiqish va mintaqaviy rivojlanish jarayonlarini chuqur tushunishga imkon beradi.

Mazkur tadqiqot turizm oqimlarining shakllanishiga ta'sir etuvchi omillarni, ichki hamda xalqaro turistlar oqimining hududiy taqsimlanishini va ularning yillik o'zgarish xususiyatlarini statistik-geografik metodlar orqali tahlil qilishga qaratilgan. Tadqiqot doirasida O'zbekiston misolida real ma'lumotlar asosida mintaqaviy dinamika ko'rib chiqiladi.

Buning uchun biz avvalo turizm oqimlari tushunchasi va uning hududiy-dinamik xususiyatlarini o'rganib chiqishimiz lozim.

Turizm oqimi — ma'lum vaqt oralig'ida turistlarning bir hududdan ikkinchi hududga ko'chish intensivligi va hajmini ifodalovchi geografik jarayon bo'lib, quyidagi xususiyatlar bilan tavsiflanadi:

1.*Hududiy differentsiallik* - turistik oqimlar asosan iqtisodiy rivojlangan, transport jihatidan qulay, madaniy merosi boy hududlarda to'planadi. Uning umumiy global oqimlari yevropa, sharqiy osiyo va o'rta yer dengizi mintaqasida yuqori.

2.*Vaqtiiy dinamika ya'ni mavsumiylik* - yozgi dengizbo'yi yo'nalishlari, qishki tog'-chang'i yo'nalishlari. Undan tashqari bayramlar, festivallar va xalqaro tadbirlar oqimni keskin oshiradi.

3.*Ijtimoiy-iqtisodiy o'zgaruvchanlik* - infratuzilma modernizatsiyasi, viza liberallasuvi, narxlar stabilligi oqimni ko'paytiradi. siyosiy beqarorlik, pandemiya yoki iqtisodiy inqirozlar turistik oqimni kamaytiradi.

Turistik oqimlarni shakllanishi bevosita bir qancha omillar bilan uzviy bog'liq. Bular:

-Tabiiy-geografik omillar- landshaftlar xilma-xilligi: tog'lar, cho'llar, vodiylar, sohilbo'yi zonalar, iqlim ko'rsatkichlari: harorat, yog'ingarchilik, iqlim komforti tabiiy obyektlarga bo'lgan talab: milliy bog'lar, ekoturizm, geoturizm.

-Tarixiy-madaniy omillar- arxeologik yodgorliklar, qadimiy shaharlar, madaniy markazlar, etnoturizm: hududning milliy urf-odatlar, festivallari,

oshxona madaniyati va UNESCO merosi obyektlari mavjudligi turistlar oqimini barqaror oshiradi.

- **Ijtimoiy-iqtisodiy omillar**- transport infratuzilmasi (aviatsiya, temir yo‘l, avtomobil yo‘llari), mehmonxona fondi: mehmonxonalar soni, qulaylik darajasi, narxlar segmenti xizmatlar sifati va turizm klasterlarining samaradorligi.

- **Siyosiy omillar**- viza rejimi, chegaradan o‘tish tartiblari, xavfsizlik darajasi, ekologik siyosat va turizmni qo‘llab-quvvatlash bo‘yicha davlat dasturlari yuqorida aytib o‘tganimiz turistik oqimlarning eng dolzarblaridir.

Turistik oqimlar asosan tashqi va ichki turistik oqimlariga bo‘linadi. Tashqi turistik oqim - mamlakat fuqarolarining chet davlatlarga turistik, iqtisodiy, diniy, sog‘liqni tiklash, ta‘lim yoki boshqa maqsadlarda amalga oshiradigan safarlari majmuyidir. Tashqi turizm oqimlari nafaqat demografik va iqtisodiy jarayonlarni aks ettiradi, balki mamlakatning tashqi aloqalari, transport infratuzilmasi va aholi farovonligi darajasini ham ko‘rsatib beradi.

So‘nggi yillarda O‘zbekiston fuqarolarining tashqi sayohatlari sezilarli o‘sish bilan xarakterlanmoqda. Statistik ma‘lumotlarga ko‘ra: yiliga millionlab fuqarolar chet davlatlarga chiqish amalga oshirmoqda.

2018–2023 yillar oralig‘ida chiquvchi turistlar sonida barqaror o‘sish kuzatildi (1-jadval). Safarlarning asosiy sababi: turizm, ziyorat, dam olish, savdo-sotiq, ta‘lim va mehnat migratsiyasi. Tashqi turizmning tahlili shuni ko‘rsatadiki, iqtisodiy imkoniyatlar kengayishi va transport xizmatlarining jadal rivojlanishi oqimni kuchaytiruvchi asosiy omillar bo‘lmoqda.

1-jadval

O‘zbekistonga eng ko‘p turistlar keluvchi mamlakatlar ro‘yxati

№	Mamlakat	Turistlar soni (taxminan, 2025)	Ulushi
1	Qirg‘iziston	3 300 000	~28 %
2	Tojikiston	2 700 000	~23 %
3	Qozog‘iston	2 700 000	~23 %
4	Rossiya	984 400	~8.5 %
5	Afg‘oniston	476 700	~4.1 %
6	Turkmaniston	370 000	~3.2 %
7	Xitoy	278 900	~2.4 %
8	Turkiya	174 900	~1.5 %
9	Hindiston	80 800	~0.7 %
10	Janubiy Koreya	46 300	~0.4 %

Mamlakatimiz hududida ichki turizmning eng yuqori ko‘rsatkichlari mashhur turistik shaharlar va obyektlar hissasiga to‘g‘ri keladi. Masalan: Toshkent shahri va Toshkent viloyati, Samarqand viloyati, Buxoro viloyati, Xorazm viloyati hamda Farg‘ona vodiysi (Farg‘ona, Andijon, Namangan) hududlari ichki sayyohlar eng ko‘p tashrif buyuradigan manzillar hisoblanadi. Bu hududlarda tarixiy-me‘moriy obidalar, muqaddas ziyoratgohlar, zamonaviy dam olish

maskanlari hamda rivojlangan transport va mehmonxona infratuzilmasi mavjudligi ichki turizmning rivojlanishiga katta ta'sir ko'rsatadi.

Quyida O'zbekiston Respublikasida ichki turizmning viloyatlar kesimidagi katta tafovudlarni ko'rishimiz mumkin. Turistik oqim asosan tarixiy merosga boy hududlar hamda tabiiy rekreatsion zonalarda to'plangan bo'lsa, sanoat yoki qishloq xo'jaligiga ixtisoslashgan ayrim viloyatlarda turistik ko'rsatkichlar nisbatan pastroq bo'lishi kuzatiladi. Shu bilan birga, so'nggi yillarda hududlarda yangi turizm yo'nalishlarini rivojlantirish, ekologik va agro-turizmni kengaytirish, transport infratuzilmasini yaxshilash orqali ichki turizm geografiyasini kengaytirish bo'yicha ishlar olib borilmoqda.

Bundan tashqari, mamlakatimizda turizm mavsumiy xarakterga ham ega. Bahor faslida asosan tarixiy shaharlar bo'ylab sayohatlar faollashadi, yoz oylarida esa dam olish maskanlari, tog' va suv havzalari sayyohlarni o'ziga jalb etadi. Kuz mavsumida ziyorat turizmi yanada faol bo'lib, muqaddas qadamjolar va tarixiy majmualarga tashriflar ko'payadi. Qish faslida esa qishki sport turizmi rivojlanib, ayniqsa Chimgan tog'lari hamda Amirsoy Mountain Resort kabi maskanlar doimiy turistlar oqimi bilan gavjum bo'ladi.

Shuningdek, ichki turizmning rivojlanishida milliy bayramlar, madaniy festivallar, sport tadbirlari va turli ko'ngilochar dasturlar ham muhim rol o'ynaydi. Bunday tadbirlar aholi o'rtasida sayohat madaniyatini rivojlantirib, mamlakatimizning turli hududlariga ichki turistlar oqimini yanada oshirishga xizmat qiladi.

O'zbekiston Respublikasi ichki turizmining hududlar kesimida taqsimlanishi
1-rasm.



Mamlakatimiz butunjahon turizm tashkilotining ma'lumotlariga ko'ra dunyoda turistlar oqimi tez o'sib borayotgan yettinchi davlat deb tan olindi. Statistik ma'lumotlarga ko'ra, mamlakatga kelgan xorijiy turistlar soni 2019-yilga nisbatan 73 foizga oshgan, bu esa turizm sohasining pandemiyadan keyingi davrda tez tiklanganini ko'rsatadi. Shuningdek, 2025-yilning dastlabki o'n bir oyida

O'zbekistonga 10,7 milliondan ortiq xorijiy turist tashrif buyurgan bo'lib, turizm xizmatlari eksportidan tushgan daromad 4 milliard dollardan ortiqni tashkil etdi.

Mutaxassislar bunday o'sishni mamlakatda turizm sohasini rivojlantirish bo'yicha amalga oshirilayotgan islohotlar bilan izohlaydi. Jumladan, ko'plab davlatlar uchun vizasiz rejim joriy etilishi, transport va mehmonxona infratuzilmasining rivojlantirilishi, xalqaro turizm ko'rgazmalarida faol qatnashish hamda mamlakatning boy tarixiy-madaniy merosini targ'ib qilish turizm oqimining ortishiga xizmat qilmoqda.

Bundan tashqari, Samarqand, Buxoro va Xiva kabi qadimiy shaharlar nafaqat Markaziy Osiyoda, balki jahon miqyosida ham mashhur turistik markazlar sifatida tan olinib, mamlakatning xalqaro turizm bozoridagi nufuzini yanada oshirmoqda. Natijada O'zbekiston bugungi kunda global turizm xaritasida tez rivojlanayotgan va sayyohlar uchun jozibador yo'nalishlardan biri sifatida shakllanib bormoqda.

Jahon bo'yicha turizmi jadal su'ratda o'sib borayotgan davlatlar

2-rasm



Xulosa

Tadqiqot natijalari shuni ko'rsatadiki, turizm oqimlarining hududiy dinamikasi va shakllanish mexanizmlari ko'p omillilik xususiyatiga ega. Ularning shakllanishida tabiiy-geografik sharoitlar, tarixiy-madaniy meros obyektlari, transport va kommunikatsiya infratuzilmasi, xizmat ko'rsatish darajasi hamda hududlarning ijtimoiy-iqtisodiy rivojlanish darajasi muhim rol o'ynaydi. Shu sababli turizm oqimlarini tahlil qilish jarayonida ushbu omillarni kompleks tarzda o'rganish muhim ahamiyat kasb etadi. Ichki va xalqaro turizmning statistik-geografik tahlili hududlarning turistik salohiyatini aniqlash, investitsiya yo'nalishlarini belgilash, infratuzilmani modernizatsiya qilish va turizm siyosatini takomillashtirish uchun muhim ilmiy-amaliy ahamiyatga ega. Bunday tahlillar natijasida turizm resurslaridan samarali foydalanish, yangi turistik yo'nalishlarni

shakllantirish, hududlar o'rtasidagi turizm rivojlanishidagi tafovutlarni kamaytirish hamda xizmat ko'rsatish sifatini oshirish imkoniyatlari yaratiladi.

Shuningdek, turizm oqimlarining hududiy xususiyatlarini o'rganish turizmni barqaror rivojlantirish strategiyalarini ishlab chiqishda ham muhim ahamiyatga ega. Bu esa o'z navbatida yangi ish o'rinlari yaratish, mahalliy aholining daromadlarini oshirish, milliy madaniyat va tarixiy merosni asrab-avaylash hamda mamlakatning xalqaro turizm bozoridagi raqobatbardoshligini mustahkamlashga xizmat qiladi. Natijada turizm sohasi mamlakat iqtisodiyotining muhim va istiqbolli tarmoqlaridan biri sifatida yanada rivojlanib boradi.

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MATEMATIKA DARSLARIDA AXBOROT-KOMMUNIKATSIYA TEKNOLOGIYALARIDAN FOYDALANISHNING PEDAGOGIK ASOSLARI

***Annotatsiya.** Ushbu maqolada matematika darslarida axborot-kommunikatsiya texnologiyalaridan foydalanishning pedagogik asoslari tahlil qilinadi. Zamonaviy ta'lim muhitida raqamli vositalar, interaktiv platformalar, multimediya resurslari va elektron ta'lim tizimlari matematik bilimlarni o'zlashtirish jarayonini samarali tashkil etishning muhim omili sifatida talqin etiladi. Maqolada axborot-kommunikatsiya texnologiyalarining o'quvchilarda mantiqiy fikrlash, mustaqil ishlash, muammoni hal etish va amaliy ko'nikmalarni rivojlantirishdagi o'rni yoritiladi. Shuningdek, mazkur texnologiyalarni iqtisodiy yo'nalishdagi oliy ta'lim muassasalarida matematika fanini o'qitish jarayoniga integratsiya qilishning didaktik imkoniyatlari hamda pedagogik samaradorligi ochib beriladi. Tadqiqotda AKTdan foydalanishning ta'lim sifati, motivatsiya va interfaollikka ta'siri ilmiy-pedagogik nuqtai nazardan asoslab beriladi.*

***Kalit so'zlar.** matematika ta'limi, axborot-kommunikatsiya texnologiyalari, pedagogik asoslar, raqamli ta'lim, interaktiv metodlar, elektron resurslar, multimediya vositalari, mantiqiy fikrlash, mustaqil ta'lim, didaktik samaradorlik.*

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PEDAGOGICAL BASIS OF THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN MATHEMATICS LESSONS

***Abstract.** This article analyzes the pedagogical foundations of using information and communication technologies in mathematics lessons. In the modern educational environment, digital tools, interactive platforms, multimedia resources, and electronic learning systems are interpreted as important factors in organizing the process of mastering mathematical knowledge effectively. The article highlights the role of information and communication technologies in developing students' logical thinking, independent learning, problem-solving abilities, and practical skills. It also reveals the didactic opportunities and pedagogical effectiveness of integrating these technologies into the process of teaching mathematics in higher education institutions with an economic profile.*

The study substantiates from a scientific and pedagogical perspective the impact of ICT use on education quality, motivation, and interactivity.

Keywords. *mathematics education, information and communication technologies, pedagogical foundations, digital learning, interactive methods, electronic resources, multimedia tools, logical thinking, independent learning, didactic effectiveness.*

Kirish

Zamonaviy ta'lim tizimida axborot-kommunikatsiya texnologiyalari o'quv jarayonining tarkibiy qismiga aylanib bormoqda. Ayniqsa, matematika fanini o'qitishda raqamli vositalardan foydalanish nafaqat mavzuni tushuntirishning yangi shakllarini yaratadi, balki bilimni o'zlashtirish sifatini oshirishga ham xizmat qiladi. Matematika abstrakt tushunchalar, mantiqiy bog'lanishlar va aniq hisob-kitoblarga asoslangan fan bo'lgani sababli uni o'qitishda vizual, interaktiv va modellashtiruvchi vositalarning ahamiyati nihoyatda kattadir. Shu nuqtai nazardan, axborot-kommunikatsiya texnologiyalaridan foydalanishning pedagogik asoslarini tadqiq etish dolzarb ilmiy va amaliy masalalardan biri hisoblanadi.

Iqtisodiy yo'nalishdagi oliy ta'lim muassasalarida matematika fanining o'рни alohida ahamiyat kasb etadi. Chunki bo'lajak iqtisodchilar, menejerlar, moliyachilar va statistika mutaxassislari uchun matematik tafakkur, analitik yondashuv hamda miqdoriy tahlil ko'nikmalari zarur kasbiy kompetensiyalarning asosi bo'lib xizmat qiladi. Bunday sharoitda darslarni an'anaviy usullar bilan cheklab qo'yish yetarli natija bermaydi. Talabalarni murakkab formulalar, grafiklar, funksional bog'lanishlar va iqtisodiy modellar bilan samarali ishlashga o'rgatish uchun elektron taqdimotlar, matematik dasturlar, virtual platformalar, test tizimlari va masofaviy ta'lim resurslaridan foydalanish muhimdir.

Axborot-kommunikatsiya texnologiyalari matematika darslarida bir necha pedagogik vazifalarni bajaradi. Birinchidan, ular o'quv materialini vizuallashtirish orqali murakkab tushunchalarni sodda va tushunarli shaklda ifodalash imkonini beradi. Ikkinchidan, o'quv jarayonida interfaollikni kuchaytirib, talabani faol ishtirokini ta'minlaydi. Uchinchidan, mustaqil ta'lim, o'z-o'zini nazorat qilish va individual yondashuvni rivojlantiradi. To'rtinchidan, real iqtisodiy vaziyatlarga yaqin bo'lgan matematik masalalarni modellashtirish orqali nazariy bilimlarning amaliy ahamiyatini kuchaytiradi.

Shu bilan birga, AKTdani foydalanish pedagogdan yangi metodik tayyorgarlikni, darsni rejalashtirishda moslashuvchanlikni va raqamli kompetensiyalarni talab etadi. Demak, matematika darslarida axborot-kommunikatsiya texnologiyalaridan samarali foydalanish faqat texnik imkoniyatlar bilan emas, balki uning puxta pedagogik asoslanganligi bilan ham belgilanadi. Mazkur maqolada aynan shu jihatlar ilmiy-pedagogik nuqtai nazardan yoritiladi.

Metodlar

Mazkur tadqiqotda matematika darslarida axborot-kommunikatsiya texnologiyalaridan foydalanishning pedagogik asoslarini yoritish uchun bir-birini

to'ldiruvchi nazariy va amaliy tadqiqot metodlaridan foydalanildi. Avvalo, mavzuga oid pedagogik, psixologik, metodik va didaktik adabiyotlar tahlil qilindi. Ushbu yondashuv orqali matematika ta'limida AKTning o'rni, imkoniyatlari hamda cheklovlari yuzasidan mavjud ilmiy qarashlar umumlashtirildi. Tahlil jarayonida zamonaviy ta'lim konsepsiyalari, raqamli pedagogika tamoyillari, interfaol o'qitish texnologiyalari va kompetensiyaviy yondashuvga asoslangan ilmiy manbalarga alohida e'tibor qaratildi.

Tadqiqotning metodologik asosini tizimli yondashuv, faoliyatga yo'naltirilgan yondashuv va kompetensiyaviy yondashuv tashkil etdi. Tizimli yondashuv matematika darslarida AKTdan foydalanishni yagona pedagogik jarayon sifatida ko'rib chiqish imkonini berdi. Faoliyatga yo'naltirilgan yondashuv esa talabalarni tayyor bilimni qabul qiluvchi subyekt emas, balki axborotni tahlil qiluvchi, qayta ishlovchi va amaliyotda qo'llovchi faol ishtirokchi sifatida talqin etishga xizmat qildi. Kompetensiyaviy yondashuv yordamida AKT vositalarining nafaqat bilim berish, balki kasbiy va intellektual kompetensiyalarni rivojlantirishdagi roli ochib berildi.

Empirik qismda kuzatish, taqqoslash, suhbat va pedagogik tahlil metodlari qo'llanildi. Kuzatish metodi asosida iqtisodiy yo'nalishdagi oliy ta'lim muassasalarida matematika mashg'ulotlarini tashkil etish jarayoni o'rganildi. Bunda o'qituvchilarning elektron taqdimotlar, grafik dasturlar, test platformalari, onlayn topshiriq tizimlari va virtual ta'lim muhitidan foydalanish holatlari tahlil qilindi. Suhbat metodi yordamida o'qituvchilar va talabalar fikrlari o'rganilib, AKTdan foydalanishning qulay va murakkab jihatlari aniqlandi. Taqqoslash metodi esa an'anaviy yondashuv bilan AKTga asoslangan yondashuv o'rtasidagi farqlarni aniqlashda muhim ahamiyat kasb etdi.

Shuningdek, pedagogik modellashtirish metodidan ham foydalanildi. Ushbu metod yordamida matematika darslarida AKTni joriy etishning maqbul pedagogik modeli ishlab chiqildi. Mazkur modelda maqsad, mazmun, metod, vosita va natija o'rtasidagi uzviy bog'liqlik ko'rsatib berildi. Ma'lumotlarni tahlil qilishda umumlashtirish, tasniflash va mantiqiy xulosa chiqarish usullaridan foydalanildi. Natijada matematika darslarida AKTdan foydalanishning pedagogik asoslari ilmiy jihatdan tizimlashtirildi va ularning amaliy samaradorligini baholash uchun zarur metodik zamin yaratildi.

Natijalar

Tadqiqot natijalari matematika darslarida axborot-kommunikatsiya texnologiyalaridan foydalanish o'quv jarayonining sifati va samaradorligini sezilarli darajada oshirishini ko'rsatdi. Avvalo, AKT vositalari yordamida tashkil etilgan mashg'ulotlarda talabalar tomonidan o'quv materialini qabul qilish va tushunish darajasi an'anaviy usullarga nisbatan yuqori bo'lishi aniqlandi. Ayniqsa, formulalar, funksiyalar, grafiklar, tenglamalar tizimi va statistik ma'lumotlarni izohlashda vizual vositalardan foydalanish murakkab tushunchalarning osonroq anglanishiga xizmat qildi. Elektron taqdimotlar, interaktiv doskalar va matematik dasturlar yordamida mavzuning bosqichma-bosqich ochib berilishi talabalar diqqatini uzoqroq saqlash imkonini yaratdi.

Shuningdek, AKT asosida olib borilgan darslarda talabalar faolligining ortgani kuzatildi. Onlayn testlar, virtual mashqlar, elektron topshiriqlar va tezkor baholash tizimlari talabalarni dars jarayoniga faol jalb etdi. Natijada tinglovchi pozitsiyasidan faol ishtirokchi pozitsiyasiga o'tish holati kuchaydi. Talabalarda mustaqil ishlash, xatolarni tahlil qilish, javob variantlarini solishtirish va o'z bilimini nazorat qilish ko'nikmalari shakllandi. Bu esa matematika fanini o'zlashtirishda reproduktiv faoliyatdan produktiv faoliyatga o'tishni ta'minladi.

Tadqiqot davomida iqtisodiy yo'nalishdagi oliy ta'lim muassasalari uchun AKTning alohida amaliy ahamiyatga ega ekani ham aniqlandi. Chunki iqtisodiy mazmundagi matematik masalalarni elektron jadvallar, grafik modellar va hisoblash dasturlari orqali yechish talabalar uchun nazariy bilim bilan amaliy vaziyat o'rtasidagi bog'liqlikni kuchaytirdi. Foizlar, regressiya, optimallashtirish, statistik tahlil va funksional bog'lanishlar kabi mavzularni AKT vositalari orqali o'rganish kasbiy yo'naltirilganlikni oshirdi. Natijada matematikaning iqtisodiy fanlar bilan integratsiyasi kuchaydi.

Bundan tashqari, o'qituvchilarning fikrlari AKTdan foydalanish darsni rejalashtirish va nazorat qilish imkoniyatlarini kengaytirishini ko'rsatdi. Talabalar esa bunday yondashuvni qiziqarli, qulay va tushunarli deb baholadilar. Umuman, tadqiqot yakunlari matematika darslarida AKTdan foydalanish bilim sifati, motivatsiya, interfaollik va kasbiy yo'naltirilganlikni oshiruvchi muhim pedagogik omil ekanini tasdiqladi.

Muhokama

Matematika darslarida axborot-kommunikatsiya texnologiyalaridan foydalanishning pedagogik mohiyati faqat texnik vositalarni ta'lim jarayoniga olib kirish bilan cheklanmaydi. Uning asosiy mazmuni o'qitish metodikasi, o'quv faoliyatini tashkil etish usullari va ta'lim natijalarini boshqarish mexanizmlarining yangilanishida namoyon bo'ladi. Shu bois AKTni matematika ta'limiga joriy etish jarayonini faqat zamonaviylik belgisi sifatida emas, balki didaktik transformatsiya omili sifatida baholash maqsadga muvofiqdir. Mazkur yondashuv o'quvchini passiv tinglovchidan faol izlanishga moyil subyektga aylantiradi, pedagogni esa axborot uzatuvchi emas, balki ta'lim jarayonini loyihalashtiruvchi va yo'naltiruvchi mutaxassis sifatida namoyon etadi.

Tadqiqot natijalari shuni ko'rsatadiki, AKTdan foydalanish matematika fanining abstrakt tabiati bilan bog'liq qiyinchiliklarni yumshatadi. Ayniqsa, vizual modellashtirish, animatsion tushuntirish va interaktiv topshiriqlar orqali murakkab matematik tushunchalar talabalarga ancha ravshan yetkaziladi. Biroq bu yerda muhim jihat shundaki, texnologiyaning o'zi emas, undan qanday pedagogik maqsadda va qanday metodik asosda foydalanilayotgani hal qiluvchi omil hisoblanadi. Agar o'qituvchi AKTni faqat taqdimot vositasi sifatida qo'llasa, uning samarasi cheklangan bo'lib qoladi. Aksincha, AKT mustaqil fikrlashni, tahlilni, taqqoslashni va amaliy masala yechishni rag'batlantiruvchi vosita sifatida qo'llansa, ta'lim natijadorligi sezilarli oshadi.

Shu bilan birga, ayrim muammoli jihatlar ham mavjud. Birinchidan, barcha pedagoglarda raqamli metodik kompetensiya yetarli darajada shakllanmagan

bo'lishi mumkin. Ikkinchidan, texnik infratuzilma, internet sifati va dasturiy vositalarning mavjudligi har doim ham bir xil darajada emas. Uchinchidan, ayrim hollarda talabalar tayyor elektron vositalarga ortiqcha tayanib, mustaqil mantiqiy faoliyatni sustlashtirishi ehtimoli ham kuzatiladi. Demak, AKTdan foydalanishda muvozanatni saqlash zarur: texnologiya matematik tafakkurni almashtirmasligi, aksincha uni rivojlantirishi kerak.

Umuman olganda, matematika darslarida AKTdan foydalanish pedagogik jihatdan asoslangan, maqsadga yo'naltirilgan va metodik jihatdan puxta tashkil etilgandagina yuqori samaradorlik beradi. Aynan shunday yondashuv iqtisodiy yo'nalishdagi oliy ta'limda matematik tayyorgarlik sifatini oshirish, kasbiy tafakkurni rivojlantirish va raqamli ta'lim muhitini takomillashtirishga xizmat qiladi.

Xulosa

Matematika darslarida axborot-kommunikatsiya texnologiyalaridan foydalanishning pedagogik asoslarini tahlil qilish shuni ko'rsatadiki, raqamli vositalar zamonaviy ta'lim jarayonining samaradorligini oshiruvchi muhim omillardan biri hisoblanadi. Ayniqsa, matematika kabi abstrakt tafakkur, mantiqiy izchillik va aniq tahlilni talab qiluvchi fanlarni o'qitishda AKT o'quv materialini tushunarli, ko'rgazmali va interaktiv shaklda tashkil etish imkonini beradi. Bu esa talabalarning fan mazmunini chuqurroq anglashiga, murakkab nazariy tushunchalarni amaliy holatlar bilan bog'lashiga va mustaqil bilim olishga bo'lgan ehtiyojini kuchaytirishga xizmat qiladi.

Tadqiqot jarayonida aniqlanganidek, AKTdan foydalanish o'qitish jarayonida bir vaqtning o'zida bir necha pedagogik vazifani bajaradi. U bilimlarni vizuallashtiradi, darsning interfaoligini oshiradi, talabalarning o'zlashtirish darajasini tezkor nazorat qilish imkonini yaratadi va individual yondashuvni qo'llab-quvvatlaydi. Shu bilan birga, iqtisodiy yo'nalishdagi oliy ta'lim muassasalari uchun bu texnologiyalar alohida amaliy ahamiyat kasb etadi. Chunki iqtisodiy masalalarni matematik modellar, statistik jadvallar, grafik tahlillar va elektron hisoblash vositalari orqali o'rganish bo'lajak mutaxassislarining kasbiy kompetensiyasini mustahkamlaydi.

Shu o'rinda ta'kidlash joizki, AKTdan foydalanishning haqiqiy samarasi faqat texnik vositalarning mavjudligi bilan emas, balki ularni pedagogik maqsadga muvofiq, metodik jihatdan puxta va didaktik asoslangan holda qo'llash bilan belgilanadi. Demak, o'qituvchi nafaqat fanni chuqur bilishi, balki raqamli resurslardan oqilona foydalanish, elektron ta'lim muhitini boshqarish va talabalarni faol bilish jarayoniga jalb etish kompetensiyasiga ham ega bo'lishi zarur. Shuningdek, ta'lim muassasalarida AKTdan foydalanish uchun zarur infratuzilma, sifatli dasturiy ta'minot va metodik qo'llab-quvvatlash tizimi mavjud bo'lishi muhimdir.

Umuman olganda, matematika darslarida axborot-kommunikatsiya texnologiyalaridan foydalanish pedagogik nuqtai nazardan istiqbolli, amaliy jihatdan samarali va ta'lim sifatini oshirishga xizmat qiluvchi yo'nalishdir. Mazkur yondashuv matematika ta'limini yangilash, talabalar bilimini

mustahkamlash, ularning mantiqiy va kasbiy tafakkurini rivojlantirish hamda raqamli ta'lim muhitida muvaffaqiyatli faoliyat yuritishga tayyorlashda muhim ahamiyatga ega.

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STATISTICS OF AI-DRIVEN DIGITALIZATION AND MANAGEMENT IN HEALTHCARE SECTORS OF UZBEKISTAN

Abstract: *This article examines the role of statistics, artificial intelligence (AI), and digitalization in the management and transformation of healthcare sectors in Uzbekistan. Drawing on data from national and international sources, the study analyzes how Uzbekistan has leveraged digital platforms, AI-driven diagnostics, and electronic health management systems to modernize its healthcare infrastructure. Using a descriptive-analytical methodology grounded in secondary data, the study presents quantitative evidence through tables and charts illustrating key trends in digital health adoption, healthcare investment, and AI integration from 2020 to 2025. The findings reveal that Uzbekistan has made significant progress in deploying unified electronic medical records, reducing diagnostic times through AI, and expanding private healthcare provision.*

Keywords: *statistics, artificial intelligence, Uzbekistan, healthcare management, digitalization, digital health, DMED, healthcare reform*

Introduction

Uzbekistan, Central Asia’s most populous nation with over 36 million inhabitants, has embarked on a sweeping transformation of its healthcare system since 2018. The country’s ambitious development framework—the Uzbekistan 2030 strategy—places healthcare modernization, digitalization, and the adoption of artificial intelligence at the center of national policy priorities (President of the Republic of Uzbekistan, 2024). Between 2021 and 2025, the government allocated approximately €16.3 billion to the healthcare sector, signaling an unprecedented commitment to infrastructure renewal, digital integration, and human capital development (Euronews, 2026).

Globally, digital health technologies and AI have reshaped healthcare delivery, enabling faster diagnostics, more efficient resource management, and improved patient outcomes (WHO, 2021; Topol, 2019). However, developing and transitional economies face unique challenges in adopting these technologies, including limited digital infrastructure, workforce shortages, and fragmented data systems (World Bank, 2025). Uzbekistan’s experience offers a valuable case study of how a middle-income country can strategically deploy statistical frameworks, AI tools, and digital management platforms to address these challenges.

The statistical foundations for evidence-based healthcare management in Uzbekistan are anchored in the work of the National Statistics Committee (stat.uz), which publishes annual compendia on healthcare indicators, demographic trends, and social development (National Statistics Committee, 2024). These datasets, combined with international monitoring by the World Health Organization, the World Bank, and UNICEF, provide the empirical basis for tracking progress in healthcare digitalization. Despite growing interest in Uzbekistan's digital health reforms, systematic analyses integrating statistical evidence, AI applications, and management outcomes remain scarce in the academic literature.

Methodology

This study employs a descriptive-analytical research design based on secondary data collection and synthesis. The methodology was selected to enable a comprehensive assessment of digitalization and AI integration in Uzbekistan's healthcare sector without the constraints of primary field research, and is consistent with established approaches to health systems analysis in transitional economies (Rechel et al., 2013).

Data Sources. Quantitative data were drawn from multiple authoritative sources. National-level healthcare statistics were obtained from the National Statistics Committee of the Republic of Uzbekistan (stat.uz), including its annual publication Healthcare in Uzbekistan (2023–2024) and the Statistical Yearbook of the Regions of Uzbekistan (2024). International datasets were sourced from the World Health Organization Global Health Observatory (data.who.int), the World Bank Open Data platform (data.worldbank.org), UNICEF country profiles, Statista Digital Health Market Forecasts, and the CEOWORLD Healthcare Index (2024). Policy documents included presidential decrees, the Strategy for the Development of Artificial Intelligence Technologies until 2030 (Resolution PP-358, October 14, 2024), and

Results

Healthcare Investment Trends

Government investment in healthcare has risen substantially since 2021, reflecting the priority status assigned to the sector under the Uzbekistan 2030 strategy. Figure 1 presents the annual investment trajectory from 2021 to 2025, demonstrating a general upward trend with total cumulative spending reaching approximately €16.3 billion over the five-year period (Euronews, 2026). The 2025 allocation alone amounted to €3.2 billion, directed toward infrastructure modernization, digital system deployment, and medical education reform. This investment has enabled the establishment of 231 maternity complexes and 46 inter-district perinatal centers, equipped with advanced monitoring technologies valued at approximately €40.46 million (Euronews, 2026).

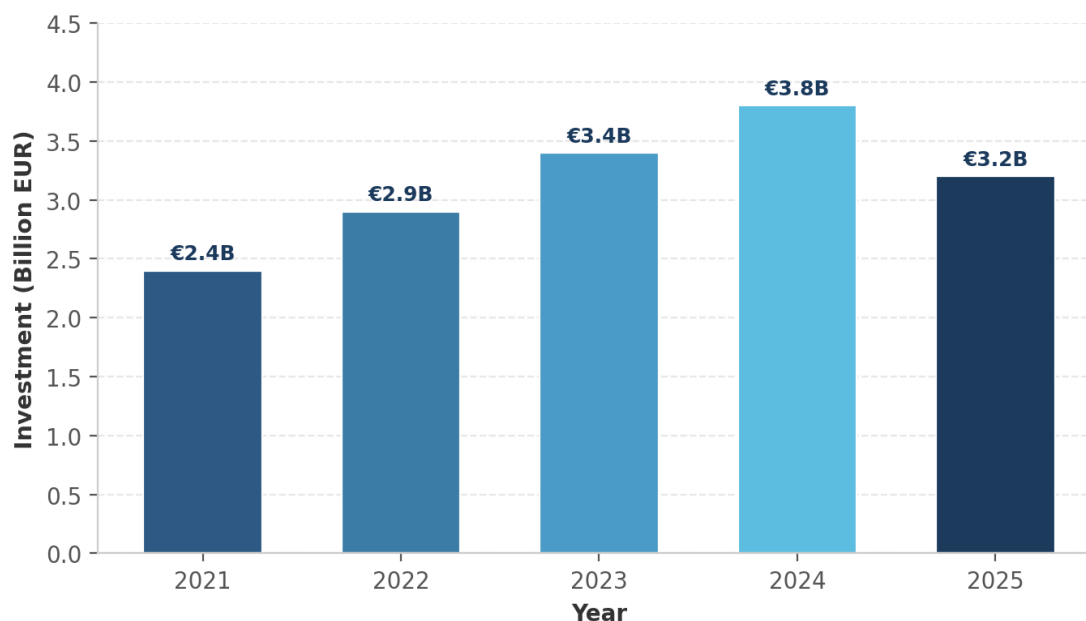


Figure 1. Government healthcare investment in Uzbekistan (2021-2025)
Source: *Compiled from Euronews (2026), P4H Network (2024), and WHO (2024) reports.*

Digital Health Infrastructure and Key Indicators

Table 1 presents a summary of key digitalization and healthcare indicators tracked across the period 2020–2025. The most notable developments include the rapid expansion of the DMED unified electronic health platform, which has grown from covering 12.5 million citizens in 2020 to approximately 37 million by 2025—effectively encompassing the entire population (Caspian Post, 2025). Simultaneously, the number of private healthcare clinics has nearly tripled from approximately 3,500 in 2017 to over 9,000 by 2025 (Euronews, 2026), reflecting the government’s public-private partnership strategy. Average consultation times per patient have fallen from 30 minutes to 17 minutes as a result of digital workflow optimization (Euronews, 2026).

Table 1.

Key Healthcare Digitalization Indicators in Uzbekistan (2020–2025)

Indicator	2020	2022	2024	2025
Private healthcare clinics	~3,500	~5,800	~7,600	~9,000
DMED registered citizens (millions)	12.5	24.0	34.0	37.0
AI-based health projects	0	3	12	20+
Consultation time (min/patient)	30	25	20	17
Health expenditure (% of GDP)	5.3	5.1	5.4	5.6
Physicians per 1,000 population	2.6	2.7	2.8	2.9

Sources: National Statistics Committee (stat.uz, 2024); Euronews (2026); Caspian Post (2025); WHO (2024); P4H Network (2024); Statista (2024).

AI Applications in Healthcare

Table 2 details the specific AI applications that have been deployed or piloted in Uzbekistan's healthcare system as of 2025. The most impactful implementations include AI-powered medical image analysis for breast cancer and stroke detection, which has reduced diagnostic processing times by approximately 80 percent (President of the Republic of Uzbekistan, 2025). In rural regions, AI-assisted retinal cameras now screen premature infants for retinopathy, enabling diagnosis in areas previously lacking specialist ophthalmologists (Euronews, 2026). The electronic prescription system, integrated into the DMED platform, has algorithmically reduced unnecessary prescriptions by 40 percent, improving both patient safety and pharmaceutical resource management (Caspian Post, 2025). More than 20 AI-based healthcare projects are currently in progress, with plans to launch over 10 additional projects in 2026 (Euronews, 2026; Kun.uz, 2025).

Table 2.
AI Applications in Uzbekistan's Healthcare Sector (2024–2025)

AI Application Area	Technology Used	Reported Outcome	Implementation Status
Breast cancer screening	Medical image analysis	80% faster diagnostics	Operational in Tashkent
Stroke detection	Neural network imaging	80% reduction in diagnosis time	Pilot in republican centers
Retinopathy screening	AI-assisted retinal cameras	Remote neonatal diagnosis	Active in rural regions
Electronic prescriptions	DMED platform algorithms	40% reduction in unnecessary Rx	Nationwide
Digital medical assistant	NLP + speech recognition	Reduced documentation burden	Pilot in Almazar, Yunusabad
Medical education simulation	AI-driven simulation centers	Enhanced clinical training	Operational in universities

Sources: President.uz (2025); Euronews (2026); Oxford Insights (2025); Kun.uz (2025); Caspian Post (2025).

Discussion

The results presented above demonstrate that Uzbekistan has made remarkable strides in integrating digital technologies and AI into its healthcare management infrastructure within a relatively short timeframe. Several dimensions of this transformation merit deeper analysis and contextualization.

First, achieving near-universal electronic health record coverage for 37 million citizens in approximately four years places Uzbekistan among the more successful e-health rollouts in the post-Soviet space, contrasting with fragmented digital health landscapes in neighboring countries (WHO Europe, 2024). The DMED system's integration of records, appointments, results, and prescriptions within a single platform aligns with WHO recommendations for health information system design (WHO, 2023).

Second, the application of AI in clinical diagnostics—particularly the 80 percent reduction in breast cancer and stroke detection times—indicates that Uzbekistan is selectively adopting AI technologies where the clinical impact is most immediate and measurable. This targeted approach is consistent with the recommendations of the Oxford Insights Government AI Readiness framework, which advises developing countries to prioritize AI deployments in areas with acute workforce shortages and high disease burden (Oxford Insights, 2025). The national AI strategy's explicit goal of ranking among the top 50 countries on the Government AI Readiness Index by 2030 provides a quantifiable benchmark for tracking progress (Regulations.AI, 2024).

Third, the rapid growth of private healthcare provision highlights the role of public-private partnerships in expanding service capacity (World Bank, 2025). However, persisting challenges remain: physician density stands at 2.8 per 1,000 population, below the WHO European Region average; and out-of-pocket payments have historically exceeded 50 percent of total health spending (P4H Network, 2024; Destatis, 2024). These constraints suggest that digitalization alone cannot resolve equity gaps without complementary financing reforms.

Fourth, the allocation of \$50 million for supercomputer procurement and planned collaboration with NVIDIA signal the government's recognition that AI scalability depends on computational infrastructure (Gov.uz, 2025). The expansion from 20 active AI healthcare projects to 100 cross-sectoral projects will require sustained attention to data governance, algorithm validation, and workforce upskilling. The national Big Data database initiative, mandated for completion by September 2025, will be a critical enabler (Lex.uz, 2024).

The Statista Digital Health Market Forecast projects Uzbekistan's digital health market to grow at 11.33 percent annually through 2029, reaching \$304.70 million (Statista, 2024). The 2024 CEOWORLD Healthcare Index ranked Uzbekistan 64th globally—the highest in Central Asia—confirming that reform efforts are yielding measurable improvements in healthcare quality (Times of Central Asia, 2025).

Conclusion

This study has demonstrated, through a systematic review of statistical evidence, that Uzbekistan's healthcare sector is undergoing a transformative shift driven by digitalization, AI integration, and reformed management approaches. The deployment of the DMED electronic health platform to cover 37 million citizens, the application of AI to reduce diagnostic times for life-threatening conditions by up to 80 percent, and the tripling of private healthcare facilities collectively illustrate a healthcare system in accelerated modernization.

Statistical data from national and international sources converge on a clear narrative: Uzbekistan has moved beyond policy aspiration to measurable implementation. The national AI strategy, backed by substantial investment and institutional infrastructure, provides a credible roadmap toward 2030 targets. However, sustained progress depends on closing the physician density gap, reducing out-of-pocket expenditure, ensuring equitable digital access across regions, and building a robust regulatory framework for AI in clinical decision-making.

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ORGANIZATION OF MEDICAL CARE PROVISION DURING THE COVID-19 PANDEMIC

Abstract. *By the mid-20th century, humanity had achieved unprecedented success in combating infectious diseases. These achievements were primarily based on discoveries in the diagnosis, treatment, and prevention of infectious diseases, as well as extensive efforts to implement these findings in practice.*

Keywords: *coronavirus, pandemic, immunogenicity, epidemiology, prevention.*

The primary goal of the global response to COVID-19 is to slow and stop disease transmission, identify every suspected case, isolate and test them, and ensure timely and appropriate care for patients. The location of the recommended medical service depends on the epidemiological scenario: this may be a COVID-19 dedicated medical facility or home-based care.

The Strategic Preparedness and Response Plan defines the WHO's approach to ending the COVID-19 pandemic and sets strategic objectives for developing a systematic approach for national stakeholders. The WHO has set the following tasks in combating COVID-19:

1. Slow and stop the spread of the virus;
2. Ensure appropriate care for all patients;
3. Minimize the negative impact of the epidemic on health systems, social services, and economic activities.

The WHO plans to engage all stakeholders in three key areas to address emerging challenges:

1. Enhancing global coordination of all stakeholders – from scientists to industry, from civil society to non-governmental organizations (NGOs). Actions of all stakeholders in the field of global research and development need to be aligned.
2. Global coordination mechanism – a voluntary structure established to facilitate information exchange, incentivize funders, product manufacturers, and researchers. Such coordination is necessary to address gaps in research and prevent duplication of efforts.
3. Supporting clear and transparent processes for identifying priority areas in scientific research and innovation. A coordinated global research roadmap provides potential donors and researchers with critical information, enabling them

to identify priority investment areas and research directions.

4. Creating a common platform for standardized processes, protocols, and tools, as well as for sharing samples, data, and information. As a global research community, it is essential to establish common standards for clinical trials, sample and data sharing during the current and future epidemics. Such harmonization ensures the use of only the most reliable methods in any research. The WHO facilitates stakeholder interactions to agree on standardized protocols for sample collection, storage, shipment, delivery, analysis, recording, and data entry. Shared platforms provide a common space for data, results, and conclusions. Additionally, a strategy for disseminating information is developed to enable the exchange of research data and findings. Core clinical trial protocols ensure quality assurance and facilitate aggregation of scientific data.

Clinical practice for COVID-19 should be based on information hosted on the WHO international platform. Logistics management, procurement, and supply chain oversight are considered key components of preparedness and rapid response measures.

Material and methods. Most researchers emphasize that when a new disease, previously unknown to medical science and practice, is detected or emerges, proper diagnosis is essential to provide appropriate and specialized medical care. Early identification of patients, effective treatment, and timely organization of epidemic control measures are of critical importance. From this perspective, special attention should be paid to the clinical signs, epidemiological characteristics, and laboratory diagnostic criteria of COVID-19. The COVID-19 pandemic has entered history as a global emergency, placing enormous responsibilities on the entire healthcare system, particularly primary healthcare and family physicians. According to Yodgorova M. and colleagues, during the pandemic, primary healthcare institutions provided the population not only with medical but also psychological and social support. In such a situation, representatives of the primary healthcare system were responsible for daily household monitoring, providing advice and recommendations, organizing daily medical check-ups, and ensuring infection control.

Results. According to sources, the specificity of the clinical approach lies in the diversity of pathological processes and the nature of response measures, making the evaluation of the effectiveness of different healthcare services in both quality and quantity long-standing and still relevant. From this perspective, family medicine is considered the most effective and widely adopted clinical approach.

Early detection and positive dynamics of follow-up are ensured by the special role of family medicine representatives and ambulatory care specialists. Research results indicate that identifying individuals with infectious diseases, hospitalization/separation, and follow-up demonstrate stable positive trends, reflecting the strength of interaction among family doctors, ambulatory facilities, and specialists in sanitary-epidemiological oversight and public health.

Some researchers emphasize the importance of specialist competence, infection monitoring, data analysis, and timely notification of relevant

stakeholders in the provision of medical care. The WHO emphasizes the importance of developing and implementing infection prevention and control (IPC) measures, training specialists, and supporting responsible personnel to prevent healthcare worker infections and the spread of COVID-19 in medical facilities. Even in countries with poorly established IPC systems, partners (WHO, CDC, UNICEF, etc.) should assess IPC capacity, including patient triage and the availability of ventilated isolation units, and assist in determining patient routing accordingly. Patient triage, early detection, application of standard precautions, isolation, and referral should comply with WHO requirements.

Conclusion

Thus, the literature analysis shows that during the early stage of the pandemic, measures against COVID-19 were focused on ensuring global preparedness and rapid response. The emergence of COVID-19 placed healthcare professionals at the forefront of tasks related to rapid diagnosis and provision of medical care to patients. Furthermore, the analysis indicates that, given the interconnected nature of health and economic challenges, protection against infectious diseases cannot be confined within the borders of a single country. Instead, safeguarding against these threats requires comprehensive global efforts and collaborative action. Thus, the final conclusion from the literature review is that COVID-19, which emerged in 2020 as an “exotic” infection, cannot be fully eliminated at this stage and is increasingly exhibiting an “endemic” nature. Accordingly, the package of medical services aimed at managing this disease must evolve and improve. In this context, as a general basis (platform) for selecting the medical services provided, only the WHO’s “Response Program” for infectious disease management can be adopted from the perspective of the current situation. In particular, the standard definition of an event should be considered the primary criterion for differentiating each COVID-19 case. The aim and essence of the present study are grounded precisely in these principles.

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ZAMONAVIY GEOGRAFIYA XONASI: TALABALARNING FAZOVIIY TAFAKKURI VA AMALIY KO'NIKMALARINI RIVOJLANTIRISH OMILI SIFATIDA

Annotatsiya. Mazkur maqolada zamonaviy geografiya xonasini tashkil etishning nazariy va amaliy jihatlarini hamda uning talabalarning fazoviy tafakkuri va amaliy ko'nikmalarini rivojlantirishdagi o'rni tahlil qilingan. Tadqiqotda geografiya ta'limida o'quv ko'rgazmali vositalar (xaritalar, globuslar, diagrammalar, modellar va tabiiy namunalarning) didaktik imkoniyatlari va ularning o'quv jarayonidagi samaradorligi yoritilgan. Shuningdek, multimedia vositalari, raqamli atlaslar hamda onlayn geografik platformalarning talabalarda fazoviy tasavvur, mantiqiy tafakkur va tahliliy fikrlashni shakllantirishdagi ahamiyati asoslab berilgan. Bundan tashqari, maqolada geografik asboblar (kompas, barometr, termometr, anemometr va boshqalar) bilan ishlash orqali talabalarda amaliy ko'nikmalarni rivojlantirish, kuzatuvchanlikni oshirish, tahlil qilish va xulosa chiqarish malakalarini shakllantirishning metodik asoslari ochib berilgan.

Kalit so'zlar: geografiya ta'limi, geografiya xonasi, ko'rgazmali vositalar, xarita, globus, multimedia vositalari, raqamli atlaslar, geografik asboblar, fazoviy tafakkur, tahliliy fikrlash.

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MODERN GEOGRAPHY ROOM: AS A FACTOR IN DEVELOPING STUDENTS' SPATIAL THINKING AND PRACTICAL SKILLS

Annotation. This article analyzes the theoretical and practical aspects of organizing a modern geography classroom and its role in developing students' spatial thinking and practical skills. The study highlights the didactic potential of instructional visual aids used in geography education, including maps, globes,

diagrams, models, and natural specimens, as well as their effectiveness in the teaching and learning process. Furthermore, the significance of multimedia tools, digital atlases, and online geographic platforms in fostering students' spatial perception, logical reasoning, and analytical thinking is substantiated. In addition, the paper reveals the methodological foundations for developing students' practical skills through the use of geographic instruments (such as compass, barometer, thermometer, anemometer, etc.), enhancing their observational abilities, and improving their capacity for analysis and drawing conclusions.

Keywords: *geography education, geography room, visual teaching aids, maps, globe, multimedia tools, digital atlases, geographic instruments, spatial thinking, analytical thinking*

KIRISH

Hozirgi globallashuv va axborotlashuv jarayonlari sharoitida ta'lim tizimini modernizatsiya qilish, talabalarning bilim, ko'nikma va kompetensiyalarini zamonaviy talablar asosida rivojlantirish ustuvor vazifalardan biri sifatida e'tirof etilmoqda. Ayniqsa, tabiiy fanlar tarkibiga kiruvchi geografiya ta'limi talabalarda fazoviy tafakkur, tahliliy fikrlash, tabiat va jamiyat o'rtasidagi o'zaro bog'liqlikni anglash kabi muhim kompetensiyalarni shakllantirishda alohida ahamiyat kasb etadi. Shu jihatdan geografiya fanini samarali o'qitish nafaqat nazariy bilimlarni yetkazish, balki amaliy ko'nikmalarni shakllantirish bilan uzviy bog'liqdir.

Zamonaviy ta'lim konsepsiyalarida, xususan, kompetensiyaviy yondashuv, STEAM ta'limi hamda raqamli pedagogika doirasida o'quv jarayonini tashkil etishda o'quv-moddiy bazaning o'rni tobora ortib bormoqda. Geografiya xonasi esa ushbu jarayonning markaziy elementi sifatida nafaqat o'quv faoliyati olib boriladigan muhit, balki talabalarning bilish faoliyatini rag'batlantiruvchi, ularning mustaqil va ijodiy fikrlashini rivojlantiruvchi didaktik makon hisoblanadi. Shu sababli geografiya xonasini zamonaviy talablar asosida maqbul jihozlash, uni interfaol va innovatsion vositalar bilan boyitish dolzarb ilmiy-amaliy muammolardan biri sifatida qaralmoqda.

Mazkur muammo bo'yicha olib borilgan ilmiy tadqiqotlar shuni ko'rsatadiki, geografiya ta'limida ko'rgazmali vositalar va texnik jihozlardan samarali foydalanish talabalarning bilimni o'zlashtirish darajasini sezilarli darajada oshiradi. Xususan, an'anaviy o'quv vositalari — xaritalar, globuslar, diagrammalar hamda modellar talabalarda fazoviy tasavvur va mantiqiy tafakkurni shakllantirishda muhim vosita sifatida e'tirof etilgan. Shu bilan birga, zamonaviy tadqiqotlarda raqamli texnologiyalar, jumladan, interfaol doskalar, geografik axborot tizimlari (GIS), virtual ta'lim texnologiyalarining ta'lim samaradorligini oshirishdagi ahamiyati alohida ta'kidlanmoqda. Biroq mavjud tadqiqotlar, asosan, alohida o'quv vositalarining samaradorligini o'rganishga qaratilgan bo'lib, geografiya xonasini kompleks tizim sifatida tashkil etish, ya'ni an'anaviy va innovatsion vositalarning integratsiyalashgan holda qo'llanilishi orqali talabalarning fazoviy tafakkuri va amaliy ko'nikmalarini rivojlantirish masalalari

yetarli darajada yoritilmagan. Shu nuqtai nazardan, mazkur maqola geografiya xonasini zamonaviy didaktik va texnologik talablar asosida tashkil etish hamda uning talabalar bilimini oshirishdagi kompleks ta'sirini o'rganishga qaratilganligi bilan ilmiy ahamiyat kasb etadi.

Tadqiqotning maqsadi — zamonaviy geografiya xonasini jihozlashning nazariy-metodik asoslarini tahlil qilish va uning talabalarning fazoviy tafakkuri hamda amaliy ko'nikmalarini rivojlantirishdagi o'rnini aniqlashdan iborat. Ushbu maqsadga erishish jarayonida ta'limda qo'llanilayotgan an'anaviy va innovatsion vositalarning o'zaro uyg'unligi, ularning didaktik imkoniyatlari hamda o'quv jarayoniga ta'siri tizimli yondashuv asosida o'rganiladi.

ADABIYOTLAR TAHLILI

Zamonaviy geografiya xonasining talabalarning fazoviy tafakkuri hamda amaliy ko'nikmalarini rivojlantirishdagi ahamiyatini o'rganish jarayonida mahalliy va xorijiy olimlar tomonidan olib borilgan ilmiy tadqiqotlari tahlil qilindi. Tahlil natijalari shuni ko'rsatadiki, ushbu yo'nalish bugungi kunda pedagogika va geografiya didaktikasining muhim ilmiy muammolaridan biri sifatida qaralmoqda. Jumladan, xorijlik taniqli olimlardan biri bo'lgan David Lambert geografiya ta'limining asosiy vazifasi talabalarda "geografik fikrlash"ni shakllantirishdan iborat ekanligini ta'kidlab, bunda o'quv muhitining, xususan, sinf xonasining didaktik jihatdan to'g'ri tashkil etilishi muhim omil ekanligini qayd etadi. Uning fikricha, geografiya xonasi faqat bilim beruvchi makon emas, balki talabalarning fazoviy tafakkurini rivojlantiruvchi interfaol muhitdir [1].

Shuningdek, Michael Solem tomonidan olib borilgan tadqiqotlarda geografiya ta'limida ko'rgazmali vositalar va xaritalardan foydalanish talabalarning tahliliy fikrlash darajasini oshirishi ilmiy jihatdan asoslangan. Muallif xaritalar bilan ishlash ko'nikmalari fazoviy tafakkurning asosiy komponenti ekanligini alohida ta'kidlaydi [2].

Sarah Bednarz esa geografik axborot tizimlari (GIS) va raqamli texnologiyalarni ta'lim jarayoniga joriy etish talabalarning murakkab geografik jarayonlarni tushunish darajasini sezilarli darajada oshirishini ko'rsatib beradi. Uning tadqiqotlarida GIS asosidagi ta'lim muhitining samaradorligi empirik ma'lumotlar bilan isbotlangan [3].

Boshqa bir tadqiqotchi Joseph Kerski raqamli atlaslar va interfaol platformalar talabalarda mustaqil tahlil qilish va qaror qabul qilish ko'nikmalarini rivojlantirishda muhim vosita ekanligini qayd etadi. Unga ko'ra, zamonaviy geografiya xonasi raqamli resurslar bilan boyitilgan bo'lishi zarur [4].

Margaret Roberts o'z tadqiqotlarida geografiya ta'limida vizual materiallarning (diagramma, model, xarita) didaktik ahamiyatini ochib berib, ular orqali talabalarning abstrakt tushunchalarni anglash darajasi oshishini ta'kidlaydi [5].

Daniel Edelson tomonidan ilgari surilgan "learning-for-use" modeli esa talabalarning bilimni amaliy faoliyat bilan bog'lash zarurligini asoslaydi. Bu yondashuv geografiya xonasida amaliy mashg'ulotlarning muhimligini ko'rsatadi [6].

Roger Downs va David Stea tadqiqotlarida fazoviy tafakkur insonning atrof-muhitni idrok etish va tahlil qilish qobiliyatining asosi sifatida talqin etiladi. Ularning fikricha, vizual va fazoviy materiallardan foydalanish ushbu tafakkurni rivojlantirishda hal qiluvchi rol o'ynaydi [7].

Xalqaro ilmiy nashrlarda chop etilgan boshqa tadqiqotlarda ham zamonaviy ta'lim muhitining samaradorligi keng yoritilgan. Masalan, John Hattie ta'lim samaradorligiga ta'sir etuvchi omillarni tahlil qilib, o'quv muhitining sifati talabalarning natijalariga bevosita ta'sir ko'rsatishini aniqlagan [8]. Lev Vygotskyning ijtimoiy-konstruktivistik yondashuvi esa o'quv muhitining interfaol bo'lishi bilimlarni samarali o'zlashtirishga xizmat qilishini nazariy jihatdan asoslaydi [9]. Jerome Bruner esa o'quv jarayonida vizual va amaliy faoliyatning ahamiyatini ta'kidlab, bilimlarni bosqichma-bosqich shakllantirish zarurligini ko'rsatadi [10].

Mahalliy tadqiqotchilar orasida geografiya ta'limining metodik asoslarini o'rgangan olimlar ham mazkur masalaga alohida e'tibor qaratgan. Jumladan, B.X.Xo'jayev geografiya fanini o'qitishda ko'rgazmali va jonli vositalardan samarali foydalanish talabalarning bilimini chuqur o'zlashtirishga xizmat qilishini ta'kidlaydi [11, 12, 13]. R.A.Mamatqulov esa geografiya xonasini zamonaviy jihozlash talabalarning fanlarga bo'lgan qiziqishini oshirishda muhim omil ekanligini qayd etadi [14]. Shuningdek, N.O.Abdullayeva o'z tadqiqotlarida interfaol metodlar va multimedia vositalarining qo'llanilishi talabalarning mustaqil fikrlashini rivojlantirishini ilmiy asoslab bergan [15, 16]. Sh.S.Sharipov ta'lim jarayonida innovatsion texnologiyalardan foydalanish talabalarning kompetensiyalarini shakllantirishda muhim ahamiyatga ega ekanligini ta'kidlaydi [17].

Yuqoridagi ilmiy manbalar tahlili shuni ko'rsatadiki, zamonaviy geografiya xonasini tashkil etish nafaqat o'quv vositalarini yangilash, balki ularni integratsiyalashgan holda qo'llash orqali talabalarning fazoviy tafakkuri va amaliy ko'nikmalarini rivojlantirishga xizmat qiladi. Shu bilan birga, mavjud tadqiqotlar asosan alohida vositalar samaradorligini o'rganishga qaratilgan bo'lib, geografiya xonasini kompleks didaktik tizim sifatida o'rganish yetarli darajada yoritilmagan. Mazkur holat ushbu tadqiqotning dolzarbligini belgilab, geografiya xonasini integrativ yondashuv asosida o'rganish zarurligini ko'rsatadi.

TADQIQOT METODOLOGIYASI

Mazkur tadqiqot zamonaviy geografiya xonasining talabalarning fazoviy tafakkuri hamda amaliy ko'nikmalarini rivojlantirishdagi pedagogik ahamiyatini aniqlashga qaratilgan bo'lib, unda tizimli, kompleks va integrativ yondashuv asosida nazariy hamda empirik tadqiqot metodlari majmuasidan foydalanildi.

Pedagogik kuzatuv metodi

Tadqiqot jarayonida pedagogik kuzatuv metodi asosiy empirik usullardan biri sifatida qo'llanildi. Kuzatuvlar geografiya fanidan tashkil etilgan real o'quv mashg'ulotlari jarayonida olib borilib, talabalarning bilish faoliyati va amaliy harakatlari tizimli ravishda monitoring qilindi.

Taqqoslash (komparativ) metodi

Mazkur tadqiqotda taqqoslash (komparativ) metodi muhim tahliliy vosita sifatida qo'llanildi. Ushbu metod yordamida an'anaviy jihozlangan geografiya xonalari va zamonaviy texnologiyalar bilan boyitilgan geografiya xonalarining didaktik imkoniyatlari hamda turli oliy ta'lim muassasalari (institut va universitetlar) geografiya xonalarining moddiy-texnik ta'minoti holati o'zaro taqqoslandi va tahlil qilindi. Komparativ tahlil natijalari zamonaviy geografiya xonasining talabalarda fazoviy tafakkur va amaliy ko'nikmalarni shakllantirishda an'anaviy yondashuvlarga nisbatan yuqori samaradorlikka ega ekanligini ilmiy jihatdan asoslash imkonini berdi.

Kompleks (integrativ) yondashuv

Tadqiqotda qo'llanilgan barcha metodlar o'zaro uzviy bog'liqlikda va integratsiyalashgan holda qo'llanildi. Bu yondashuv geografiya xonasini alohida elementlar yig'indisi sifatida emas, balki yaxlit didaktik tizim sifatida o'rganish imkonini yaratdi.

Kompleks yondashuv asosida an'anaviy va innovatsion o'quv vositalarining uyg'unlashtirilgan holda qo'llanilishi talabalarining bilim olish samaradorligini oshirishi, ularning fazoviy tafakkuri va amaliy faoliyatini rivojlantirishga xizmat qilishi ilmiy jihatdan asoslab berildi.

NATIJALAR

Mazkur tadqiqot doirasida zamonaviy geografiya xonasini tashkil etish va undan samarali foydalanishning talabalarining fazoviy tafakkuri hamda amaliy ko'nikmalarini rivojlantirishga ta'siri kompleks yondashuv asosida tahlil qilindi. Tadqiqot natijalari pedagogik kuzatuv, taqqoslash va analitik metodlar asosida umumlashtirildi.

1. Zamonaviy geografiya xonasining didaktik samaradorligi bo'yicha tadqiqot natijalari shuni ko'rsatdiki, zamonaviy texnologiyalar bilan jihozlangan geografiya xonasida tashkil etilgan darslar talabalarining bilimni o'zlashtirish darajasini sezilarli darajada oshiradi. Xususan, an'anaviy o'qitish shakllariga nisbatan:

- talabalarining darsdagi faolligi ortadi;
- mavzuni tushunish va idrok etish darajasi yaxshilanadi;
- mustaqil ishlash ko'nikmalari rivojlanadi.

Pedagogik kuzatuv natijalari zamonaviy jihozlangan muhitda talabalarining dars jarayonida faol ishtirok etishi va o'z fikrlarini erkin bayon etish darajasi oshganligini ko'rsatmoqdi.

2. Fazoviy tafakkurning rivojlanish ko'rsatkichlariga ko'ra, talabalarining xaritalar, globuslar va diagrammalar bilan ishlash jarayonini kengaytirish va faolligini oshirish natijasida:

- talabalarni xaritalarni tahlil qilish va undan xulosa chiqarish ko'nikmalari sezilarli darajada yaxshilangan;
- fazoviy tasavvur qilish (hududiy bog'liqliklarni anglash) darajasi oshgan;
- murakkab geografik jarayonlarni tushunish qobiliyati rivojlangan.

Ayniqsa, raqamli atlaslar va GIS texnologiyalaridan foydalanish talabalarining fazoviy tafakkurini rivojlantirishda yuqori samaradorlikka ega ekanligi aniqlandi.

3. Amaliy ko'nikmalarning shakllanishi. Geografik asboblar (kompas, barometr, termometr va boshqalar) bilan ishlash orqali talabalarda amaliy ko'nikmalarni rivojlantirish jarayoni ham alohida tahlil qilindi (1-rasm). Natijalarga ko'ra:

- talabalarining kuzatuvchanlik darajasi oshdi;
- tajriba va amaliy mashg'ulotlarga qiziqish kuchaydi;
- o'lchash, tahlil qilish va xulosa chiqarish malakalari shakllandi.

Bu esa nazariy bilimlarning amaliy faoliyat bilan uyg'unlashuvini ta'minlab, talabalarining kompetensiyalarini rivojlantirishga xizmat qildi.



1-rasm. Namangan davlat pedagogika instituti Geografiya yo'nalishi talabalarini geografik asboblar bilan o'lchov ishlarini amalga oshirish jarayoni

4. Taqqoslash natijalari (an'anaviy va zamonaviy yondashuv). Komparativ tahlil natijalari shuni ko'rsatdiki, zamonaviy geografiya xonasida tashkil etilgan o'quv jarayoni an'anaviy sharoitga nisbatan quyidagi ustunliklarga ega:

- talabalarining geografik bilimni o'zlashtirish darajasi yuqori bo'ladi;
- dars samaradorligi va qiziqarli tashkil etilishi ta'minlanadi;
- interfaollik va mustaqil fikrlash darajasi oshadi.

Shuningdek, turli ta'lim muassasalaridagi geografiya xonalarining jihozlanish darajasini taqqoslash natijasida zamonaviy texnologiyalar bilan boyitilgan xonalar yuqori didaktik samaradorlikka ega ekanligi aniqlandi.

Bundan tashqari, tadqiqot jarayonida Andijon, Buxoro va Namangan davlat pedagogika institutlaridagi geografiya xonalari vizual jihatdan tahlil qilindi va ularning didaktik imkoniyatlari o'zaro taqqoslandi.

O'xshash jihatlar:

✓ Barcha hududlardagi geografiya xonalarida globuslar, xaritalar va ko'rgazmali materiallar mavjud;

✓ O'quv jarayoni uchun vizual didaktik vositalardan faol foydalanish yo'lga qo'yilgan;

✓ Dars muhitida fazoviy tafakkurni rivojlantirishga yo'naltirilgan elementlar (devor xaritalari, modellashgan obyektlar) mavjud.

Farqli jihatlar:

Andijon davlat pedagogika instituti (2-rasm):

✓ Sinf xonalari vizual jihatdan boy va rang-barang tashkil etilgan;

✓ Har bir partada globus va davlat bayroqlari joylashtirilgan bo'lib, bu geosiyosiy tasavvurni shakllantirishga xizmat qiladi;

✓ Ko'rgazmali vositalarning ko'pligi o'quvchilarning darsdagi faolligini oshiradi.



2-rasm. Andijon davlat pedagogika institutining geografiya xonasi

Buxoro davlat pedagogika instituti (3-rasm):

✓ Geografiya xonalari tizimli va konseptual yondashuv asosida jihozlangan;

✓ Devoriy tasvirlar (biosfera, litosfera, gidrosfera) orqali tabiiy jarayonlarning yaxlit tasviri berilgan;

✓ Bu esa o'quvchilarda tizimli va ekologik tafakkurni rivojlantirishga xizmat qiladi.



3-rasm. Buxoro davlat pedagogika institutining geografiya xonasi

Namangan davlat pedagogika instituti (4-rasm):

- ✓ Xonalar zamonaviy va minimalistik dizayn asosida tashkil etilgan;
- ✓ Kitob javonlari, xaritalar va globuslar uyg'unligi nazariy va amaliy bilim integratsiyasini ta'minlaydi;
- ✓ O'quv muhiti tinch va tizimli o'rganishga yo'naltirilgan.



4-rasm. Namangan davlat pedagogika institutining geografiya xonasi

Ushbu tahlil shuni ko'rsatadiki, har bir hududda geografiya xonalari o'ziga xos didaktik yondashuv asosida shakllangan bo'lib, ularning barchasi o'quvchilarning fazoviy tafakkurini rivojlantirishga xizmat qiladi, ammo jihozlanish uslubi va metodik yo'nalishida farqlar mavjud.

5. Kompleks yondashuv natijalari. Tadqiqot natijalari an'anaviy va innovatsion o'quv vositalarining integratsiyalashgan holda qo'llanilishi talabalarning bilim olish samaradorligini oshirishda muhim omil ekanligini tasdiqladi. Xususan:

- vizual (xarita, globus) va raqamli (GIS, multimedia) vositalarning uyg'unligi;

- nazariy va amaliy faoliyatning integratsiyasi;

- interfaol metodlarning qo'llanilishi

talabalarning fazoviy tafakkuri, tahliliy fikrlashi va amaliy ko'nikmalarini kompleks rivojlantirishga xizmat qilishi aniqlandi.

Umumiy natijalar tahlili. Umumlashtirilgan natijalar shuni ko'rsatadiki, zamonaviy geografiya xonasini tashkil etish:

- talabalarning bilim darajasini oshiradi;

- ularning fazoviy tafakkurini rivojlantiradi;

- amaliy ko'nikmalarni shakllantiradi;

- ta'lim samaradorligini sezilarli darajada yaxshilaydi.

Shu tariqa, geografiya xonasini zamonaviy didaktik va texnologik talablar asosida jihozlash o'quv jarayonining sifatini oshirishda muhim pedagogik omil sifatida namoyon bo'ldi.

MUHOKAMA

Mazkur tadqiqot natijalari zamonaviy geografiya xonasini tashkil etish talabalarining fazoviy tafakkuri hamda amaliy ko'nikmalarini rivojlantirishda muhim pedagogik omil ekanligini ko'rsatdi. Olingan natijalarni ilmiy jihatdan tahlil qilish va ularni mavjud nazariy qarashlar bilan solishtirish mazkur bo'limning asosiy mazmunini tashkil etadi.

Avvalo, tadqiqot natijalari David Lambert tomonidan ilgari surilgan geografiya ta'limida "geografik fikrlash"ni shakllantirish g'oyasi bilan uyg'unlikda ekanligi kuzatildi [1]. Muallif ta'kidlaganidek, o'quv muhitining didaktik jihatdan to'g'ri tashkil etilishi talabalarining fazoviy tafakkurini rivojlantirishda muhim ahamiyatga ega. Ushbu tadqiqot natijalari ham zamonaviy jihozlangan geografiya xonalari talabalarining faolligini oshirishi va bilimni chuqurroq o'zlashtirishga xizmat qilishini tasdiqlaydi.

Shuningdek, tadqiqot natijalari Michael Solem va boshqalarning xaritalar va ko'rgazmali vositalardan foydalanish fazoviy tafakkurning asosiy komponenti ekanligi haqidagi ilmiy xulosalari bilan mos keladi [2]. Mazkur ishda ham globus, xarita va diagrammalar bilan ishlash talabalarining hududiy tafakkurini rivojlantirishda muhim vosita sifatida namoyon bo'ldi.

Raqamli texnologiyalar bilan bog'liq natijalar Sarah Bednarz va Joseph Kerski tadqiqotlari bilan uyg'unlikda ekanligi aniqlandi [3]. Xususan, GIS texnologiyalari va raqamli atlaslardan foydalanish talabalarining murakkab geografik jarayonlarni tushunish hamda tahlil qilish qobiliyatini oshirishda samarali vosita sifatida namoyon bo'ldi. Bu esa zamonaviy geografiya xonasini raqamli texnologiyalar bilan boyitish zarurligini yana bir bor tasdiqlaydi.

Mazkur tadqiqot natijalari Daniel Edelson tomonidan ishlab chiqilgan "learning-for-use" konsepsiyasi bilan ham ilmiy jihatdan asoslanadi [6]. Tadqiqot davomida amaliy mashg'ulotlar va geografik asboblar bilan ishlash talabalarining bilimni amaliy faoliyat bilan bog'lash ko'nikmalarini rivojlantirganligi kuzatildi. Bu esa nazariya va amaliyot integratsiyasining muhimligini ko'rsatadi.

Fazoviy tafakkurning shakllanishiga oid natijalar Roger Downs va David Stea tadqiqotlari bilan hamohang bo'lib, vizual va fazoviy materiallardan foydalanish insonning atrof-muhitni idrok etish qobiliyatini rivojlantirishda muhim omil ekanligi tasdiqlandi [7]. Mazkur ishda ham vizual vositalarning keng qo'llanilishi talabalarining fazoviy tasavvurini sezilarli darajada oshirgan.

Bundan tashqari, tadqiqot natijalari John Hattie ning ta'lim samaradorligiga o'quv muhitining ta'siri haqidagi ilmiy qarashlari bilan mos keladi. Zamonaviy jihozlangan geografiya xonalari talabalarining o'zlashtirish ko'rsatkichlarini oshirganligi ushbu nazariyani amaliy jihatdan tasdiqlaydi [8].

Pedagogik nuqtai nazardan, natijalar Lev Vygotsky ning ijtimoiy-konstruktivistik yondashuvi bilan hamohang bo'lib, interfaol o'quv muhitining mavjudligi bilimlarni samarali o'zlashtirishga xizmat qilishi aniqlandi [9]. Shuningdek, Jerome Bruner ta'kidlaganidek, vizual va amaliy faoliyat asosida bilimlarni bosqichma-bosqich shakllantirish samarali natija beradi [10].

Mahalliy olimlar tadqiqotlari bilan solishtirganda ham olingan natijalar uyg'unlikda ekanligi kuzatildi. Jumladan, B.X.Xo'jayev geografiya ta'limida ko'rgazmali vositalarning ahamiyatini ta'kidlagan bo'lsa, R.A.Mamatqulov geografiya xonasini zamonaviy jihozlash talabalarning qiziqishini oshirishini qayd etadi. Tadqiqot natijalari ushbu fikrlarni amaliy jihatdan tasdiqladi.

Shu bilan birga, tadqiqot natijalari geografiya xonalarining turli hududlarda (Andijon, Buxoro, Namangan) turlicha yondashuv asosida tashkil etilganligini ko'rsatdi. Bu esa Sh.S.Sharipov tomonidan ilgari surilgan innovatsion yondashuvlarning moslashuvchanligi haqidagi g'oyalarni tasdiqlaydi. Ya'ni, geografiya xonasini tashkil etishda yagona modeldan ko'ra, hududiy va didaktik ehtiyojlardan kelib chiqib yondashish samaraliroq hisoblanadi.

Biroq, tadqiqot jarayonida ayrim salbiy holatlar ham aniqlandi. Jumladan:

- barcha ta'lim muassasalarida geografiya xonalari zamonaviy ta'lim texnologiyalari bilan, shuningdek, geografik asboblarni to'liq jihozlanmagan;
- raqamli vositalardan foydalanish darajasi o'qituvchilarning malakasiga bog'liq bo'lib, bu borada ham kamchiliklar mavjud;
- ayrim hollarda an'anaviy vositalar bilan cheklanib, zamonaviy texnologiyalarga katta qiziqish bildirilmaydi;
- ayrim ta'lim muassasalari rahbariyatini o'quv honalarini zamonaviy jihozlanishiga jiddiy e'tibor qaratmaydi, zaruriy mablag'lar ajratilmaydi.

Mazkur holatlar kelgusida geografiya xonalarini modernizatsiya qilishda kompleks yondashuvni yanada takomillashtirish zarurligini ko'rsatadi.

Umuman olganda, olib borilgan tadqiqot natijalari zamonaviy geografiya xonasini tashkil etish faqat moddiy-texnik bazani yaxshilash bilan cheklanmasdan, balki didaktik, metodik va texnologik jihatlarning uyg'unlashuvi asosida amalga oshirilishi lozimligini ko'rsatadi. Bu esa talabalarning fazoviy tafakkuri va amaliy ko'nikmalarini rivojlantirishda yuqori samaradorlikka erishish imkonini beradi.

XULOSA

Xulosa qilib aytganda, mazkur tadqiqot natijalari zamonaviy geografiya xonasini tashkil etish talabalarning fazoviy tafakkuri va amaliy ko'nikmalarini rivojlantirishda muhim didaktik va pedagogik omil ekanligini ilmiy jihatdan asoslab berdi. Tadqiqot jarayonida qo'llanilgan kompleks yondashuv (nazariy tahlil, pedagogik kuzatuv va komparativ tahlil) asosida olingan natijalar quyidagi asosiy xulosalarni shakllantirish imkonini berdi.

Birinchidan, geografiya xonasining zamonaviy didaktik talablarga mos holda jihozlanishi talabalarning o'quv jarayonidagi faolligini oshiradi, bilimni o'zlashtirish darajasini yaxshilaydi va mustaqil fikrlash ko'nikmalarini rivojlantiradi. Bu esa o'quv muhitining sifati ta'lim samaradorligiga bevosita ta'sir ko'rsatishini tasdiqlaydi.

Ikkinchidan, xaritalar, globuslar, diagrammalar hamda modellar kabi ko'rgazmali vositalardan tizimli foydalanish talabalarning fazoviy tafakkurini shakllantirishda asosiy vosita bo'lib xizmat qiladi. Ayniqsa, raqamli atlaslar va GIS texnologiyalarining qo'llanilishi murakkab geografik jarayonlarni chuqurroq anglash imkonini beradi.

Uchinchidan, geografik asboblarni bilan ishlashga asoslangan amaliy mashg'ulotlar talabalarda kuzatuvchanlik, tahlil qilish va xulosa chiqarish kabi muhim kompetensiyalarni rivojlantiradi. Bu esa nazariy bilimlarning amaliy faoliyat bilan integratsiyasini ta'minlaydi.

To'rtinchidan, Andijon, Buxoro va Namangan davlat pedagogika institutlari geografiya xonalarining komparativ tahlili shuni ko'rsatdiki, turli hududlarda geografiya xonalari turlicha metodik yondashuv asosida tashkil etilgan bo'lsa-da, ularning barchasi talabalarining fazoviy tafakkurini rivojlantirishga xizmat qiladi. Shu bilan birga, jihozlanish darajasi va metodik yo'nalishdagi farqlar ta'lim samaradorligiga turlicha ta'sir ko'rsatadi.

Beshinchidan, an'anaviy va innovatsion o'quv vositalarining integratsiyalashgan holda qo'llanilishi eng yuqori samaradorlikni ta'minlovchi omil sifatida namoyon bo'ldi. Bu esa geografiya xonasini yaxlit didaktik tizim sifatida tashkil etish zarurligini ko'rsatadi.

Amaliy taklif va tavsiyalar

Tadqiqot natijalaridan kelib chiqib, quyidagi ilmiy asoslangan taklif va tavsiyalar ilgari suriladi:

Geografiya xonalarini standartlashtirish va modernizatsiya qilish. Oliy ta'lim muassasalarida geografiya xonalarini zamonaviy didaktik talablar asosida jihozlash bo'yicha yagona metodik standartlar ishlab chiqilishi lozim.

Raqamli texnologiyalarni keng joriy etish. Ta'lim jarayoniga GIS texnologiyalari, raqamli atlaslar, interfaol doskalar va virtual platformalarni joriy etish orqali o'quv jarayonining samaradorligini oshirish zarur.

O'qituvchilarning malakasini oshirish. Geografiya fanidan dars beruvchi pedagoglar uchun zamonaviy pedagogik texnologiyalar va raqamli vositalardan foydalanish bo'yicha muntazam malaka oshirish kurslarini tashkil etish tavsiya etiladi.

Amaliy mashg'ulotlar ulushini oshirish. O'quv rejalarda geografik asboblarni bilan ishlash, tajriba va kuzatuvlarga asoslangan mashg'ulotlar hajmini kengaytirish maqsadga muvofiq.

Hududiy tajribalarni ommalashtirish. Andijon, Buxoro va Namangan davlat pedagogika institutlarida mavjud ilg'or tajribalarni o'rganish va boshqa ta'lim muassasalariga joriy etish tizimini yo'lga qo'yish zarur.

Geografiya xonasini integrativ ta'lim makoniga aylantirish. Geografiya xonasini faqat dars o'tiladigan joy sifatida emas, balki ilmiy-amaliy faoliyat, loyiha ishlari va interfaol o'quv faoliyatlari amalga oshiriladigan innovatsion muhit sifatida rivojlantirish lozim.

Moddiy-texnik bazani mustahkamlash. Ta'lim muassasalarida geografiya xonalarini jihozlash uchun zarur moliyaviy resurslarni oshirish va homiylik hamda grant dasturlaridan foydalanishni kengaytirish tavsiya etiladi.

Umuman olganda, zamonaviy geografiya xonasini tashkil etish talabalarining fazoviy tafakkuri, tahliliy fikrlashi va amaliy ko'nikmalarini kompleks rivojlantirishga xizmat qiluvchi muhim pedagogik vosita hisoblanadi. Shu sababli geografiya xonasini zamonaviy didaktik va texnologik talablar asosida

tashkil etish ta'lim sifatini oshirishning ustuvor yo'nalishlaridan biri sifatida qaralishi lozim.

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SAMBO KURASHINING TEXNIK USULLARINI BAJARISHDA TEZKORLIK SIFATLARINI TAKOMILLASHTIRISH

Annotatsiya. Ushbu maqolada sambochilarning sportda muvaffaqiyatli ishtirok etishi uchun zarur bo'lgan tezkorlik sifatini rivojlantirish hamda sambo kurashi bilan shug'ullanuvchi sportchilar uchun o'quv mashg'ulot jarayonida texnik usullarini bajarishda tezkorlik sifatlarini takomillashtirish yuzasidan taklif va tavsiyalar ishlab chiqilgan

Kalit so'zlar. Sambo, texnik usul, tezkorlik, sport, takomillashtirish, jismoniy sifat, raqobat, maxsus mashqlar, kurash mashg'ulotlari.

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IMPROVEMENT OF SPEED QUALITIES IN PERFORMING TECHNICAL METHODS OF SAMBO WRESTLING

Abstract. This article presents proposals and recommendations for the development of agility qualities necessary for sambo wrestlers to successfully participate in sports, as well as for athletes involved in sambo wrestling to improve agility qualities when performing technical techniques during training.

Keywords: Sambo, technical method, speed, sport, improvement, physical quality, competition, special exercises, wrestling training.

Kirish

Zamonaviy sambo kurashi yildan-yilga shiddatli tus olmoqda. Xalqaro arenalarda g'oliblikni qo'lga kiritish uchun sportchidan faqatgina jismoniy kuch emas, balki kutilmagan vaziyatlarda tezkor qaror qabul qilish va usulni raqib ulgurmasidan avval yakunlash talab etiladi. Sambo texnikasining samaradorligi bevosita tezkorlik (speed) sifatiga bog'liq. Tezkorlik - bu insonning ma'lum vaqt oralig'ida maksimal darajadagi harakatlarni amalga oshira olish qobiliyatidir. Hozirgi zamonaviy sport sohasida, ayniqsa jismoniy tayyorgarlikni rivojlantirishga alohida e'tibor berilayotgan sambo kurashida, sportchilarni tayyorlash jarayonida tezkorlik jismoniy sifatining ahamiyati yuksakdir. Boshqa sport turlari kabi sportchilarning yuqori tezkorligi ularning yaxshi natijalarga

erishishlarini belgilaydi. Sambo sport turi uchun tezkorlikni rivojlantirish alohida ahamiyatga egadir. O'zbekiston Respublikasi mustaqillikka erishgandan so'ng jimoniy tarbiya va sportga bo'lgan e'tibor yanada kuchaytirildi. Sportchilarimiz Osiyo va jaxon miqyosidagi musobaqalarga erishib, O'zbekiston bayrog'ini yuqoriga ko'tarib kelishmoqda. Mustaqillik yillarida sportga qaratilayotgan katta e'tibor tufayli qilinayotgan olamshumul ishlar, islohatlar hammamizning ko'z o'ngimizda nomoyon bo'lmoqda. Jimoniy tarbiya va sportni yanada rivojlantirish uchun birqancha ishlar amalga oshirilmoqda. O'zbekiston Respublikasi Prezidentining 2017 yil 3 iyundagi PQ-3031 "Jismoniy tarbiya va ommaviy sportni yanada rivojlantirish chora tadbirlari to'g'risida"gi, O'zbekiston Respublikasi Prezidentining 2020 yil 24 yanvardagi PF-5924-son "O'zbekiston Respublikasida jismoniy tarbiya va sportni takomillashtirish va ommalashtirish chora-tadbirlari to'g'risida"gi farmoni, 2022 yil 29-iyuldagi PQ-336-sonli O'zbekiston Respublikasi Prezidentining "Sport kurashlarining olimpiya turlarini yanada rivojlantirish chora-tadbirlari to'g'risida"gi qarorlari Jismoniy tarbiya va ommaviy sportni rivojlantirish dasturining qabul qilinishi axolini sport bilan faol va muntazam shug'ullanishga ommaviy jalb qilish tarbiya jarayonining yana bir uzviy qismi bo'lib xizmat qiladi.

Tadqiqotning maqsadi

Sambochi sportchilarning texnik usullarni bajarishdagi harakat tezligini oshirish bo'yicha samarali mashg'ulot uslublarini ishlab chiqish va ularni amaliyotda asoslash.

Jahon arenalarida sambo bo'yicha o'tkazilayotgan xalqaro musobaqalarda yuqori natijalarni egallash uchun olib borilayotgan bellashuvlarni saviyasi sambochilarni texnik-taktik tayyorgarligini doimiy ravishda takomillashtirilib borilishi kerak. Sambochilarda turli oraliq masofadagi texnik harakatlarning bazaviy elementlarini bajarish usullarini tajribada asoslash. Tezlik sambo kurashida eng muhim komponentlardan biri hisoblanadi. Sambochi raqibni oldindan ko'ra olish va uning hujumlariga qarshi javob berishi uchun tezkor reaksiya vaqtiga ega bo'lishi kerak. Bu maqsadda tezlikni oshirishga qaratilgan mashqlarni bajarish kerak. Masalan, tezkor oyoq ishlashlari, raqibni aniqlab olishdagi tezkor reaksiyalarni rivojlantirish kurashchiga hujumda yaxshiroq imkoniyatlar yaratadi. Kurashchilarda tezkorlik jismoniy sifatining yetarli darajada rivojlanmaganligi ko'p hollarda murakkab texnik elementlarni noto'g'ri bajarayotgan yoki sekin bajarishga olib keladi.

Muammoning o'rganilganlik darajasi

Barcha sport turlarida, shu jumladan, kurash turlarida ham umumiy va maxsus jismoniy sifatlarning o'ziga xos ravishda farqlanuvchi xususiyatlari, ularni texnik tayyorgarlik komponentlariga bog'liq holda rivojlantirishning ilmiy, nazariy va uslubiy asoslari A.K.Ataev, A.R.Taymuratov, V.P.Filin, L.P.Matveev, L.P.Volkov, Yu.V.Verxoshanskiy, G.S.Tumanyan, V.N.Platonov, V.F.Boyko, G.V.Danko A. A.Xarlampiey, F.M.Zezyulin, D.L.Rudman, I.P.Kolodnikov, M.N.Lukashev, Yu.A.Shulika, E.M.Chumakov kabi yetakchi mutaxassis-olimlarning fundamental tadqiqotlariga muvofiq ochib berilgan.

Adabiyotlarni tahlil qilish jarayonida shug'ullanuvchining yoshi va ularning individual xususiyatlari tezlikni rivojlantirish imkoniyatlarini chegaralaydi. Qizlarda qulay yosh 11-12, o'g'il bolalarda esa 12-13 yosh hisoblanadi.

Tezkorlik deb, muayyan faoliyatni qisqa muddat ichida ijro etilishiga aytiladi.

Tezkorlikni takomillashtirish usullari

Tadqiqotlar shuni ko'rsatadiki, tezkorlikni rivojlantirish uchun "takroriy usul" va "o'yin usuli" eng samarali hisoblanadi. Sambochilar uchun quyidagi mashqlar tavsiya etiladi:

Signal bo'yicha ishlash: Murabbiyning ovozli yoki isual signali berilishi bilan usulni portlovchi tezlikda boshlash.

Og'irliklar bilan ishlash: Rezina tortqichlar (expanders) yordamida qarshilikni engib, usulni bajarish. Bu "portlovchi kuch"ni oshiradi.

Interval mashg'ulotlar: Qisqa vaqt ichida (10-15 soniya) maksimal tezlikda bir necha marta usulni takrorlash va so'ngra dam olish.

Tadqiqot natijalari

Pedagogik tajribalar shuni ko'rsatdiki, mashg'ulotlar jarayoniga haftasiga 3 marta maxsus tezkorlik mashqlarini kiritish, sportchilarning asosiy usullarni bajarish vaqtini o'rtacha 12-15% ga qisqartirishga imkon beradi. Bu esa musobaqa davomida raqibning himoyalaniishga ulgurmasligini ta'minlaydi.

Xulosa

Sambochilarga berilayotgan jismoniy yuklamalarni rivojlantirish va takomillashtirishda qo'llaniladigan mashqlar orqali ularning kunlik bajaradigan yuklamalarini albatta organizmni yosh toyifalarini mutuxassis darajasida chuqur taxlil qilib jismoniy rivojlanganligi, jinsiga, ruhiyatiga e'tibor bergan holda mashg'ulotlarni rejalashtirishni tavsiya etardik. Sambochilarning tezkorlik jismoni sifatini takomillashtirishga mo'ljallangan mashg'ulotlar strukturasining asosiy maqsadi –sportchilarning harakatlarini aniq va samarali bajarish, shu bilan birga ularning tezkor harakat qilish qobiliyatlarini rivojlantirishdir. Sambo kurashida texnik usullarni bajarishda tezkorlik sifatlarini takomillashtirish - bu tizimli jarayon bo'lib, u nafaqat jismoniy, balki nerv-mushak tizimining koordinatsiyasini ham rivojlantirishni talab etadi. Maxsus ishlab chiqilgan mashqlar majmuasi sportchining texnik mahoratini yangi bosqichga olib chiqadi va g'alaba koeffitsientini oshiradi.

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SAMBOCHILARNING TEXNIK-TAKTIK TAYYORGARLIGINI TAKOMILLASHTIRISH

Annotatsiya: Ushbu maqolada sambo kurashchilarining texnik va taktik harakatlarini birgalikda takomillashtirishning nazariy va amaliy asoslari tahlil qilinadi. Kurash jarayonida usullarni vaziyatga qarab to'g'ri tanlash va ularni samarali ijro etish metodikasi yoritilgan.

Kalit so'zlar: Sambo, texnika, taktika, tayyorgarlik, musobaqa faoliyati, kombinatsiya, hujum, himoya.

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IMPROVING THE TECHNICAL-TACTICAL TRAINING OF SAMBO PLAYERS

Abstract: This article analyzes the theoretical and practical foundations of the combined improvement of technical and tactical movements of sambo wrestlers. The methodology for choosing the right techniques depending on the situation and their effective implementation during the wrestling process is highlighted.

Keywords: Sambo, technique, tactics, preparation, competition activities, combination, attack, defense.

Kirish

Sambo - bu doimiy harakat va o'zgaruvchan vaziyatlar sporti. Bugungi kunda faqatgina boy texnik arsenalga (usullar to'plamiga) ega bo'lish g'alaba uchun yetarli emas. Sportchi ushbu usullarni qachon, qayerda va qaysi raqibga nisbatan qo'llashni bilishi, ya'ni yuqori taktik tafakkurga ega bo'lishi lozim. Texnik-taktik tayyorgarlik deganda, usullarni bajarish mahorati va ularni bellashuvga tatbiq etish san'atining uzviy bog'liqligi tushuniladi.

Sambo kurashining zamonaviy rivojlanish bosqichi sportchilardan yuqori dinamika va intellektual tayyorgarlikni talab etmoqda. Bellashuv vaqti qisqarishi va raqobatning kuchayishi natijasida, sportchining texnik mahorati uning tezkorlik sifatlari bilan qanchalik bog'langanligi hal qiluvchi ahamiyat kasb etmoqda. Tezkorlik - bu shunchaki jismoniy harakat emas, balki raqibning harakatini

oldindan ko'ra olish va eng qisqa vaqt ichida samarali texnik usulni bajarish qobiliyatidir. Mazkur maqolada sambochilarning texnik-taktik harakatlarini takomillashtirishda tezkorlik sifatlarini rivojlantirishning metodologik asoslari va amaliy yechimlari ko'rib chiqiladi.

Zamon bilan hamnafaslik: Zamonaviy sambo kurashi yildan-yilga "tezlashib" bormoqda. Musobaqa qoidalarining o'zgarishi (passiv kurash uchun beriladigan ogohlantirishlar, parterdagi vaqtning cheklangani) sportchini soniyalar ichida natijali harakat qilishga majbur qilmoqda.

Tadqiqotning maqsadi

Mashg'ulotlar jarayonida qo'llanilgan tezkorlik mashqlarining texnik-taktik tayyorgarlik darajasiga ta'sirini tajriba (eksperiment) asosida tahlil qilish.

Texnika va jismoniy sifatlar uyg'unligi: Ko'pincha sportchilar mashg'ulotlarda texnik usulni mukammal o'rganishadi, biroq real bellashhuvdagi yuqori tezlik va hayajon tufayli uni qo'llay olmaydilar. Shuning uchun texnikani aynan tezkorlik sifatleri bilan bog'liq holda takomillashtirish metodikasiga bo'lgan ehtiyoj yuqori.

Sportchining raqobatbardoshligi: Xalqaro maydonda muvaffaqiyat qozonayotgan sambochilarning tajribasi shuni ko'rsatadiki, g'alaba koeffitsienti usulning qanchalik kutilmaganda va tezkor bajarilishiga (ekspress-hujum) to'g'ridan-to'g'ri bog'liqdir.

Ilmiy bo'shliqni to'ldirish: Sambo bo'yicha ko'plab qo'llanmalar mavjud bo'lsa-da, aynan tezkorlik sifatlarini texnik harakatlar bilan sinxronlashtirish (bir vaqtda rivojlantirish) masalalari hali yetarlicha chuqur o'rganilmagan.

Texnik tayyorgarlikni takomillashtirish

Texnik tayyorgarlikning asosi - usullarning biomexanik jihatdan to'g'ri va tejamkor bajarilishidir. Takomillashtirish bosqichida quyidagilarga e'tibor qaratiladi:

Usullar bazasini kengaytirish: Tik turgan holatda (stoyka) va parterdagi usullarning xilma-xilligini oshirish.

Kombinatsiyalarni shakllantirish: Bitta usul natija bermaganda, darhol ikkinchi yoki uchinchi usulga o'tish zanjirini yaratish (masalan, "podsechka"dan "podxvat"ga o'tish).

Amplituda va aniqlik: Usulning yakuniy nuqtasida raqibni nazorat qilish va baho olish darajasiga yetkazish.

Taktik tayyorgarlikning tarkibiy qismlari

Taktika - bu bellashuvni boshqarish rejasi. Uni takomillashtirish quyidagi yo'nalishlarni qamrab oladi:

Razvedka taktikasi: Bellashuvning dastlabki soniyalarida raqibning kuchli va kuchsiz tomonlarini, uning "sevimli" usullarini aniqlash.

Masofa va tutqich (zaxvat) uchun kurash: Raqibga o'z o'yinini o'tkazishga yo'l qo'ymaslik va o'zi uchun qulay tutqichni qo'lga kiritish.

Psixologik bosim: Raqibni chalg'ituvchi harakatlar orqali xatoga majburlash.

Sambo kurashida g'alaba qozonish uchun faqat kuchli bo'lish yetarli emas. Sportchi ikki narsani birlashtirishi kerak:

Texnika - bu usulni (masalan, otishni) to'g'ri bajarish mahorati.

Taktika - bu usulni raqibga nisbatan qachon va qanday qo'llashni rejalashtirish.

Tezkorlik - bu harakatni raqib ko'z ochib yunguncha yakunlash.

Tezkorlik - muvaffaqiyat kaliti: Sambo kurashida tezkorlik faqat jismoniy harakat emas, balki "tezkor qaror qabul qilish" qobiliyatidir. Maxsus ishlab chiqilgan signalga asoslangan va portlovchi kuchni oshiruvchi mashqlar sportchining reaksiyasini 10-15% ga yaxshilash imkonini beradi.

Vaqtни boshqarish: Kurash oxirida hisobni ushlab qolish yoki so'nggi soniyalarda hal qiluvchi hujumni uyushtirish.

Integratsiyalashgan tayyorgarlik metodikasi

Texnika va taktikani alohida emas, balki bir butunlikda rivojlantirish uchun quyidagi mashg'ulot usullari samarali hisoblanadi:

Vaziyatli mashqlar: Sportchiga aniq topshiriq beriladi (masalan: "Siz hisobda orqadasiz, 30 soniya vaqtingiz bor, faqat hujum qiling").

Shartli bellashuvlar: Faqat ma'lum bir usulni qo'llash yoki faqat ma'lum bir tutqichdan ishlash cheklovlari bilan kurashish.

Video-tahlil: O'zining va potensial raqiblarning bellashuvlarini tahlil qilish orqali taktik xatolarni tuzatish.

"Zamonaviy samboda aldamchi harakatlar (fintlar) texnik usulning muvaffaqiyatini 60-70% gacha ta'minlaydi. Masalan, sportchi raqibni pastki qismdan (oyoqdan) ushlamoqchi bo'lib ko'rsatib, aslida yuqori qismdan (yelkadan) otish usulini qo'llashi — bu taktik chalg'itishning yorqin namunasidir. Bu usul raqibning himoya reaksiyasini noto'g'ri yo'nalishga burishga xizmat qiladi."

"Texnik-taktik tayyorgarlik nafaqat jismoniy, balki ruhiy tayyorgarlik bilan ham bog'liq. Musobaqa stressi sharoitida sportchi o'zi rejalashtirgan taktikani unutib qo'ymasligi uchun mashg'ulotlarda 'shovqinli muhit' yoki 'tomoshabinlar bosimi' kabi sun'iy sharoitlarni yaratish lozim."

Tezkorlikni oshirish uchun sportchi uchta narsani mashq qilishi shart:

Reaksiya: Raqib qo'zg'alishi bilan darhol javob qaytarish.

Portlovchi kuch: Usulni birdaniga, katta kuch bilan boshlash.

Kombinatsiya: Bitta usul o'xshamasa, ikkinchisiga darhol ulab ketish (masalan: "oyoqdan chalish" + "yelkadan otish").

Xulosa

Sambochilarning texnik-taktik tayyorgarligini takomillashtirish sportchining intellektual salohiyatini oshirishni talab qiladi. Texnik mukammallik taktik moslashuvchanlik bilan birlashgandagina, sportchi xalqaro miqyosdagi yuqori natijalarga erisha oladi. Zamonaviy mashg'ulotlarda modellashtirilgan bellashuv sharoitlaridan keng foydalanish bu jarayonning eng qisqa yo'lidir.

Foydalanilgan adabiyotlar.

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ECOLOGICAL PROBLEMS: MAIN CAUSES AND POSSIBLE SOLUTIONS

Annotation. *Ecological problems have become one of the most urgent global challenges of the 21st century. Rapid industrialization, population growth, deforestation, pollution, and excessive use of natural resources have significantly affected the balance of ecosystems. These environmental changes lead to climate change, loss of biodiversity, soil degradation, and water scarcity. The purpose of this article is to analyze the main causes of ecological problems and propose possible solutions for sustainable environmental management. The study highlights the importance of environmental protection policies, sustainable agriculture, renewable energy sources, and public awareness in mitigating ecological damage. The results indicate that coordinated global actions, technological innovations, and environmentally responsible behavior can significantly reduce environmental degradation and promote sustainable development.*

Keywords: *ecology, environmental protection, climate change, pollution, sustainable development.*

Introduction

Environmental sustainability has become a critical issue worldwide due to the increasing pressure on natural resources. Over the past century, human activities have dramatically altered natural ecosystems. Industrial development, urbanization, and intensive agricultural practices have contributed to environmental degradation and ecological imbalance.

Ecological problems affect not only natural ecosystems but also human health, economic stability, and global food security. Climate change, air pollution, soil erosion, and water contamination are among the most serious environmental issues facing humanity today.

Understanding the causes of these ecological problems is essential for developing effective strategies to mitigate their impact. Governments, scientists, and environmental organizations are increasingly focusing on sustainable solutions to protect natural resources and restore ecological balance.

Materials and Methods

This study is based on the analysis of scientific literature, environmental reports, and international ecological data. Various research articles, environmental monitoring reports, and statistical information from global environmental organizations were reviewed to identify the main causes of ecological problems.

Comparative analysis and descriptive methods were used to evaluate different environmental factors and their impacts on ecosystems. In addition, case studies related to pollution, deforestation, and climate change were examined to determine the effectiveness of existing environmental protection measures.

Table 1.
Main Ecological Problems and Their Causes

Ecological Problem	Main Causes	Possible Solutions
Air Pollution	Industrial emissions, vehicle exhaust, burning fossil fuels	Use renewable energy, improve emission control technologies
Water Pollution	Industrial waste, agricultural chemicals, plastic waste	Wastewater treatment, reduction of chemical fertilizers
Deforestation	Agricultural expansion, logging, urbanization	Reforestation programs, sustainable forestry
Soil Degradation	Overgrazing, intensive farming, pesticide overuse	Organic farming, crop rotation
Climate Change	Greenhouse gas emissions, deforestation	Renewable energy, carbon reduction policies

Discussion

The analysis shows that ecological problems are largely caused by human activities. Industrial production, urban development, and unsustainable agricultural practices significantly contribute to environmental degradation. For example, air pollution caused by industrial emissions and vehicle exhaust affects both climate and human health.

Deforestation is another major ecological issue. Large areas of forests are being cleared for agriculture and urban expansion, which reduces biodiversity and contributes to climate change. Soil degradation caused by excessive use of fertilizers and pesticides also threatens agricultural productivity and food security.

To address these challenges, governments and international organizations must implement sustainable environmental policies. The adoption of renewable energy sources such as solar and wind power can significantly reduce greenhouse gas emissions. In agriculture, sustainable farming methods such as crop rotation, organic fertilizers, and integrated pest management can help maintain soil fertility and reduce environmental damage.

Public awareness and education also play an important role in environmental protection. Encouraging environmentally responsible behavior can help reduce pollution and promote conservation of natural resources.

Conclusion

In conclusion, ecological problems are among the most serious global challenges today. Human activities such as industrialization, deforestation, pollution, and overexploitation of natural resources are the main causes of environmental degradation.

However, these problems can be mitigated through sustainable development strategies, technological innovations, and strong environmental policies. The use

of renewable energy, conservation of forests, sustainable agriculture, and increased environmental awareness are key steps toward protecting the environment.

Global cooperation between governments, scientists, and communities is essential to ensure a sustainable future for the planet. Protecting natural ecosystems today will help maintain environmental balance and improve the quality of life for future generations.

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THE IMPORTANCE OF SUSTAINABLE AGRICULTURE IN THE CONTEXT OF ECOLOGICAL PROBLEMS

Annotation. *Ecological problems such as climate change, soil degradation, water scarcity, and biodiversity loss pose significant threats to global food security. Sustainable agriculture has emerged as a critical strategy to address these challenges. By promoting environmentally friendly farming practices, efficient use of resources, and resilience to climate change, sustainable agriculture ensures long-term productivity while protecting ecosystems. This article explores the relevance of sustainable agriculture in mitigating ecological problems and highlights strategies that can enhance agricultural sustainability. Key findings indicate that adopting conservation practices, integrating modern technologies, and fostering community-based approaches can significantly reduce ecological impacts and support sustainable development.*

Keywords: *sustainable agriculture, ecological problems, climate change, soil fertility, resource efficiency.*

Introduction

Global agriculture faces increasing pressure due to ecological problems. Climate change, deforestation, soil erosion, and pollution threaten the ability of farmers to maintain consistent food production. Traditional agricultural practices, including monocropping, overuse of chemical fertilizers, and intensive irrigation, often exacerbate these environmental issues, creating a cycle of degradation that affects both ecosystems and human well-being.

Sustainable agriculture is a farming approach that balances the need for food production with the conservation of natural resources. It emphasizes soil health, water conservation, biodiversity protection, and reduction of greenhouse gas emissions. In the context of growing ecological challenges, promoting sustainable agriculture has become essential to ensure global food security and environmental resilience.

Materials and Methods

This study is based on a comprehensive review of scientific literature, international reports, and case studies related to sustainable agriculture and ecological problems. Data from environmental monitoring organizations, agricultural research institutes, and global sustainability reports were analyzed to evaluate the relationship between ecological challenges and agricultural practices.

The methodology involved a comparative analysis of conventional and sustainable agricultural systems, focusing on resource efficiency, environmental impact, and productivity. Key sustainable farming practices, such as organic

farming, integrated pest management, and agroforestry, were assessed for their effectiveness in mitigating ecological problems.

Table 1.
Ecological Problems and Their Impact on Agriculture

Ecological Problem	Impact on Agriculture	Sustainable Practices to Mitigate Impact
Climate Change	Reduced crop yields, altered growing seasons	Climate-resilient crops, water-efficient irrigation, agroforestry
Soil Degradation	Loss of fertility, erosion	Crop rotation, organic fertilizers, no-till farming
Water Scarcity	Limited irrigation, drought stress	Drip irrigation, rainwater harvesting, drought-tolerant crops
Biodiversity Loss	Pest outbreaks, pollination decline	Crop diversification, habitat restoration, integrated pest management
Pollution	Soil and water contamination	Reduced chemical inputs, organic farming, precision agriculture

Discussion

The increasing frequency of extreme weather events, rising temperatures, and erratic rainfall patterns demonstrate the vulnerability of conventional agriculture to ecological problems. Unsustainable farming practices not only degrade natural resources but also reduce agricultural productivity over time. Soil erosion, nutrient depletion, and groundwater contamination are direct consequences of intensive agricultural methods.

Sustainable agriculture offers practical solutions to these challenges. Crop diversification and rotation improve soil fertility and reduce pest pressure. Organic fertilizers and composting enhance soil structure and nutrient availability while minimizing chemical runoff. Water-efficient irrigation systems and rainwater harvesting techniques reduce water stress and promote resilience against droughts.

Technological innovations such as precision agriculture, remote sensing, and climate-smart farming also play a critical role in sustainable agriculture. By optimizing resource use and reducing environmental impact, these approaches help farmers adapt to ecological challenges while maintaining productivity.

Furthermore, community-based approaches, farmer education, and supportive government policies are crucial for widespread adoption of sustainable practices. Awareness campaigns and incentives for environmentally friendly farming can accelerate the transition toward sustainable agriculture, protecting ecosystems and ensuring long-term food security.

Conclusion

In conclusion, ecological problems present significant threats to agricultural productivity and environmental health. Sustainable agriculture has emerged as a vital approach to mitigate these challenges, ensuring long-term food security and ecosystem protection. By promoting soil conservation, water efficiency, biodiversity, and responsible resource use, sustainable agriculture addresses both environmental and socio-economic concerns.

The adoption of sustainable farming practices, supported by technology, policy measures, and community engagement, is essential to enhance agricultural resilience. In the context of escalating ecological challenges, sustainable agriculture represents a pathway toward a more secure, productive, and environmentally responsible future.

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AHOLI EKOLOGIK ONGINI SHAKLLANTIRISHDA EKOLOGIK TARBIYANING USTUVORLIGI

Annotatsiya: Maqolada, ekologik madaniyatni shakllantirishning dolzarb masalalari hamda ekologik tarbiyani va ekopedagogik kompetentsiyani aholi ekologik ongi va faoliyatini yuksaltirishdagi imkoniyatlari va yo'llari yoritilgan. Shuningdek, ekologik tarbiyaning asosiy maqsadi shaxsning ekologik ongini shakllantirish va yuksaltirish, uni oqilona ekologik faoliyat yuritishga odatlantirish mexanizmlari haqida fikr yuritilgan.

Kalit so'zlar: ekologik globallashuv, ekologik siyosat, ekologik xavfsizlik, ekologik tarbiya, ekologik ong, ekologik faoliyat, ekologik bilim, ekologik targ'ibot, ekologik muhit, ekologik madaniyat, ekopedagogik kompetensiya.

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PRIORITY OF ECOLOGICAL EDUCATION IN FORMING THE ECOLOGICAL AWARENESS OF THE POPULATION

Annotation: The article discusses the current issues of forming an ecological culture, the possibilities and ways of using ecological education and eco-pedagogical competence in raising the ecological awareness and activity of the population. It also considers the mechanisms of forming and raising the ecological awareness of a person, accustoming him to rational ecological activity, the main goal of ecological education.

Key words: ecological globalization, ecological policy, ecological security, ecological education, ecological consciousness, ecological activity, ecological knowledge, ecological propaganda, ecological environment, ecological culture.

Ekologik siyosat ekologik globallashuv tendensiyalarining zamonaviy sotsiumga ta'sirini kamaytirishi, jamiyat ekologik xavfsizligini ta'minlashi uchun ekologik muhitni muhofaza qilish tadbirlari shaxs ekologik ongini yuksaltirish, ekologik faoliyatini takomillashtirish choralari bilan to'ldirilmo'g'i shart. Binobarin, zamonaviy davlat ekologik siyosatining ustuvor yo'nalishlaridan biri

ekologik tarbiya bilan bog'liq bo'lmog'i lozim. Chunki aynan ekologik tarbiya aholi ekologik ongi va faoliyatini yuksaltirish imkonini yaratadi.

Ekologik tarbiya tarbiyaning yil sayin tobora dolzarblashib borayotgan shakllaridan biridir. U tarbiyaning boshqa shakllari bilan uyg'un tarzda takomil topa boradi. Aynan shuning uchun ham ekologik tarbiyaning mazmunini chuqurroq anglab olish uchun uni tarbiya tizimi kontekstida, uning turli shakllari bilan o'zaro aloqadorlikda tahlil qilmoq kerak. Ekologik tarbiyaning tarbiya tizimidan ayri holda talqin etilishi mazkur fenomen haqida ilmiy tasavvurlar hosil qilishga xalal beradi.

Tarbiya shaxsni shakllantirishga qaratilgan jarayondir. U shaxs qadriyat va manfaatlarini jamiyat qadriyat hamda manfaatlariga moslashtirish maqsadida amalga oshiriladi. Tarbiya obyekti hamisha shaxs yoxud muayyan guruh bilan bog'liq. Biroq tarbiyaning subyekti turli-tumanligi bilan tavsiflanadi. Masalan, tarbiya alohida shaxs, biror bir institut, guruh, davlat tomonidan amalga oshirilishi mumkin. Har qanday holatda ham tarbiyaviy ta'sir o'zining maqsadga muvofiqligi va tizimlilik bilan ajralib turadi.

Tarbiya masalalari bilan shug'ullangan barcha mutaxassislar uning turli shakllari mavjudligini qayd qiladilar. Biroq odatda bunda tarbiyaning o'z mazmuniga ko'ra turli shakllarga bo'linishi nazarda tutiladi, xolos. Aytaylik, tarbiya mazmunan aqliy, mehnat, jismoniy, ahloqiy, huquqiy, vatanparvarlik, iqtisodiy va shu kabi shakllarda amalga oshirilishi mumkin. Shuning bilan bir qatorda, unutmazlik zarurki, tarbiya nafaqat o'z mazmuniga ko'ra, balki institutsional belgilari, tamoyillariga ko'ra ham turli shakllarga ega. Masalan, tarbiya insonning umri davomida turli ijtimoiy institutlar - oila, mahalla, ta'lim maskani, mehnat jamoasi, jamoatchilik tashkilotlari tomonidan olib boriladi. Bundan tashqari, inson tarbiyasi turli tamoyillarga bo'ysundirilishi mumkin. Bu borada erkin, avtoritar, demokratik tarbiya haqida gapirish o'rinli.

Tarbiya masalalari odatda pedagoglar tomonidan puxta o'rganiladi. Biroq bunda masalaning bir jihati e'tibordan chetda qolib ketadi. Pedagoglar o'z faoliyatlari ta'lim muassasalari bilan bog'liq bo'lgani bois ko'proq bolalar, o'smirlar va yoshlar tarbiyasi xususida bosh qotiradilar. Vaholanki masalaga ijtimoiy falsafa pozitsiyasidan yondashsak, tarbiya insonning butun umri mobaynida davom etadigan jarayondir. Shu boisdan tarbiya masalalarining pedagogik nuqtai nazardan tadqiq etilishi qay darajada muhim bo'lsa, uning ijtimoiy-falsafiy talqini ham shu qadar ahamiyatlidir. Yuqorida keltirgan nazariy tezislrimiz ekologik tarbiyaning mazmuni va mohiyati, maqsadi va vazifalari, shakllari va uslublari, tamoyillari va vositalarini mufassal aniqlash imkonini beradi. Shunday qilib, ekologik tarbiya o'z mazmuniga ko'ra tarbiyaning o'ziga xos shakli bo'lib, shaxs ekologik ongini yuksaltirish, ekologik faoliyatini takomillashtirish maqsadida amalga oshiriladigan maqsadga muvofiq tarbiyaviy jarayondir. U turli subyektlar tomonidan olib borilishi mumkin. Masalan, oilada, u yoki bu institutda, jamoada ham ekologik tarbiyaning muayyan shakllari amalga oshiriladi. Biroq bu borada davlat tomonidan ekologik siyosat doirasida maqsadga muvofiq tarzda amalga oshirilgan ekologik tarbiyaning ahamiyati beqiyosdir.

Ta'rifdan ko'rinib turibdiki, ekologik tarbiyaning asosiy maqsadi shaxsning ekologik ongini shakllantirish va yuksaltirish, uni oqilona ekologik faoliyat yuritishga odatlantirishdan iborat. Uning yo'nalishlari va vazifalari ana shu maqsaddan kelib chiqadi, uslublari va usullari esa unga muvofiq ravishda tanlanadi. Jumladan, maqsadga mos tarzda, ekologik tarbiya ikki asosiy yo'nalishda (shaxs ekologik ongini yuksaltirish; shaxs ekologik faoliyatini takomillashtirish) amalga oshiriladi. Ekologik tarbiyaning vazifalari turkumiga esa quyidagilar kiradi:

“1. Ekologik ong negizida atrof-muhitga mus'uliyatli yondashuvni shakllantirish.

2. Zamonaviy ekologik muammolar va ularni bartaraf etish yo'llariga doir bilimlar tizimini shakllantirish.

3. O'z hududidagi atrof-muhitni o'rganish, holatini baholash va yaxshilashga doir intellektual va amaliy malakalar tizimini rivojlantirish; atrof-muhitni muhofaza qilishga doir faol faoliyatga intilishni rivojlantirish”

Ekologik tarbiya turli shakl va uslubda amalga oshiriladi. Tarbiya obyektining xususiyatlari yangilangani sayin bu shakl va uslublar ham o'zgara boradi. Masalan, inson umrining dastlabki bosqichlarida qo'llanilgan ekologik tarbiya uslub va shakllaridan uning yetuklik davrida foydalanib bo'lmaydi, albatta. Yetuk yoshdagi kishining ekologik ongi va faoliyatiga tarbiyaviy ta'sir ko'rsatish uchun mutlaqo boshqa turkumdagi shakl va uslublarga murojaat etish zarur bo'ladi. Shuning uchun ekologik tarbiya shakl va uslublarini tasniflash birmuncha murakkabroq. Bizning fikrimizcha, bu shakl va uslublarni ekologik tarbiyaning maqsadi va yo'nalishlariga mutanosib ravishda quyidagicha tasniflash maqsadga muvofiq:

a) shaxsning ekologik ongiga ta'sir ko'rsatishga mo'ljallangan shakl va uslublar (masalan, tushuntirish, ishonirish, mashq qilish, ibrat va sh.k.);

1) shaxsning maqbul ekologik faoliyatini shakllantirishga mo'ljallangan shakl va uslublar (masalan, o'zini tahlil qilishga undash, anglab olishga undash, ekskursiya va sh.k.);

2) shaxsning maqbul ekologik ongi va faoliyatini rag'batlantirish shakl va uslublari;

3) shaxsning nomaqbul ekologik ongi va faoliyatini jazolash shakl va uslublari.

4) Ekologik tarbiya vositalari ham o'zining turli-tumanligi bilan ajralib turadi. Shaxs ekologik ongi va faoliyatini yuksaltirishda adabiyot va san'at, fan va din, ommaviy axborot vositalari va shu kabi vositalar jiddiy rol o'ynaydi. E'tiborli jihati shundaki, ekologik tarbiyaning bir bosqichida bu vositalarning ayrimlari ustuvor ahamiyat kasb qilishi, boshqalari esa ikkilamchi rol o'ynashi mumkin.

Vaziyat o'zgargach, bu iyerarxiya ham yangicha tus oladi. Masalan, ta'lim maskanlarida bolalar ekologik ongi va faoliyatiga ko'proq fan, adabiyot va san'at vositasida ta'sir ko'rsatiladi. Yetuk yoshdagi kishilar ekologik ongi va faoliyatiga esa ommaviy axborot vositalarining ta'siri ustuvor.

Boshqa vositalar ikkilamchi rol o'ynaydi.

5) Ekologik tarbiya muayyan samaraga olib kelishi uchun aniq tamoyillarga bo'ysundirilmog'i zarur. Mavzuning ushbu jihatini maxsus tadqiq qilgan mutaxassislar quyidagi tamoyillarga

e'tiborni tortadilar:

- 6) tarbiyaviy jarayonning maqsadga muvofiqligi va g'oyaviyligi;
- 7) umuminsoniy va milliy qadriyatlar uyg'unligi;
- 8) shaxsiy va ijtimoiy manfaatlar uyg'unligi;
- 9) tarbiyaning hayot, jamiyat ijtimoiy-siyosiy va madaniy taraqqiyotining bugungi bosqichi bilan bog'liqligi;
- 10) jamoada shaxs tarbiyasi;
- 11) tarbiyaning tabiatga muvofiqligi

Ushbu mulohazalarga qo'shimcha qilib ta'kidlash zarurki, ekologik tarbiya uzluksiz va tizimli xarakterga ega bo'lishi, bosqichma-bosqich amalga oshirilishi va innovatsion uslublarga tayanishi darkor. Shuningdek, ekologik tarbiya zamon talablariga mos ravishda yo'lga qo'yilmog'i zarur, aks holda u o'z oldiga qo'yilgan maqsadlarga xizmat qilmay qo'yadi.

Ekologik tarbiyani tarbiyaning boshqa shakllaridan ayri ravishda tashkil etib bo'lmaydi. U barkamol inson shaxsini shakllantirishga qaratilgan umumiy sa'y-harakatlarning bir jihatini, shakli, xolos. Ekologik tarbiya aqliy, axloqiy, iqtisodiy, vatanparvarlik va boshqa tarbiya shakllari bilan uyg'unidir. Jumladan, shaxsning aqliy salohiyati oshgani sayin uni ekologik jihatdan tarbiyalash imkoniyatlari kengaya boradi. Aksincha, shaxs ekologik tarbiyasi uning ekologik ongi va faoliyatini shakllantirish bilan cheklanmasdan, aqliy xislat va fazilatlarining ham kamol topishiga ta'sir ko'rsatadi.

Axloqiy tarbiya shaxsni tabiatga oqilona munosabatda bo'lishga undovchi fazilatlarini ham shakllantiradi, ekologik tarbiya esa shaxs axloqiy qiyofasining qaror topishi jarayonida ham iz qoldiradi.

Xulosa qiladigan bo'lsak, ekologik globallashtirish tendensiyalarining shaxs ongi va faoliyatiga salbiy ta'siri kuchayib borayotgan bugungi kunda ekologik tarbiyani davlat ekologik siyosatining ustuvor yo'nalishlaridan biriga aylantirish zaruriyati yuzaga kelmoqda. Jahonning yetakchi mamlakatlarida ekologik tarbiya masalalariga ustuvor ahamiyat berilayotgani ham shundan.

O'zbekistonda ekologik tarbiya samaradorligini oshirish, uning zamonaviy tizimini yaratish uchun quyidagi vazifalarga diqqatni jamlash maqsadga muvofiq bo'ladi:

- a) ekologik tarbiyaning uzluksizligini ta'minlash zaruriyati;
- b) ekologik tarbiya shakllari uyg'unligini ta'minlash zaruriyati;
- v) ekologik tarbiya vositalaridan foydalanish samaradorligini oshirish zaruriyati.

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**GLOBALLASHUV JARAYONLARIDA SHARQ
MUTAFAKKIRLARINING TA'LIM VA TARBIYA HAQIDAGI
PEDAGOGIK QARASHLARINING AHAMIYATI**

Annotatsiya. Maqolada globallashuv tushunchasi, sharq mutafakkirlari va allomalarining ta'lim-tarbiya, odob-axloq masalalaridagi pedagogik qarashlari, islomda bolalar tarbiyasi to'g'risida so'z yuritilgan.

Kalit so'zlar: Tarbiya, odob, axloq, komil inson, komillik, insonparvarlik, pedagogika, milliy qadriyat

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**EDUCATION AND UPBRINGING OF EASTERN THINKERS IN
THE PROCESSES OF GLOBALIZATION THE IMPORTANCE OF HIS
PEDAGOGICAL VIEWS ON**

Abstract. The article discusses the concept of globalization, the pedagogical views of Eastern thinkers and scholars on education and upbringing, ethics, and child-rearing in Islam.

Keywords: Upbringing, manners, morality, perfect person, perfection, humanism, pedagogy, national values

Globallashuv sharoitida dunyo mamlakatlari barcha sohalarda, barqaror taraqqiyot yo'lida o'zlarining o'rinlariga ega bo'lib bormoqda. Albatta, bunda har bir davlatning tabiiy va iqtisodiy omillari bilan bir qatorda inson omili, jumladan, yosh avlodlarni tarbiyalash, shart-sharoitlar yaratish, ularning intellektual salohiyatidan samarali foydalanish muhim.

Chunki prezidentimiz ta'biri bilan aytganda, “Yosh avlod tarbiyasi hamma zamonlarda ham muhim va dolzarb ahamiyatga ega bo'lib kelgan. Ammo biz yashayotgan XXI asrda bu masala haqiqatan ham hayot-mamot masalasiga aylanib bormoqda”.

Millatimiz o'zining uzoq tarixi davomida yaratilgan ta'lim-tarbiyaga oid boy merosga ega bo'lib, avlodlarda gumanizm, insonparvarlik, kamtarlik,

mehribonlik, mehnatsevarlik, do'stlik, iymon-e'tiqod, mehr-oqibat, odoblilik, axloqlilik kabi umuminsoniy fazilatlarini shakllantirishning o'ziga xos tajribasini boshdan o'tkazib to'plagan. Bizga ma'lumki, ma'naviy-axloqiy fazilatlar hech qachon o'z-o'zidan vujudga kelib qolmaydi, aksincha ularning kelib chiqishining haqiqiy manbai, ularni keltirib chiqargan sabablar va harakatga keltiradigan kuchlar mavjud ekanligidadir.

Bugungi kunda yoshlarimiz nafaqat ta'lim muassasalarida, balki radio-televideniye, matbuot, internet, telefon kabi turli texnik vositalar orqali ham turli-tuman, rang-barang axborot va ma'lumotlarni olmoqda.

Dunyoda axborot maydoni tobora kengayib borayotgan shunday bir sharoitda o'quvchi-yoshlarimizning ongini faqat o'rab-chirmab, uni o'qima, buni ko'rma, deb bir tomonlama tarbiya berish, ularning atrofini temir devor bilan o'rab olish, hech shubhasiz, zamonning talabiga ham, bizning ezgu maqsad-muddaolarimizga ham to'g'ri kelmaydi. Nega deganda, biz yurtimizda ochiq va erkin demokratik jamiyat qurish vazifasini o'z oldimizga qat'iy maqsad qilib qo'yganmiz va bu yo'ldan hech qachon qaytmaymiz.

Yoshlarimizni tarbiyalash ularga bilim berish, o'rgatish uchun birinchi galda, sharq mutafakkirlarining duru-gavhariga teng ma'naviy meroslari misol bo'la oladi. Sharq mutafakkirlarining ijtimoiy-siyosiy, falsafiy ta'limotlariga tayanib ish ko'rilsa, tarbiya ta'sirchanligi yanada mukammallik kasb etadi. Aslida Markaziy Osiyo allomalarining ta'lim-tarbiyaga oid qarashlarida ma'naviy qadriyatlarga bo'lgan e'tibor asosiy o'rinda turadiki, bu bevosita inson kamolotini shakllantirishga omil bo'la oladigan ijtimoiy hodisadir.

Sharq Renessansi deb nom olgan IX-XV asr Markaziy Osiyo ma'naviy madaniyatining eng yuksaklikka ko'tarilgan, boy davri bo'lib, bu davrda ilm-fanning ikki yo'nalishi, birinchisi - inson uchun tabiiy fanlardirki, u aql ko'zi bilan egallanadi, ikkinchisi - bu fanlar inson tomonidan, boshqa kishilardan taqlid qilib o'rganiladi, ular asosida shariat qonunlari yotadi.

Bu davrda Sharq madaniyatini umuminsoniy qadriyat darajasiga ko'tarish markazi "Ma'mun akademiyasi" (IX asr, Bag'dod, "Baytul hikmat") tashkil etildi. Akademiya ilmiy ijodkorlari faoliyatida Yaqin va O'rta Sharq xalqlari moddiy va ma'naviy madaniyatining qo'shilishi asnosida hozirgi Markaziy Osiyo madaniyatining maxsus bir-biridan ajratilmagan ko'p qirrali qorishiq turi vujudga keldi.

Bunday ko'p qirrali ilmiy qadriyatlarning maydonga kelishida vatandoshlarimiz Muhammad ibn Muso al-Xorazmiy (780-850), Ahmad al-Farg'oniy (247-861), Ahmad ibn Abdulloh al-Marvaziy (IX asr), Abu Nasr Forobiy (870-950), Abu Ali Ibn Sino (980-1037), Abu Rayhon Beruniy (973-1050) va boshqalarning xizmatlari katta bo'lgan. Sharq mutafakkirlarining ma'naviy madaniyat sohasiga qo'shgan ulushlari nihoyatda boy bo'lib, mazmunan qadriyatlarning barcha yo'nalishlarini qamrab olganligi bilan xarakterlanadi. Forobiy pedagogik qarashlarini, ta'lim-tarbiya haqidagi ta'limotini o'rganishda inson xislatlari to'g'risidagi falsafiy fikrlari nihoyatda muhim sanaladi. Forobiy o'zining falsafiy qarashlarida, inson barcha boshqa jismlarda bo'lmagan qobiliyat

va kuchga, ruhiy quvvatga, aql va soʻzlash qobiliyatiga egaligi, bu kuch uni tabiatdagi boshqa jismlardan ajratib turishi va uning ustidan hokim boʻlish imkoniyatini berganligi namoyon boʻladi. Forobiy oʻzining qarashlarida insonga nisbatan “faol aql” degan tushunchani ilgari suradi.

Forobiy oʻzining “Baxt-saodatga erishuv haqida”, “Fanlarning tasnifi”, “Ilmlar va sanʼatlar fazilati” kabi koʻplab risolalarida insonning maʼnaviy rivojlanishi ilm-maʼrifatga bogʻliqligini taʼkidlaydi. Abu Rayhon Beruniy bilim umuminsoniy qadriyatlarni oʻrganishning kaliti ekanligini alohida taʼkidlaydi. Uning fikricha, ilm-maʼrifatli odam jamiyat taqdiri, insonlar taqdiri uchun kurashuvchan, barcha yomonliklardan uzoqdir. “Ilmning foydasi ochkoʻzlik bilan oltin-kumush toʻplash uchun boʻlmay, balki u orqali inson uchun zarur narsalarga ega boʻlishdir”.

Muhammad al-Xorazmiy birinchi boʻlib koinot obyektlarining harakatlari hamda yerdagi nuqtalarining joylashishini jadval koʻrinishida aks ettirib, tajriba-kuzatish va tadqiqotlar metodlarini ilmiy jihatdan asoslab berdi, yagonalikning birligi tamoyili, shuningdek, alohida va umumiy, induksiya va deduktsiyalarning mohiyatini aniqlashtirdi; matematik masalalarni yechishning algoritmik metodini ishlab chiqdi. Bu metoddan bugungi kunda ham foydalanib kelinmoqda.

Ibn Sino shuningdek, bolalarni maktabda oʻqitish va ularga kasb-hunar berish zarurligini qayd etar ekan, taʼlim-tarbiyada quyidagi tamoyillarga rioya qilish zarurligini taʼkidlaydi.

- yoshlarga taʼlim berishda birdaniga kitobga band qilib qoʻymaslik;
- taʼlimda engildan ogʻirga borish orqali bilim berish;
- olib boriladigan mashqlar bolalar yoshiga mos boʻlishi;
- jamoa boʻlib maktabda oʻqishga eʼtibor berish;
- bilim berishda bolalarning bilimga moyilligi, qiziqishi va qobiliyatini hisobga olish;

- oʻqishni jismoniy mashqlar bilan qoʻshib olib borish.

Xulosa qilib aytganda, buyuk ajdodlarimizga xos azmu shijoat, xalqimizning metin irodasi, tobora ulgʻayib kelayotgan barkamol avlodimizga tayanib, jamiyatimiz hayotini yanada rivojlantirish yoʻlini izchil davom ettirish-eng dolzarb vazifamiz boʻlib qoladi. Yuqoridagi fikrlardan maʼlum boʻladiki, sharq mutafakkirlari oʻzlarining axloqiy qarashlari bilan bir necha asrlardan beri ajdodlarimiz tafakkuruni boyitib kelmoqda. Hozirgi kunda ham ularning bunyodkor gʻoyalari yosh avlodni shaxs qilib tarbiyalashda oʻz qadr-qiyamatini yoʻqotgani yoʻq.

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UMUMIY O’RTA TA’LIM MAKTABI DIREKTORLARINING BOSHQARUV FAOLIYATIDA MEHNAT KODEKSI NORMALARINI QO’LLASHNING EMPIRIK TADQIQOT NATIJALARI

Annotatsiya: Ushbu maqolada O‘zbekiston Respublikasining barcha viloyatlari va Qoraqalpog‘iston Respublikasidan **678 nafar umumiy o‘rta ta’lim maktabi direktori** ishtirokida o‘tkazilgan empirik so‘rovnoma natijalari tahlil qilinadi. Tadqiqot maktab direktorlarining boshqaruv faoliyatida Mehnat kodeksi normalarini qo‘llash mexanizmlari holatini, mavjud to‘siqlarni va takomillashtirish yo‘llarini aniqlashga qaratilgan. Miqdoriy tahlil metodologiyasiga asoslangan tadqiqotda respondentlarning qonunchilikni tushunish darajasi, qo‘llash mexanizmlari, qiyinchiliklar, kutilayotgan natijalar va bilim olish manbalari o‘rganilgan. Natijalar shuni ko‘rsatadiki, direktorlarning 42,5 foizi qonunchilik normalarini qo‘llashni asosan hujjat rasmiylashtirishdan iborat deb tushunadi (protsedural paradigma ustunligi), 83,5 foizi mehnat shartnomasi tuzishni bosh mexanizm sifatida belgilaydi, 66,7 foizi huquqiy bilim yetishmasligi (35,7%) va yangi texnologiyalarga moslashuv (31,0%) muammolarini asosiy to‘siq sifatida ko‘rsatadi. Maqolada olingan empirik natijalar asosida tizimli huquqiy ta’lim modeli, standartlashtirilgan hujjat bazasi va shaffoflik mexanizmi joriy etishga doir amaliy tavsiyalar ishlab chiqilgan.

Kalit so‘zlar: Mehnat kodeksi, maktab direktori, boshqaruv faoliyati, qonunchilik normalari, huquqiy savodxonlik, mehnat shartnomasi, empirik tadqiqot, ta’lim boshqaruvi.

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EMPIRICAL RESULTS OF A STUDY ON THE APPLICATION OF LABOR CODE NORMS IN THE MANAGEMENT ACTIVITIES OF GENERAL SECONDARY SCHOOL PRINCIPALS.

Abstract: This article analyzes the results of an empirical survey conducted with the participation of 678 general secondary school principals from all regions of the Republic of Uzbekistan and the Republic of Karakalpakstan. The study aims to identify the state of mechanisms for applying the norms of the Labor Code in the administrative activities of school principals, existing obstacles, and ways to improve them. Based on a quantitative analysis methodology, the study examines

respondents' level of understanding of legislation, application mechanisms, difficulties, expected outcomes, and sources of knowledge acquisition. The results indicate that 42.5% of principals understand the application of legislative norms primarily as document processing (dominance of the procedural paradigm), 83.5% identify the conclusion of an employment contract as the primary mechanism, and 66.7% cite a lack of legal knowledge (35.7%) and adaptation to new technologies (31.0%) as the main obstacles. Based on the empirical findings, the article develops practical recommendations for introducing a systemic legal education model, a standardized documentation base, and a transparency mechanism.

Keywords: Labor code, school principal, management activities, legislative norms, legal literacy, employment contract, empirical research, education management.

KIRISH

Zamonaviy ta'lim tizimini boshqarish nafaqat pedagogik, balki yuridik kompetentlikni ham talab etadi. O'zbekiston Respublikasida amalga oshirilayotgan ta'lim islohotlari - xususan, 2017-2022-yillardagi "Harakatlar strategiyasi" va "Yangi O'zbekiston" tamoyillari doirasidagi tizimli transformatsiyalar - maktab direktorlarining huquqiy savodxonligi va qonunchilik normalarini amaliyotga tatbiq etish qobiliyatiga bo'lgan talabni keskin oshirdi. Shu bilan birga, qonunchilik normalarining boshqaruv faoliyatiga qo'llanilishi ko'pincha shakl jihatdan – ya'ni hujjatlashtirish darajasida namoyon bo'lmoqda, uning mazmuni ya'ni xodimlar huquqlarini ta'minlash va muassasa samaradorligini oshirish jihatlariga yetarlicha e'tibor qaratilmayapti.

Zamonaviy ta'lim boshqaruvi nafaqat pedagogik, balki huquqiy kompetentlikni ham talab etadi. O'zbekiston Respublikasida 2022-yil 28-oktabrda qabul qilingan yangi Mehnat kodeksi (O'RQ-798) ta'lim muassasalari direktorlari oldiga qonunchilik normalarini amaliyotga yangicha yondashuv bilan tatbiq etish vazifasini qo'ydi.

Maktab direktori, o'z lavozimi bo'yicha, bir vaqtning o'zida pedagogik jamoani boshqaruvchi rahbar, mehnat munosabatlarida ish beruvchi va davlat ta'lim siyosatini amalga oshiruvchi mansabdor shaxs sifatida namoyon bo'ladi.

Mazkur uch tomonlama rol mehnat huquqi normalarini boshqaruv amaliyotida to'g'ri va samarali qo'llash masalasining ilmiy-nazariy hamda amaliy ahamiyatini yanada oshiradi.

Maktab direktorining Mehnat kodeksi, Ta'lim to'g'risidagi qonun va boshqa qonunchilik normalarini to'g'ri qo'llashi nafaqat muassasa ichidagi mehnat munosabatlarini tartibga soladi, balki pedagogik jamoaning samarali faoliyatini ta'minlashning zaruriy shartidir.

Biroq mavjud ilmiy adabiyotlarda maktab direktorlarining qonunchilik normalarini qo'llash mexanizmlari empirik jihatdan yetarlicha o'rganilmagan. Ko'pchilik tadqiqotlar yo nazariy-huquqiy tahlil (normativ aktlarni sharhlash) yoki qiyosiy tahlil (xorijiy amaliyot) doirasida amalga oshirilgan bo'lib, O'zbekiston

sharoitidagi amaldagi holat haqida keng qamrovli empirik ma'lumotlar mavjud emas. Shu jihatdan ushbu tadqiqot muhim ilmiy bo'shliqni to'ldiradi.

Mazkur tadqiqotning ilmiy muammosi quyidagicha shakllantiriladi: Umumiy o'rta ta'lim maktab direktorlarining boshqaruv faoliyatida Mehnat kodeksi normalarini qo'llash darajasi va sifati qanday, ularning huquqiy tafakkuri protsedural yoki substantiv xarakter kasb etadimi hamda qanday omillar bu mexanizmlarning samarali ishlashiga to'siq bo'lmoqda?

Tadqiqotning maqsadi: maktab direktorlarining boshqaruv faoliyatida qonunchilik normalarini - xususan, Mehnat kodeksi talablarini qo'llash mexanizmlarining amaldagi holatini empirik ma'lumotlar asosida aniqlash va mexanizmni takomillashtirish bo'yicha ilmiy asoslangan tavsiyalar ishlab chiqish.

Tadqiqotning ilmiy yangiligi: Birinchi marta O'zbekiston bo'yicha barcha viloyatlarni qamrab olgan keng ko'lamli (678 respondent) empirik so'rovnoma asosida umumiy o'rta ta'lim maktab direktorlarining yangi tahrirdagi Mehnat kodeksi normalarini boshqaruv faoliyatida qo'llash masalasida hududiy tafovutlarni aniqlaydi.

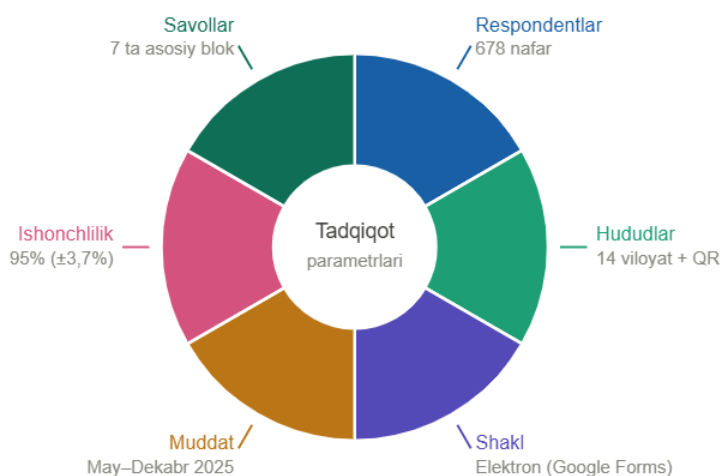
Protsedural va substantiv huquqiy tafakkur o'rtasidagi farqlanish ta'lim boshqaruvi kontekstida ilk bor ilmiy jihatdan tavsiflangan.

TADQIQOT METODOLOGIYASI

Tadqiqot 2025-yilda O'zbekiston Respublikasining barcha hududlarini qamrab olgan holda o'tkazildi. Tanlanma tavsifi: jami 678 nafar umumiy o'rta ta'lim maktabi direktori ishtirok etdi.

Tanlanma hajmi va vakillik.

Jami 678 nafar umumiy o'rta ta'lim maktabi direktori so'rovnomada to'liq ishtirok etdi. Tanlanma O'zbekiston Respublikasining barcha 12 ta viloyati, Toshkent shahri va Qoraqalpog'iston Respublikasini qamrab olishi tadqiqotga yuqori darajada geografik representativlik beradi.



1-diagramma. *Tadqiqot tanlanmasining asosiy parametrlari.*

Ma'lumot to'plash usuli.

Mazkur tadqiqotda Google Forms platformasida yaratilgan tuzilgan so'rovnoma qo'llanildi. So'rovnoma to'liq o'zbek tilida, 2025-yil may-iyun, sentabr-dekabr oylarida o'tkazildi.

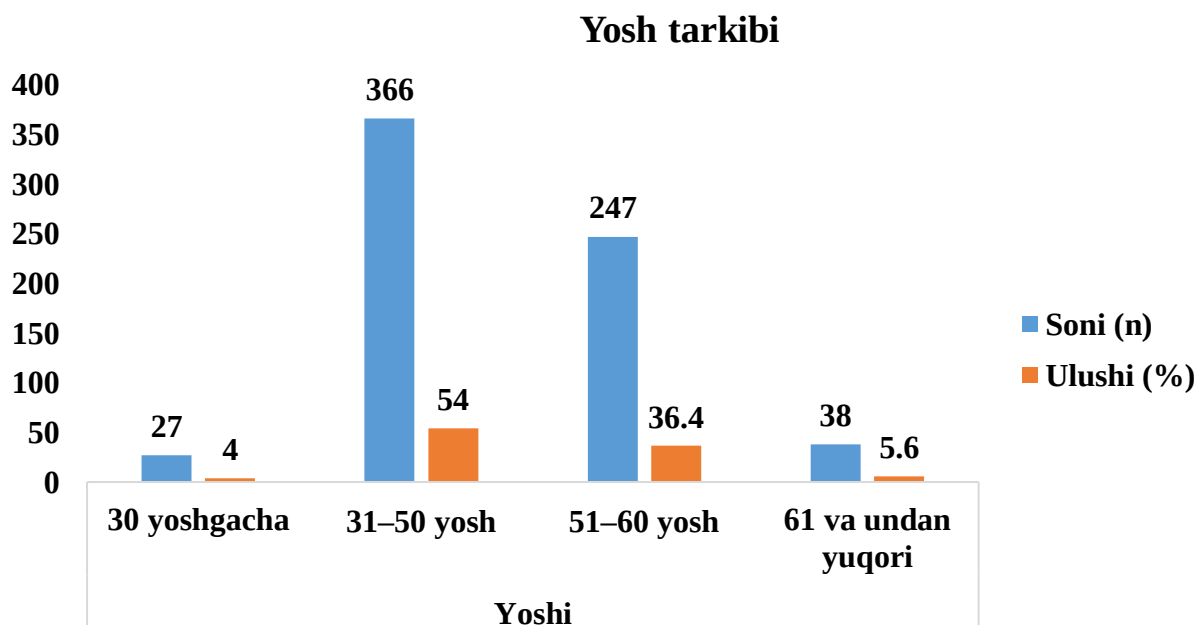
So'rovnoma 7 ta asosiy savol blokini o'z ichiga oladi: 1-qonunchilik normalarini tushunish darajasi; 2- Mehnat kodeksi mexanizmlari (ko'p variantli); 3-takomillashtirish zarurati; 4-duch kelingan amaliy qiyinchiliklar; 5- kutilayotgan ijobiy o'zgarishlar; 6-takomillashtirish bo'yicha tavsiyalar; 7-bilim olish manbalari. Savollar yarim yopiq formatda - oldindan belgilangan variantlar bilan tuzildi. Demografik o'zgaruvchilar sifatida yosh guruhi, hudud va direktor lavozimidagi ish muddati qo'llanildi.

Tahlil usullari.

Ma'lumotlar tahlilida miqdoriy taqsimot tahlili (frequency analysis) va foiz taqsimoti asosiy usul sifatida qo'llanildi. Ko'p variantli savollar uchun har bir variant alohida hisoblandi va umumiy respondentlar soniga nisbatan foiz ko'rsatkichi aniqlandi. Hududiy taqsimot tahlilida har bir viloyat bo'yicha alohida chastota ko'rsatkichlari hisoblandi.

RESPONDENTLARNING DEMOGRAFIK VA KASBIY TAVSIFI

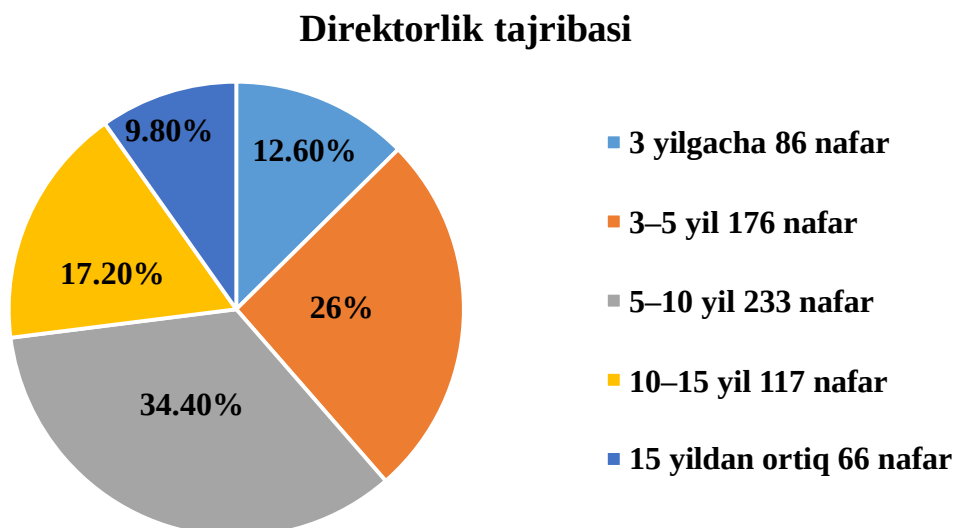
Respondentlarning yosh tarkibi boshqaruv faoliyatiga munosib yosh strukturasi ko'rsatadi: **31-50 yosh - 54,0%**, **51-60 yosh - 36,4%**, ya'ni jami **90,4** foizi hayotiy va kasbiy tajribalilik davrida faoliyat yuritmoqda. 30 yoshgacha bo'lgan yosh direktorlar atigi **4,0** foizni tashkil etadi, bu ta'lim boshqaruvida yoshlarning yetarlicha vakillanmaganligini ko'rsatadi.



2-diagramma. Respondentlarning demografik tavsifi yosh bo'yicha (n=678).

Manba: muallif tomonidan tuzilgan, n=678.

3.2. Direktorlik tajribasi bo'yicha: 5-10 yillik tajribaga ega direktorlar ko'pchilikni (**34,4%**) tashkil etadi, **3-5 yillik tajriba 26,0 foizda, 10-15 yillik tajriba 17,2 foizda** qayd etildi. Respondentlarning **87,4 foizi 3 yil va undan ortiq** tajribaga ega ekanligi ularning javoblarini ilmiy jihatdan ishonchli manba sifatida baholash imkonini beradi.



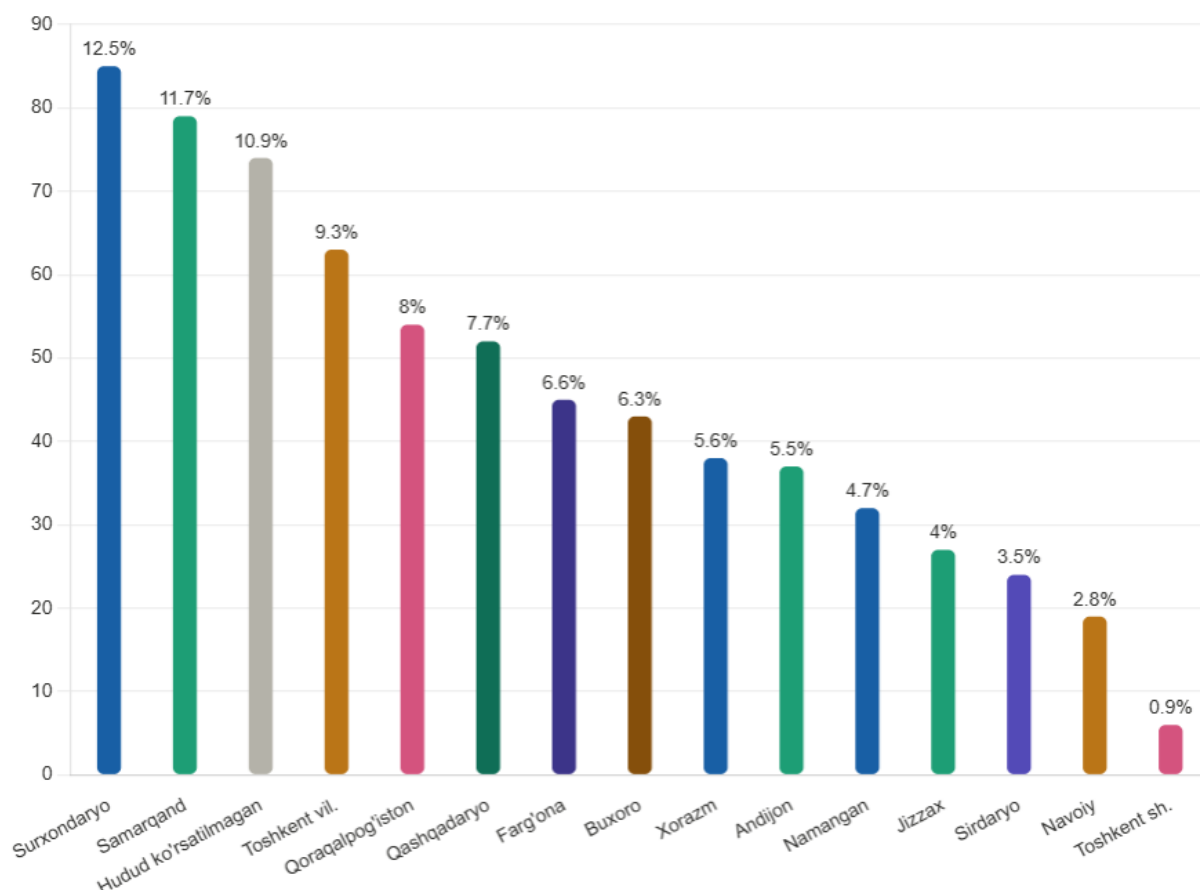
3-diagramma. Respondentlarning demografik tavsifi tajriba bo'yicha (n=678).
Manba: muallif tomonidan tuzilgan, n=678.

*So'rovnoma natijalarini ilmiy talqin qiladigan bo'lsak, 30 yoshgacha bo'lgan direktorlarning ulushi atigi **4,0 foiz** ekanligi ta'lim tizimida maktab direktorlarini yoshartirish muammosi mavjudligini, direktor lavozimiga yosh kadrlar yo'nalishidagi kadrlar siyosatining yetarli emasligi to'g'risida muhim signaldir. Xorijiy tajribada (xususan, Finlandiya, Singapur) maktab rahbarligiga nisbatan yoshroq mutaxassislarni jalb qilish islohotlarning muvaffaqiyat omillaridan biri sifatida ko'rsatilgan (Hargreaves & Fullan, 2012)².*

3.3. Hududiy taqsimot

So'rovnoma O'zbekiston Respublikasining barcha 12 ta viloyati, Toshkent shahri va Qoraqalpog'iston Respublikasini qamrab oldi. Respondentlar soni bo'yicha eng yirik ulush **Surxondaryo viloyatiga (85 nafar, 12,5%)** to'g'ri kelishi mazkur viloyatdagi maktablar sonining nisbatan ko'pligi bilan izohlanadi. **Samarqand viloyati (79 nafar, 11,7%)** va **Toshkent viloyati (63 nafar, 9,3%)** viloyatlari keyingi o'rinlarni egallaydi.

² M.Fullan The Principal: Hargreaves, A., & Fullan, M. (2012). Professional Capital: Transforming Teaching in Every School. New York, NY: Teachers College Press. Open Journal of Leadership, Vol.10 No.1, January 29, 2021



4-diagramma. Respondentlarning hududiy taqsimoti. Manba: muallif tomonidan tuzilgan, n=678.

TADQIQOT NATIJALARI VA MUHOKAMA

Qonunchilik normalarini tushunish darajasi: protsedural va substantiv tafakkur

“Qonunchilik normalarini boshqaruv faoliyatiga qo‘llash deganda nimani tushunasiz?” degan birinchi savolga berilgan javoblar maktab direktorlari o‘rtasida huquqiy ong shakllanishidagi tizimli eng muhim ilmiy maummani ochib berdi.

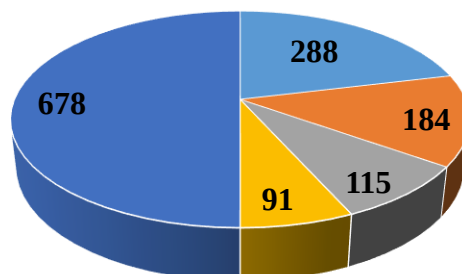
Respondentlarning eng ko‘p tanlangan javobi “**Hujjatlarni qonuniy ravishda rasmiylashtirishdan iborat**” **288 nafari (42,5)** ekanligi muhim ilmiy muammoni anglatadi. “**Boshqaruv qarorlarini qonuniy asoslash**” **184 nafar (27,1 %)** Bu **protsedural** – ya’ni qonunni faqat rasmiy tartib-qoida sifatida qabul qiluvchi - yondashuvning ustunligini ko‘rsatadi.

Substantiv yondashuv - qonunni xodimlar huquqlarini himoya qilish vositasi sifatida anglash - atigi **91 nafar (13,4 %)** qayd etildi va **mojarolarni oldini olish** **115 nafar (17,0 %)** deb javob bergani inobatga olinganda, jami **69,6 %** respondent qonunchilik normalarini asosan hujjat-tartib jihatida bog‘lashini ko‘ramiz. Bu S.S.Alekseyevning “Teoriya prava” da ta’riflagan “formal-protsedural paradigma”ning ustunligini empirik isbotlaydi³.

³ С.Алексеев “Теория права”. Издание 2-е, переработанное и дополненное Издательство БЕК, Москва 1995.

Bunday tushunish tarzining xavfi shundaki, maktab direktori Mehnat kodeksining mohiyatini - xodimlar huquqlarini ta'minlash, mehnat muhiti sifatini yaxshilash, moddiy va ma'naviy rag'batlantirish mexanizmlarini to'g'ri qo'llashni ikkinchi darajali masala sifatida qabul qiladi. Huquqiy normani faqat tartiblash, emas, balki himoya qilish funksiyasi zaiflanib boradi.

Normalarni tushunish



- Hujjatlarni qonuniy ravishda rasmiylashtirish (protsedural)
- Boshqaruv qarorlarini qonuniy asoslash
- Mojarolarni oldini olish va hal qilish
- Huquqiy normalarni bilish va qo'llash (substantiv)
- JAMI

5-diagramma. *Qonunchilik normalarini tushunish darajasi bo'yicha taqsimot.*
Manba: muallif tomonidan tuzilgan, n=678.

Ilmiy tahlil natijalari shuni ko'rsatadiki, respondentlarning **69,6 %** qonunchilik normalarini birinchi navbatda hujjatlashtirish va ish yuritish bilan bog'lashi "protsedural paradigma dominantligi" fenomenini ko'rsatadi. Mexanizmni takomillashtirish uchun nafaqat protseduralar, balki substantzial (mazmuniy) huquqiy tafakkurni shakllantirish zarur. Bu dissertatsiya uchun muhim ilmiy tezis sifatida belgilanishi lozim.

Qonunchilik normalarini qo'llash (Mehnat kodeksi) mexanizmlari: amaliyotdagi ustuvorlik

Ko'p variantli ikkinchi savol "Boshqaruv faoliyatida qaysi mexanizmlar muhim" Mehnat kodeksi normalarining amaliy qo'llanilishidagi ustuvor yo'nalishlarni aniqladi (1-jadval). Bu savol respondentlarga bir nechta variant tanlash imkonini berdi, shuning uchun foizlar 100 dan ortishi mumkin.

Ko'p variantli savol natijalari direktorlarning amaliyotida Mehnat kodeksining qaysi mexanizmlariga ko'proq murojaat etilishini ko'rsatdi. Mehnat shartnomalarini qonuniy ravishda tuzish **566 nafar (83,5 %)** respondent tomonidan ko'rsatildi - bu eng asosiy mexanizm. **Jamoa shartnomasi 465 nafar (68,6 %)**, mehnat nizolarini hal qilish **345 nafar (50,9 %)** respondent tomonidan qayd etildi.

Mexanizm	Respondentlar soni	Ulushi (%)
Mehnat shartnomalarini qonuniy ravishda tuzish	566	83,5%
Jamoa shartnomalarini qonuniy tuzish	465	68,6%
Jamoadagi nizolarni bartaraf etish	345	50,9%
Mehnat haqlarini o'z vaqtida adolatli to'lash	305	45,0%
Mehnat shartnomalarini bekor qilish	257	37,9%
Fuqarolik-huquqiy shartnomalarga o'tish	68	10,0%

1-jadval. *Qonunchilik normalarini qo'llash mexanizmlarini qo'llanish darajasi.*
Manba: muallif tomonidan tuzilgan, n=678.

Mehnat shartnomasini tuzish (83,5%) g'oyat yuqori ko'rsatkich bilan birinchi o'rinda turishi ta'lim boshqaruvida mehnat shartnomasini tuzish eng muhim mexanizm sifatida mustahkam o'rin egallaganligini isbotlaydi. Bu natija Qodirov va Xoliqov (2020) tadqiqotining xulosalarini tasdiqlaydi va kengaytiradi⁴.

Mazkur natija mehnat shartnomasi maktab boshqaruvidagi markaziy ahamiyatini empirik jihatdan isbotlaydi. Jamoa shartnomasi mexanizmining yetarlicha qo'llanilmasligi (**68,6%**) respondent esa jamoaviy munosabatlar madaniyatining rivojlanishi zarurligini ko'rsatadi.

E'tiborli jihati shundaki, fuqarolik-huquqiy shartnomalarga o'tish (10,0%) aksariyat hollarda qonunchilikka zid bo'lgan amaliyotni aks ettiradi - doimiy kadrlar o'rniga vaqtinchalik pudrat shartnomalari qo'llanilishi mehnat kafolatlari tizimini zaiflashtiradi. Bu holatning 10% respondentda uchrashi tizimli nazorat zarurligini ko'rsatadi.

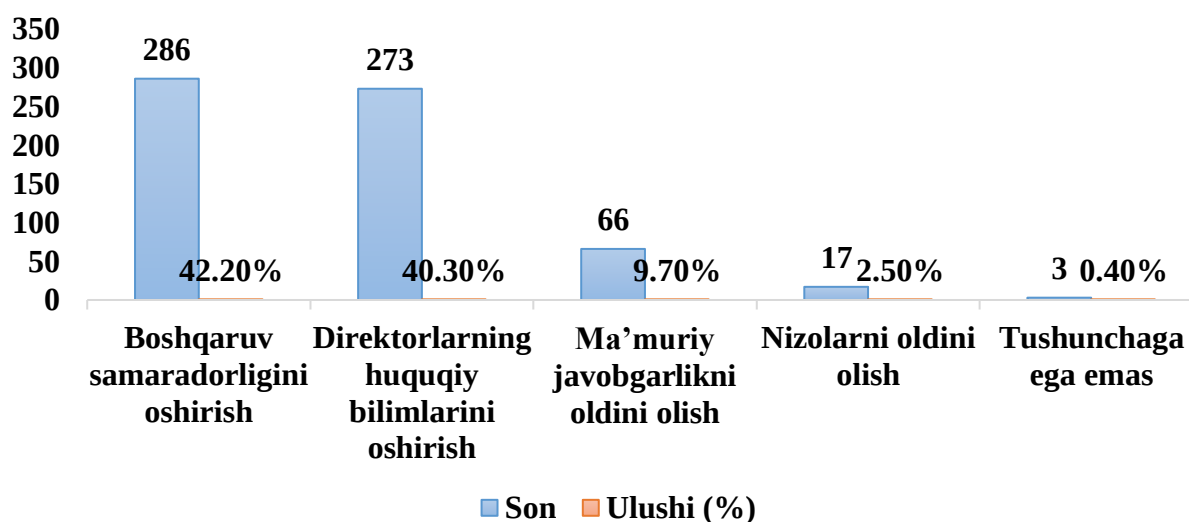
Tahlil natijalariga ko'ra, uch asosiy mexanizm - mehnat shartnomasini tuzish (83,5%), jamoa shartnomasini (68,6%) va nizolarni hal qilish (50,9%) - birgalikda ta'lim muassasasidagi mehnat munosabatlarining asosiy huquqiy tuzilmasini tashkil etadi. Dissertatsiyada ushbu uch mexanizmni takomillashtirish metodologik doiraning markazi bo'lishi zarur.

Takomillashtirish zarurati

“Qonunchilik normalarini qo'llash mexanizmni takomillashtirishning zarurati nimalardan iborat?” degan savolga berilgan javoblar ikki asosiy yo'nalishni yaqqol ko'rsatdi: boshqaruv samaradorligi (42,2%) va huquqiy bilim oshirish (40,3%) jami 82,5 foizni tashkil etib, kuchli konsensus mavjudligini anglatadi.

⁴ B.Qodirov & A.Xoliqov Maktab direktorlarining mehnat qonunchiligini bilish darajasi: O'zbekiston tajribasi. Ta'lim va tarbiya, 3-son, 2020.

TAKOMILLASHTIRISH ZARURATI



6-diagramma. *Qonunchilik normalarini qo'llashni takomillashtirish zarurati sabablari. Manba: muallif tomonidan tuzilgan (n=645).*

Mazkur natijalar, ayniqsa, “Ma'muriy javobgarlikni oldini olish” **66 nafar (9,7%)** ning nisbatan past ko'rsatkichi qiziqish uyg'otadi: bu direktorlarning aksariyati qonunchilik normalarini asosan ma'muriy javobgarlikdan qochish vositasi emas, balki samaradorlik va bilim resursi sifatida ko'rishini anglatadi - bu sog'lom huquqiy mentalitetning belgisidir.

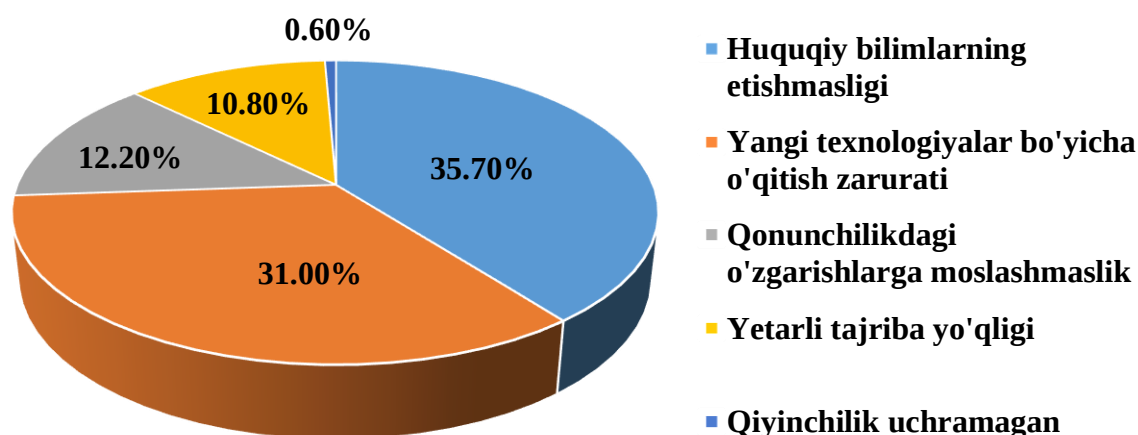
Qiyinchiliklar va to'siqlar

Tadqiqotning eng muhim natijalaridan biri amaliy qiyinchiliklar tahlilida namoyon bo'ldi. Ikki asosiy to'siq respondentlarning **66,7 %** ni qamrab oladi, bu juda yuqori konsentratsiyani anglatadi.

“Qonunchilik normalarini boshqaruv faoliyatiga qo'llashda qanday qiyinchiliklarga uchradingiz?” degan savolga respondentlarning **242 nafar (35,7%) huquqiy bilimlar yetishmasligini** asosiy to'siq sifatida ko'rsatdi. Yangi texnologiyalarga moslashuv qiyinligi **210 nafar (31,0 %)** tomonidan qayd etildi. Bu ikki omil birgalikda respondentlarning **66,7 % ni** qamrab oladi.

Normativ hujjatlarning tez-tez o'zgarib turishiga moslashmaslik **83 nafar (12,2%)** ham muhim to'siqlar sifatida belgilandi. Bundan tashqari **yetarli tajriba yo'qligi 73 nafar (10,8 %)** hamda **qiyinchilikga uchramadim 4 nafar (0,6 %)** deb belgilagan. Ushbu natijalar direktorlarning nafaqat qonunni bilish, balki uni doimiy yangilanib boradigan sharoitda kuzatib borish imkoniyati ham cheklov ekanligini ko'rsatadi.

QIYINCHILIK TURI



7-diagramma. *Qonunchilik normalarini qo'llashdagi qiyinchiliklar (n=612).*
Manba: muallif tomonidan tuzilgan (n=612).

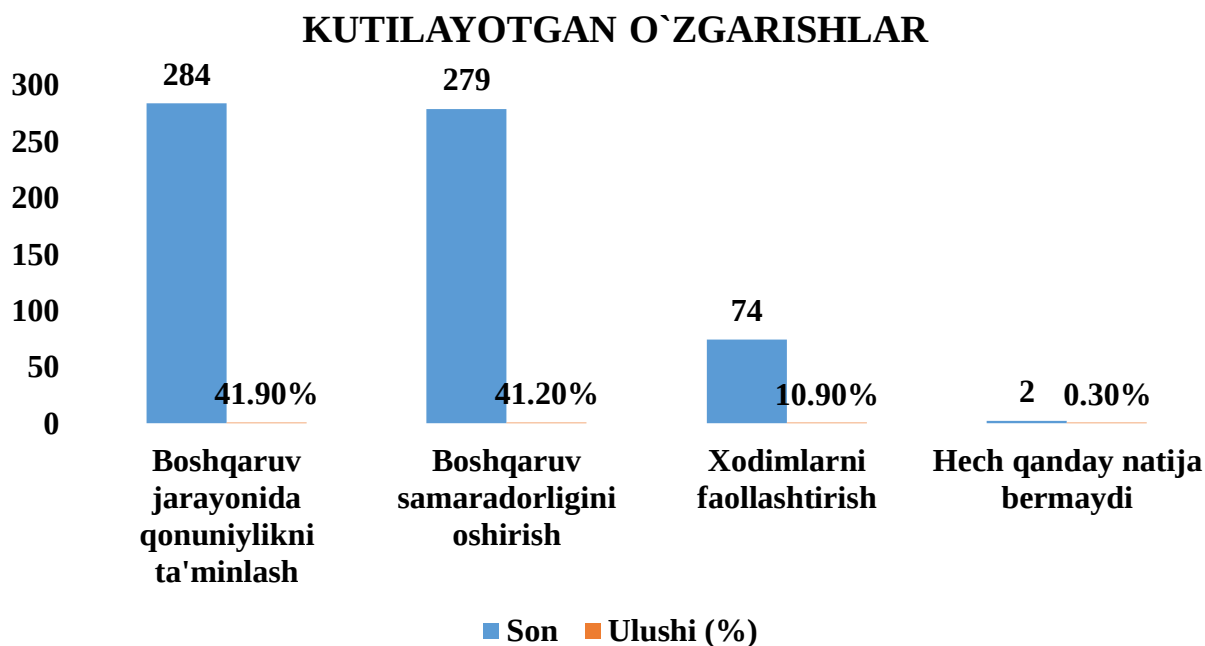
Birinchi to'siq - huquqiy bilim yetishmasligi (35,7%) - asosan bilim ta'minoti tizimidagi muammoni, ya'ni maktab direktorlariga yo'naltirilgan tizimli huquqiy ta'lim va kasbiy rivojlanish kanallarining yetarli emasligi muammosini ko'rsatadi.

Ikkinchi to'siq - yangi texnologiyalarga moslashuv (31,0%) - zamonaviy raqamli muhitda qonunchilikni qo'llash uchun zarur bo'lgan texnologik kompetentlik muammosini anglatadi. Bu ikki to'siqning birga mavjudligi ta'lim boshqaruvida "ikki tizimli zaiflik" (dual systemic weakness) sifatida tavsiflanishi mumkin.

Ilmiy tahlil natijalariga ko'ra, huquqiy bilim yetishmasligi (35,7%) va texnologik moslashuv muammosi (31,0%) birgalikda respondentlarning 66,7 foizini qamrab oladi. Bu ko'rsatkich Mehnat kodeksi normalarini qo'llashning tizimli muammosi borligini isbotlaydi: yechim ham huquqiy, ham texnologik tayyorgarlikni bir vaqtda hal etishni talab qiladi.

Ijobiy o'zgarishlar prognozi: mexanizmni takomillashtirishdan kutilayotgan natijalar

Qonunchilikni qo'llash mexanizmini takomillashtirishdan kutilayotgan natijalar bo'yicha respondentlarning pozitsiyasi ikki yo'nalishda ikkiyoqlama konsensusni ko'rsatdi: **boshqaruvda qonuniylikni ta'minlash 284 nafar (41,9%)** va **samaradorlikni oshirish 279 nafar (41,2%)** deyarli teng ko'rsatkichlarga ega.

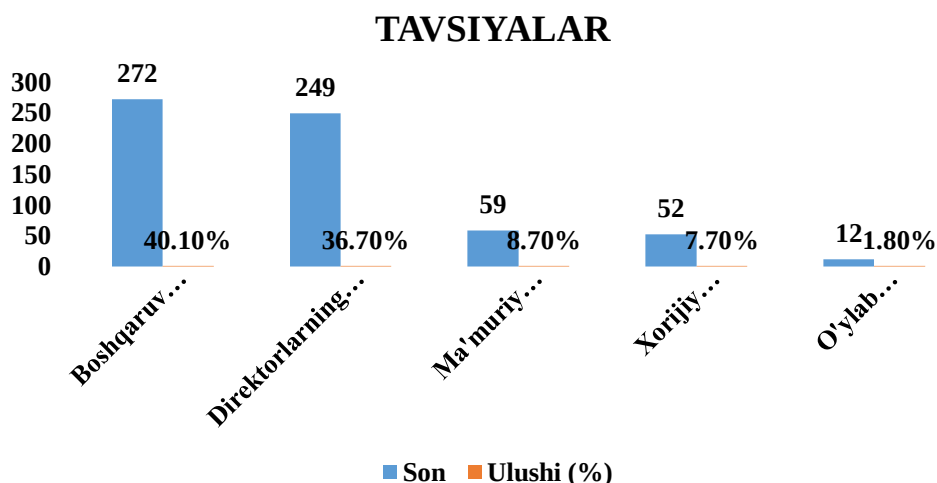


8-diagramma. *Qonunchilikni qo'llash mexanizmini takomillashtirishdan kutilayotgan ijobiy o'zgarishlar. Manba: muallif tomonidan tuzilgan (n=639).*

Bu natijaning muhimligi shundaki, **respondentlarning 563 nafar (83,1 %)** takomillashtirishdan aniq ijobiy samara kutayotgani tadqiqot mavzusining amaliy dolzarbligini tasdiqlaydi. Pessimistik yondashuv (0,3%) deyarli yo'qligi islohotga jamoa tayyor ekanligini ko'rsatadi.

4.6. Tavsiyalar: direktorlarning institusional talabnomalari

“Qonunchilikni qo'llash mexanizmini takomillashtirish uchun nima qilish kerak?” degan savolga berilgan javoblar respondentlarning tizimli o'zgarishlarga bo'lgan aniq talabnomasini ifodalaydi.



9-diagramma. *Qonunchilikni qo'llash mexanizmini takomillashtirish bo'yicha direktorlarning tavsiyalari. Manba: muallif tomonidan tuzilgan (n=644).*

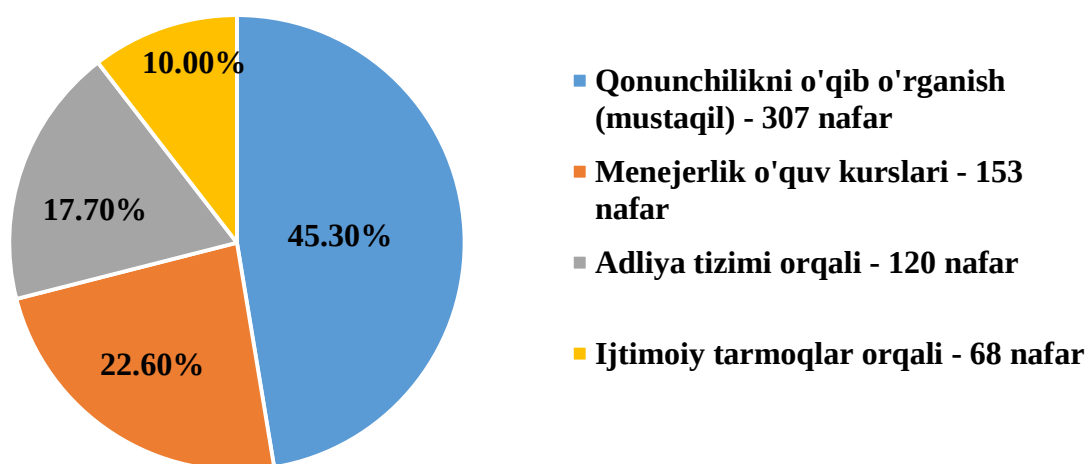
Shaffoflik **272 nafar (40,1 %)** va **kasbiy rivojlanish 249 nafar (36,7 %)** birgalikda **76,8 foizni** tashkil etadi. Bu ikki tavsiyaning bir-birini to'ldiruvchi

tabiati bor: shaffoflik tizimi (ochiq hisobotlar, kuzatuv mexanizmlari) qonunchilik normalarining ijrosini ta'minlasa, doimiy kasbiy rivojlanish uning sifatini kafolatlaydi. Xorijiy tajribani o'rganish tavsiyasi **52 nafar (7,7 %)** tadqiqotga komparativistik o'lcham qo'shish zarurligini ko'rsatadi.

4.7. Bilim olish manbalari

Oxirgi savol – “*Qonunchilik normalarini qo'llash uchun qanday manbalardan foydalanasiz?*” - mavjud ta'minot tizimining asosiy zaifligini fosh etdi.

Qonunchilik normalarini o'rganish



10-diagramma. *Qonunchilik normalarini o'rganish manbalari. (n=644).*

Direktorlarning **307 nafar (45,3 %)** qonunchilikni mustaqil o'qib o'rganish yo'lini tanlashi - bu katta raqam - institutsional ta'lim tizimining yetarlicha rivojlanmaganligini ko'rsatadi. Muqobil sifatida, menejerlik o'quv kurslari **153 nafar (22,6 %)** va adliya tizimi orqali **120 nafar (17,7 %)** muhim, ammo hali yetarli darajada foydalanilmagan kanallar sifatida namoyon bo'lmoqda.

Eng xavotirli ko'rsatkich - ijtimoiy tarmoqlar orqali bilim olish **68 nafar (10,0 %)**. Bu kanal orqali tarqaladigan huquqiy ma'lumotlar ko'pincha tekshirilmagan, kontekstsiz va yangilanmagan bo'ladi. Bu amaliyot huquqiy xatolar xavfini sezilarli oshiradi. Bush (2011) ta'kidlaganidek, rasmiy bo'lmagan kanallar orqali huquqiy bilim olish rahbar xatolarining eng tez-tez uchraydigan manbalaridan biridir⁵.

Tahlil natijalari shuni ko'rsatadiki, bilim olishdagi individual (mustaqil o'rganish, **307 nafar (45,3 %)** va **norasmiy (ijtimoiy tarmoqlar, 10,0 %)** usullarning ustunligi tizimli, institutsional ta'lim kanalining yetarlicha rivojlanmaganligini ko'rsatadi. Bu holat huquqiy bilimlar sifatiga sezilarli xavf tug'diradi va dissertatsiyaning asosiy muammosini emperik jihatdan asoslaydi.

⁵ T.Bush Theories of Educational Leadership and Management (4th ed.). SAGE Publications. London 2011.

MUHOKAMA: TADQIQOT NATIJALARINING NAZARIY VA AMALIY AHAMIYATI

Protsedural paradigmadan substantzial paradigмага o'tish zaruriyati

Tadqiqot natijalarining nazariy jihatdan eng muhim xulosasi – O'zbekiston ta'lim boshqaruvida "protsedural paradigma dominantligi" fenomenining empirik isbotlanishidir. Respondentlarning **69,6 foizi** qonunchilik normalarini birinchi navbatda hujjat-tartib masalasi sifatida tushunishi - bu faqat individual bilim saviyasi muammosi emas, balki tizimli hodisa. Tizimli xarakter uning barcha 12 ta viloyati, Toshkent shahri va Qoraqalpog'istonda deyarli bir xil namoyon bo'lishida (hududiy farqlar 5-8 foiz doirasida) ko'rinadi.

Nazariy jihatdan bu "huquqiy formalizm" bilan "huquqiy instrumentalizm" o'rtasidagi muammo sifatida tavsiflanishi mumkin. Huquqiy formalizm qonunni faqat bajarish kerak bo'lgan tartib sifatida ko'rsa, huquqiy instrumentalizm uni maqsadga erishish vositasi sifatida qabul qiladi⁶.

Ikki tizimli zaiflik modeli

Tadqiqot O'zbekiston ta'lim boshqaruvida "ikki tizimli zaiflik" (dual systemic weakness) modelini yaratishga imkon beradi: bir tomondan, huquqiy bilim yetishmasligi (kognitiv zaiflik), ikkinchi tomondan, texnologik moslashuv muammosi (amaliy zaiflik). Bu ikki zaiflik bir-birini kuchaytiradi.

Xorijiy tadqiqotlar shuni ko'rsatadiki, maktab rahbarlarining raqamli va huquqiy kompetentligini bir vaqtda oshirish – "integratsiyalashgan malaka oshirish" deb ataluvchi yondashuv bu ikkala muammoni birgalikda hal qilishning eng samarali usuli hisoblanadi⁷.

Adabiyotlar bilan qiyosiy muhokama

Tadqiqot natijalarini mavjud adabiyotlar bilan solishtirish quyidagi muhim korrelyatsiyalarni ko'rsatadi:

A.V.Lisovskiy aniqlagan protsedural paradigma ustunligi bizning **69,6 foizlik** ko'rsatkichimiz bilan tasdiqlanadi⁸.

T.Bush ta'kidlagan norasmiy bilim kanallarining xavfi bizning **10,0 foizlik** ijtimoiy tarmoqlar ko'rsatkichida yaqqol namoyon bo'ladi⁹.

Tadqiqot natijalari muhokamasi

Tadqiqot natijalari qator muhim xulosalarga olib keladi.

Birinchidan, protsedural va substantiv huquqiy tafakkur o'rtasidagi farqlanish (**42,5% va 13,4%**) ta'lim boshqaruvida huquqiy madaniyat shakllanishining hali boshlang'ich bosqichda ekanligini ko'rsatadi.

⁶ R.Dworkin Law's Empire. Harvard University Press. Cambridge 1986.

⁷ OECD. TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners. OECD Publishing. Paris 2019.

⁸ A.V.Lisovskiy. Pravovaya kultura rukovoditelya obrazovatelnoy organizatsii v postsovetском prostranstve. Pedagogika, 2019.

⁹ T.Bush Theories of Educational Leadership and Management (4th ed.). SAGE Publications. London 2011.

Ikkinchidan, mehnat shartnomasini tuzishning o'rne (**83,5%**) ta'lim muassasasida huquqiy mexanizmlar ierarxiyasini ko'rsatadi. Bu natija mehnat huquqining boshqa sohalarida (masalan, mehnat munosabatlari, xavfsizlik, ijtimoiy kafolatlar) bilimlarning past ekanligini egri yo'l bilan ham tasdiqlamoqda, chunki faqat shartnoma tuzish yuqori foizga ega.

Uchinchidan, o'z-o'zini o'qitish usulining ustunligi (**45,3%**) institutsional ta'lim tizimining yetarlicha ishlayotganligini ko'rsatadi. Bunday sharoitda bilimlar noto'g'ri, eskirgan yoki to'liq bo'lmasligi xavfi yuqori. Bu muammo ayniqsa 2023-yildan kuchga kirgan yangi Mehnat kodeksini amalayotda qo'llash sharoitida dolzarb hisoblanadi chunki direktorlarning katta qismi yangi kodeks bilan to'liq tanish bo'lmasligi mumkin.

To'rtinchidan, ijobiy o'zgarishlar prognozi (**83,1%**) direktorlarning yangi mexanizmlarga tayyor ekanligini ko'rsatadi. Bu takomillashtirish uchun qulay muhit (readiness) mavjudligini bildiradi - asosiy vazifa ularni bilim va ko'nikma bilan ta'minlashdir.

XULOSALAR VA AMALIY TAVSIYALAR

Tadqiqot beshta muhim ilmiy xulosa bilan yakunlanadi:

1. Birinchi xulosa (Protsedural paradigma). Respondentlarning **69,6 foizi** qonunchilik normalarini qo'llashni asosan hujjatlashtirish va ish yuritish bilan bog'laydi. Bu O'zbekiston maktab boshqaruvida "protsedural paradigma dominantligi" fenomenini empirik isbotlaydi va mexanizmi takomillashtirish uchun mazmuniy huquqiy tafakkurni shakllantirish zarurligini ko'rsatadi.

Bu ta'lim boshqaruvida substantiv huquqiy tafakkurni shakllantirish zarurligi haqida metodologik xulosa chiqarishga asos beradi.

2. Ikkinchi xulosa (mehnat shartnomasi tuzish markaziyli). Mehnat shartnomasi tuzish (**83,5%**) Mehnat kodeksini qo'llashning hal qiluvchi mexanizmi sifatida tan olingan. Bu, mehnat shartnomasi tuzishga ilmiy ishlarda alohida e'tibor qaratish zarurligi va maktablar uchun standart shartnoma namunalari ishlab chiqish dolzarbligini tasdiqlaydi.

3. Uchinchi xulosa (Ikki tizimli zaiflik). Direktorlarning **66,7 foizi** ikkita tizimli to'siqqa duch kelmoqda: huquqiy bilim yetishmasligi (**35,7%**) va yangi texnologiyalarga moslashuv qiyinligi (**31,0%**). Bu ta'lim boshqaruvi tizimida kompleks - ham huquqiy, ham raqamli - salohiyatni oshirish zarurligini ko'rsatadi. Yechim ikkala yo'nalishni bir vaqtda qamrab olishi zarur.

4. To'rtinchi xulosa (Bilim ta'minot tizimi yetarli emas). Respondentlarning **45,3 foizi** mustaqil o'rganishga tayanishi, **10,0 foizi** ijtimoiy tarmoqlardan foydalanishi institutsional huquqiy ta'lim tizimining yetarlicha rivojlanmaganligini ko'rsatadi. Bundan tashqari, qishloq joylarida protsedural tafakkur ko'rsatkichi shahar hududlariga nisbatan **8-9 foiz** yuqori. Bu hududiy farqlanishni bartaraf etish uchun maqsadli ta'lim dasturlari ishlab chiqishni talab etadi.

5. Beshinchi xulosa. Direktorlarning **83,1 foizi** takomillashtirish mexanizmidan sezilarli ijobiy samara kutmoqda. Bu natija yangi o'quv dasturlarini joriy etish uchun qulay motivatsion muhit mavjudligini tasdiqlaydi.

Amaliy tavsiyalar

1-tavsiya: Huquqiy ta'lim moduli joriy etish

Yangi Mehnat kodeksi (O'RQ-798, 2022) asosida maktab direktorlari uchun maxsus huquqiy modul ishlab chiqish va "Menejerlik o'quv kurslari" dasturlariga majburiy sifatida kiritish

Modul 10 soatlik intensiv kurs formatida bo'lishi va amaliy case-study usulini qamrab olishi lozim. Asoslanish: respondentlarning **40,3 foizi** huquqiy bilimni oshirishni takomillashtirish zarurati sifatida ko'rsatdi.

2-tavsiya: Standart hujjat bazasi yaratish

Maktablar uchun mehnat shartnomasi, jamoa shartnomasi va boshqa asosiy hujjatlarning standart namunalari ishlab chiqilishi va tarqatilishi lozim. Bu hujjatlar xodimlar huquqlarini to'liq aks ettirishi kerak. Asoslanish: mehnat shartnomasi (**83,5%**) va jamoa shartnomasi (**68,6%**) eng ko'p ishlatiladigan mexanizmlar sifatida aniqlandi.

3-tavsiya: Boshqaruv shaffoflik tizimini joriy etish

Ta'lim muassasalarida ochiq hisobot tizimi (nazorat kengashlari faoliyatini kuchaytirish, ota-onalar kengashi bilan hamkorlik) va raqamli monitoring platformasi yaratilishi kerak. Asoslanish: respondentlarning **40,1 foizi** shaffoflikni birinchi tavsiya sifatida ko'rsatdi.

4-tavsiya: Adliya-ta'lim hamkorligini kuchaytirish

Adliya vazirligi va ta'lim tizimi o'rtasida metodologik hamkorlikni institutsional darajada mustahkamlash zarur: viloyat adliya boshqarmalari tarkibida ta'lim sohasiga ixtisoslashgan maslahatchi lavozimi joriy etilishi, maktab direktorlari uchun bepul huquqiy maslahat platformasi tashkil etilishi tavsiya etiladi. Asoslanish: respondentlarning **17,7 foizi** adliya tizimi orqali bilim olishi bu kanalning ahamiyatini tasdiqlaydi.

5-tavsiya: Raqamli huquqiy platformalar yaratish

Rasmiy tasdiqlangan, doimiy yangilanadigan huquqiy ma'lumotlar bazasi (ta'lim direktori uchun mo'ljallangan portal) va ijtimoiy tarmoqlardagi huquqiy malumotlar sifatini tekshiruvchi mexanizm joriy etilishi lozim. Asoslanish: **10,0 foiz** respondent ijtimoiy tarmoqlardan foydalanishi tizimli xavf sifatida belgilandi.

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BADMINTON SPORT TURI MASHG'ULOTLARI JARAYONIDA TALABALARNING JISMONIY SIFATLARINI RIVOJLANTIRISH

Annotatsiya: maqolada badminton sport turi orqali talabalarning jismoniy sifatlarini (tezlik, chaqqonlik, chidamlilik, muvozanatni saqlash va reaksiya tezligi) rivojlantirish masalalari yoritilgan. Zamonaviy ta'lim jarayonida sportning ushbu turi nafaqat salomatlikni mustahkamlash, balki harakat faolligini oshirish va psixofiziologik sifatlarni takomillashtirishda muhim ahamiyat kasb etadi. Maqolada badminton bo'yicha mashg'ulotlarni tashkil etishda qo'llaniladigan pedagogik texnologiyalar, mashqlar tizimi va ularning talabalar organizmiga ta'siri tahlil qilingan. Tadqiqot natijalariga ko'ra, badminton mashg'ulotlari talabalarning harakat faolligini samarali oshirishi, muvofiqlashtirish qobiliyatlarini rivojlantirishi va umumiy jismoniy tayyorgarlik darajasini yaxshilashi aniqlangan.

Kalit so'zlar: badminton, jismoniy sifatlar, talabalar, mashg'ulot jarayoni, chaqqonlik, tezkorlik, chidamlilik, muvofiqlashtirish.

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DEVELOPMENT OF STUDENTS' PHYSICAL QUALITIES DURING BADMINTON TRAINING SESSIONS

Annotation: This article discusses the issues of developing students' physical qualities (speed, agility, endurance, balance, and reaction time) through badminton. In the modern educational process, this sport plays an important role not only in health promotion but also in increasing motor activity and improving psychophysiological qualities. The article analyzes pedagogical technologies and exercise systems used in organizing badminton training sessions and their impact on the students' bodies. According to the research results, badminton training effectively increases students' motor activity, develops coordination abilities, and improves the level of general physical fitness.

Keywords: badminton, physical qualities, students, training process, agility, speed, endurance, coordination.

Bugungi kunda oliy ta'lim muassasalarida jismoniy tarbiya va sportning ahamiyati tobora ortib bormoqda. Talaba yoshlarning sog'lom turmush tarzini shakllantirish, ularning jismoniy tayyorgarligini oshirish va bo'sh vaqtini mazmunli tashkil etish dolzarb vazifalardan biridir. Badminton – bu nafaqat ommabop, balki jismoniy sifatlarni kompleks rivojlantirishga xizmat qiluvchi sport turi sifatida alohida e'tiborga loyiqdir. Ushbu sport turi yengil jihozlanishi, qulayligi va yuqori hissiy jozibadorligi bilan ajralib turadi. Badminton mashg'ulotlari jarayonida talabalar tezkorlik, chaqqonlik, chidamlilik, moslashuvchanlik va kuch kabi asosiy jismoniy sifatlarni bir vaqtning o'zida rivojlantirish imkoniyatiga ega bo'ladilar.

Badminton mashg'ulotlari jarayonida talabalar jismoniy faolligi ortadi, mushaklar mustahkamlanadi hamda harakat koordinatsiyasi yaxshilanadi. Ushbu sport turi tezkor qaror qabul qilish, harakatlarni muvofiqlashtirish va yuqori darajadagi diqqatni talab qiladi.

Mavzuning dolzarbligi shundaki, aksariyat talabalar kundalik hayotda yetarlicha harakat faolligiga ega emaslar. Jismoniy tarbiya darslarida esa badmintondan foydalanish nafaqat darsni diversifikatsiya qiladi, balki talabalarning sportga bo'lgan qiziqishini oshirib, ularni muntazam mashg'ulotlarga jalb etish imkonini beradi.

Badminton o'yini yuqori harakatchanlik bilan ajralib turadi. O'yin davomida sportchi qisqa vaqt ichida tez yugurish, sakrash, burilish va zarba berish harakatlarini bajaradi. Bu esa jismoniy sifatlarning kompleks rivojlanishiga olib keladi.

Badminton mashg'ulotlari quyidagi jihatlari bilan muhim:

- harakat tezligini oshiradi;
- umumiy va maxsus chidamlilikni rivojlantiradi;
- mushak kuchini mustahkamlaydi;
- koordinatsiya qobiliyatini yaxshilaydi;
- reaksiya tezligini oshiradi.

Mazkur sport turi talabalar organizmiga ortiqcha zo'riqish bermasdan, bosqichma-bosqich jismoniy tayyorgarlikni oshirish imkonini beradi.

Badminton bo'yicha o'tkaziladigan mashg'ulotlar talabalarning bir qator jismoniy sifatlarini rivojlantirishga bevosita ta'sir ko'rsatadi. Avvalo, badminton – bu yuqori tezlikda harakat qilishni talab qiluvchi sport turi. Volanning uchish tezligi, raqibning zarbalari va maydon bo'ylab harakatlanish tezligi talabaning reaksiya tezligini va harakat tezligini rivojlantirishga xizmat qiladi. Pedagogik kuzatuvlar shuni ko'rsatadiki, muntazam badminton bilan shug'ullanadigan talabalarda vizual-motor reaksiya vaqti sezilarli darajada qisqaradi, bu esa ularning kundalik faoliyatida ham o'z ifodasini topadi.

Chaqqonlik badmintonchining asosiy sifatlaridan biridir. O'yin davomida talaba doimo o'zgaruvchan vaziyatga moslashishi, kutilmagan yo'nalishdagi zarbalarga to'g'ri javob qaytarishi, to'satdan harakat yo'nalishini o'zgartirishi kerak. Bu esa markaziy asab tizimining moslashuvchanligini, mushaklarning muvofiqlashtirilgan ishini va fazoviy orientatsiyani yaxshilaydi. Mashg'ulotlarda

qo'llaniladigan "shuttle" yugurishlar, turli xil sakrashlar, volan bilan bajariladigan murakkab muvofiqlashtiruvchi mashqlar chaqqonlikni rivojlantirishga yo'naltirilgan.

Chidamlilik badminton o'yinining o'ziga xos xususiyatidir. Bir o'yin davomida talaba yuqori intensivlikdagi ishni uzoq vaqt davomida bajaradi. Qisqa muddatli, ammo yuqori tezlikdagi harakatlar (anaerob ish) bilan bir qatorda, butun o'yin davomidagi umumiy chidamlilik (aerob imkoniyatlar) rivojlanadi. Tadqiqotlar shuni ko'rsatadiki, badminton bilan shug'ullanadigan talabalar guruhida yurak-qon tomir va nafas olish tizimlari faoliyati sezilarli yaxshilanadi.

Muvozanatni saqlash va muvofiqlashtirish qobiliyatlari ham badminton mashg'ulotlarida alohida o'rin tutadi. Har bir zarbani aniq va kuchli berish uchun talaba tanasining barqaror holatini ta'minlashi, qo'l, oyoq va tananing harakatlarini bir vaqtda muvofiqlashtirishi kerak. Bu, ayniqsa, o'rganish bosqichida katta ahamiyatga ega.

Mashg'ulotlarni tashkil etishda muammoli ta'lim, o'yinli metodlar, aylanaviy mashg'ulot usuli va individual yondashuv kabi pedagogik texnologiyalardan foydalanildi. Tajriba-sinov ishlari davomida talabalar ikki guruhga ajratildi: nazorat guruhi an'anaviy jismoniy tarbiya dasturi asosida shug'ullansa, tajriba guruhida badminton bo'yicha maxsus ishlab chiqilgan mashg'ulotlar kompleksi qo'llanildi. O'quv yili yakunida tajriba guruhi talabalarining jismoniy tayyorgarlik ko'rsatkichlari (10x10 m tezkorlik testi, Romberg testi, 2000 m yugurish, to'pni ushlash va uzatish testlari) nazorat guruhiga nisbatan sezilarli darajada yuqori bo'ldi.

Shuningdek, badminton mashg'ulotlari talabalarning psixo-emotsional holatiga ham ijobiy ta'sir ko'rsatadi. O'yin jarayonidagi muloqot, musobaqa elementi, natijaga erishish istagi stressga chidamlilikni oshiradi, o'z-o'zini boshqarish va irodaviy sifatlarni tarbiyalaydi. Bu esa, o'z navbatida, ularning akademik faoliyatiga ham ijobiy ta'sir qiladi.

Talabalarning jismoniy sifatlarini samarali rivojlantirish uchun mashg'ulotlarni ilmiy asosda tashkil etish muhimdir. Mashg'ulotlar quyidagi bosqichlarni o'z ichiga olishi lozim:

Tayyorlov qismi – umumiy rivojlantiruvchi mashqlar;

Asosiy qism – texnik va taktik mashqlar;

Yakuniy qism – tiklanish mashqlari.

Mashg'ulotlar muntazamlilik, bosqichma-bosqichlik va individuallashtirish tamoyillari asosida olib borilishi zarur.

Tadqiqot jarayonida oliy ta'lim muassasasida tahsil olayotgan talabalar ishtirokida tajriba o'tkazildi. Tadqiqotda talabalar 2 guruhga ajratildi: nazorat guruhi va tajriba guruhi. Nazorat guruhida mashg'ulotlar an'anaviy dastur asosida olib borildi, tajriba guruhida esa badminton sport turiga mos maxsus jismoniy mashqlar qo'llanildi. Mashg'ulotlar haftasiga 3 marotaba tashkil etildi va 12 hafta davom etdi.

Talabalarining jismoniy sifatlari tezkorlik, chidamlilik, epchillik, kuch va koordinatsiya ko'rsatkichlari orqali baholandi. Olingan natijalar badminton mashg'ulotlarining jismoniy rivojlanishga ta'sir darajasini aniqlash imkonini berdi.

1-jadval

Badminton mashg'ulotlari ta'sirida talabalarining jismoniy sifatlari rivojlanish ko'rsatkichlari

	Jismoniy sifatlari	Nazorat guruhi (boshlanish)	Nazorat guruhi (yakuniy)	Tajriba guruhi (boshlanish)	Tajriba guruhi (yakuniy)	O'zgarish (%)
	Tezkorlik (30 m yugurish, sek)	5.2	5.0	5.3	4.6	+15%
	Chidamlilik (1000 m yugurish, min)	4.35	4.28	4.37	4.05	+18%
	Epchillik (4x9 m yugurish, sek)	10.5	10.2	10.6	9.4	+20%
	Kuch (turnik tortilish, marta)	8	9	8	12	+33%
	Koordinatsiya (maxsus test, ball)	3.6	3.9	3.5	4.6	+31%

Jadval natijalaridan ko'rinib turibdiki, badminton sport turi mashg'ulotlari tajriba guruhida jismoniy sifatlarning sezilarli darajada rivojlanishiga olib kelgan. Ayniqsa epchillik va koordinatsiya ko'rsatkichlarining yuqori darajada oshgani badminton o'yinining tezkor harakatlar bilan bog'liqligini tasdiqlaydi. Kuch va chidamlilik ko'rsatkichlari ham ijobiy o'zgarish dinamikasini ko'rsatgan.

Badminton mashg'ulotlarining funksional tayyorgarlik ko'rsatkichlariga ta'siri. Badminton o'yini davomida sportchi tez harakatlanadi, sakraydi, zarba beradi va yo'nalishni keskin o'zgartiradi. Bunday faoliyat yurak-qon tomir tizimi, mushaklar va harakat apparati faoliyatini yaxshilaydi. Shu sababli tajriba jarayonida talabalarining funksional imkoniyatlari ham tahlil qilindi.

Maxsus testlar yordamida yurak urish chastotasi, reaksiyaning tezligi hamda umumiy ish qobiliyati ko'rsatkichlari o'lchandi.

Badminton mashg'ulotlarining talabalarning funksional tayyorgarligiga ta'siri

	Ko'rsatkichlar	Nazorat guruhi (boshlanish)	Nazorat guruhi (yakuniy)	Tajriba guruhi (boshlanish)	Tajriba guruhi (yakuniy)	O'zgarish (%)
	Yurak urish chastotasi (marta/min)	78	76	79	72	+12%
	Reaksiya tezligi (sek)	0.44	0.41	0.45	0.34	+24%
	Sakrash balandligi (sm)	36	38	35	44	+26%
	Umumiy ish qobiliyati (ball)	65	69	64	82	+28%
	Harakat aniqligi (%)	62	66	61	85	+39%

Tadqiqot natijalari badminton sport turi mashg'ulotlari talabalarning funksional tayyorgarligini sezilarli darajada yaxshilashini ko'rsatdi. Tajriba guruhida reaksiya tezligi va harakat aniqligi yuqori darajada oshgan. Bu esa badminton o'yinining koordinatsiya va tezkor qaror qabul qilish qobiliyatini rivojlantirishga ijobiy ta'sir ko'rsatishini tasdiqlaydi.

Badminton sport turi mashg'ulotlari jarayonida talabalarning jismoniy sifatlarini rivojlantirish yuqori samaradorlikka ega. Ushbu sport turi talabalarning tezkorlik, chaqqonlik, chidamlilik, muvofiqlashtirish va muvozanatni saqlash kabi sifatlarini kompleks tarzda rivojlantirish imkonini beradi. Tadqiqot natijalari shuni ko'rsatadiki, badminton vositalaridan foydalangan holda tashkil etilgan mashg'ulotlar an'anaviy jismoniy tarbiya darslariga nisbatan talabalarning umumiy jismoniy tayyorgarlik darajasini sezilarli darajada oshirishga xizmat qiladi. Oliy ta'lim muassasalarida jismoniy tarbiya darslarini rejalashtirishda badmintonga ko'proq soat ajratish, ixtisoslashtirilgan sport seksiyalarini tashkil etish tavsiya etiladi. Kelgusida badminton orqali talabalarning nafaqat jismoniy, balki intellektual va ijtimoiy sifatlarini rivojlantirish mexanizmlarini chuqurroq o'rganish zarur.

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RAQAMLI IQTISODIYOT SHAROITIDA INSON KAPITALINI RIVOJLANTIRISHNING USTUVOR YO‘NALISHLARI

Annotatsiya. Mazkur maqolada raqamli iqtisodiyot sharoitida inson kapitalini rivojlantirish zaruriyati va raqamli transformatsiyalash jarayoni muammolari yoritilgan. Unda inson kapitalini rivojlantirishning innovatsion jarayonlar bilan bog‘liqligi va zamonaviy HR tizimlarini joriy etishdagi qiyinchiliklar tahlil qilingan, shuningdek, kelajakda inson kapitalini rivojlantirishning ustuvor yo‘nalishlari keltirilgan.

Kalit so‘zlar. Innovatsiya, raqamli iqtisodiyot, raqamli texnologiya, raqamli infratuzilma, inson kapitali, HR tizimlari, sun‘iy intellekt, transformatsiya.

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PRIORITY AREAS FOR HUMAN CAPITAL DEVELOPMENT IN THE DIGITAL ECONOMY

Abstract. This article examines the need for human capital development in the digital economy and the challenges of digital transformation. It analyzes the relationship between human capital development and innovation, as well as the challenges of implementing modern HR management systems. Priority areas for future human capital development are presented.

Keywords. Innovation, digital economy, digital technologies, digital infrastructure, human capital, HR management systems, artificial intelligence, transformation.

Raqamli iqtisodiyot sharoitida jamiyat, texnologiya va biznes sohasini rivojlantirishda innovatsiyalar muhim rol o‘ynamoqda. Ayniqsa, sun‘iy intellekt va zamonaviy axborot texnologiyalari tobora kundalik hayotimizning ajralmas qismiga aylanib bormoqda. Bugungi kunda yangi raqamli texnologiyalar va innovatsion biznes modellarini jamiyatning barcha jabhalariga kirib borishi natijasida, iqtisodiyotning mohiyatida sifat jihatidan yangi tarkibiy o‘zgarishlarni yuzaga keltirmoqda. Natijada, zamonaviy raqamli infratuzilmalar shakllanib, inson kapitalini boshqarish tizimining butunlay o‘zgarishiga sabab bo‘lmoqda.

Raqamli jamiyatda hayot uchun zarur bo‘lgan bilim, ko‘nikma va munosabatlar tizimini ifodalovchi raqamli kompetensiyalar tobora muhim

ahamiyat kasb etadi. Bu tizim aholi o'rtasida raqamli savodxonlikni, jumladan, raqamli iste'mol, raqamli kompetensiyalar va raqamli xavfsizlik bo'yicha ko'nikma va malakalarni rivojlantiradi. Bunday sharoitda ta'lim jarayonining asosiy natijasi shunchaki talabalarning muayyan bilim, ko'nikmani egallashi emas, balki turli xil ish tajribasini o'zlashtirishiga qaratiladi. Ya'ni, inson kapitalining nafaqat miqdoriy, balki sifat jihatidan ham mazmuni ham o'zgarib, tuzilishi murakkablashib boradi.

World Economic Forum ma'lumotlariga ko'ra, yaqin kelajakda robototexnika, sun'iy intellekt, 3D va nanotexnologiyalar, kiberxavfsizlik va boshqa ilg'or texnologiyalar sohasida malakali mutaxassislar, shuningdek innovatsion biznesni rivojlantira oladigan menejerlarga talab keskin ortadi. Bu o'z-o'zidan, mavjud inson kapitalini boshqarish tizimini takomillashtirish, zamonaviy HR tizimlarini joriy etish va transformatsiya qilish zaruriyatini taqozo etadi.

Bugungu kunda zamonaviy HR tizimlari va inson kapitali tushunchalari hozirgi raqamli iqtisodiyot sharoitida tashkilotlarning muvaffaqiyati va raqobatbardoshligini belgilovchi asosiy omillar hisoblanadi. Su nuqtai nazardan, IT-parklar va malaka markazlari kabi raqamli infratuzilmalarning yaratilishi yoshlar o'rtasida innovatsiyalarni kengayishini rag'batlantirmoqda. Natijada, O'zbekistonda raqamli kasblarga o'tish, ta'limni modernizatsiya qilish, jarayonlarni avtomatlashtirish va kadrlarni boshqarishda sun'iy intellektdan foydalanishga keng yo'l ochilmoqda.

Bugungi kunda aksariyat korxona va tashkilotlarda inson kapitalini boshqarish tizimini zamonaviy talablar asosida yangilash va transformatsiya qilish jarayoni allaqachon boshlangan. Biroq, bu jarayonni to'laqonli amalga oshirishda bir qator tashkiliy, texnologik va ijtimoiy muammolar yuzaga kelmoqda:

birinchidan, korxona va tashkilot xodimlarining ko'pchiligida raqamli ko'nikmalar yetarli darajada rivojlanmaganligi sababli, yangi HR texnologiyalarini samarali joriy etish sekinlashmoqda;

ikkinchidan, ayrim rahbar va xodimlar islohotlar ish o'rinlarini qisqartiradi yoki ish jarayonini murakkablashtiradi deb hisoblashi natijasida, yangi boshqaruv tizimlarini joriy etishda sun'iy qarshiliklar yuzaga kelmoqda;

uchinchidan, korxonalarda zamonaviy HR platformalari va raqamli tizimlarni joriy etish va xodimlarni o'qitish kabi islohotlar katta investitsiya yoki xarajat talab qilishi, bunga hamma korxona rahbarlari ham tayyor emasligi natijasida, inson kapitalini rivojlantirish muammosi hanuz saqlanib qolmoqda;

to'rtinchidan, inson kapitalini samarali boshqarish uchun tashkilotda innovatsion va ochiq tashkiliy madaniyat bo'lishi zarur, biroq ko'pchilik tashkilotlarda HR bo'limi hali ham ma'muriy vazifalar bilan cheklanib qolganligi sababli, inson kapitalini transformatsiya qilish jarayoniga salbiy ta'sir ko'rsatmoqda;

beshinchidan, raqamli HR tizimlari joriy etilgan korxona va tashkilotlarda ma'lumotlarni himoya qilish, maxfiylik va kiberxavfsizlikni ta'minlash muammolari kelib chiqmoqda.

Yuqoridagi fikrlardan keilib chiqqan holda aytish joizki, avvalo, kiberxavfsizlik muammolarini hal qilish va axborot xavfsiligini ta'minlash dolzarb vazifalardan hisoblanadi. Bu borada mamlakatimizda bir qator normativ-huquqiy hujjatlar qabul qilingan: 2019-yil 2-iyuldagi "Shaxsiy ma'lumotlar to'g'risida"gi Qonun (O'RQ-547), 2022-yil 15-apreldagi "Kiberxavfsizlik to'g'risida"gi Qonun (O'RQ-764), 2023-yil 28-dekabrda "Raqamli iqtisodiyotda kiberxavfsizlikni ta'minlash chora-tadbirlari to'g'risida" Prezident qarori (PQ-450). Mazkur hujjatlar milliy kiberxavfsizlik siyosatini amalga oshirishda muhim huquqiy asos bo'lib hisoblansada, biroq, amaliyotda kiberxavfsizlik muammolari hali to'liq bartaraf etilgani yo'q. Buning eng muhim sabablaridan biri sifatida aholi va mutaxassislar o'rtasida raqamli madaniyat va raqamli kompetensiyalarining shakllanmaganligini keltirib o'tish mumkin. Shu nuqtai nazardan, bugungi kunda inson kapitalini transformatsiya qilish, xodimlarning bilim va ko'nikmalarini yangilash, raqamli kompetensiyalarni shakllantirish bo'yicha tashkilotlarda qayta tayyorlash va malaka oshirish tizimlarini samarali tashkil etish tobora dolzarblik ahamiyat kasb etmoqda.

Xulosa qilib aytganda, global o'zgarishlar va jadal islohotlar inson kapitalini boshqarish tizimini sun'iy intellekt, raqamli platformalar va uzluksiz ta'lim tizimlari asosida yanada rivojlanishi uchun sharoit yaratadi. Buning natijasida, kelajakda inson kapitalini boshqarish tizimi yanada takomillashib, quyidagi yo'nalishlarda rivojlanishi kutilmoqda:

- kadrlar boshqaruvi samaradorligini oshirishda sun'iy intellekt va Big Data texnologiyalaridan foydalanish;
- moslashuvchan ish shakllari, jumladan, masofaviy ish, gibril ish modeli kabilarni kengayishi;
- kompetensiyalarga asoslangan boshqaruv tizimining rivojlanishi;
- xodimlarning innovatsion va ijodiy salohiyatni rag'batlantirish kabilar.

Mamlakatimizda yoshlarni ish bilan ta'minlash, kasbga tayyorlash, mehnat migratsiyasining salbiy oqibatlarini yumshatish alohida ahamiyatga egaligini hisobga olgan holda inson kapitalini uzoq muddatli rivojlantirish va ta'lim tizimini mehnat bozori ehtiyojlari bilan integratsiyalash masalalarini kuchaytirish zarur.

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RAQAMLI TRANSFORMATSIYA SHAROITIDA INSON KAPITALI SIFATINI OSHIRISH ORQALI O'ZBEKISTON MILLIY IQTISODIYOTI RAQOBATBARDOSHLIGINI KUCHAYTIRISH ISTIQBOLLARI

Annotatsiya. Mazkur maqolada raqamli transformatsiya, texnologik yangilanish va global bozorlar integratsiyasi sharoitida inson kapitali sifatini yaxshilashning O'zbekiston milliy iqtisodiyoti raqobatbardoshligini oshirishdagi o'rni tahlil qilinadi. Tadqiqotning dolzarbligi shundan iboratki, bugungi kunda raqobat ustunligi tabiiy resurslar yoki arzon mehnat bilan emas, balki malakali, sog'lom, moslashuvchan va innovatsion fikrlovchi inson resurslari bilan belgilanmoqda. Maqolada inson kapitalining tarkibiy elementlari - ta'lim sifati, sog'liq, kasbiy tayyorgarlik, raqamli ko'nikmalar, ilmiy salohiyat va mehnat bozoriga moslashuvchanlik - milliy raqobatbardoshlikning asosiy drayverlari sifatida ko'rib chiqilgan. O'zbekiston bo'yicha rasmiy statistik ma'lumotlar, Jahon banki indikatorlari hamda milliy strategik hujjatlar asosida so'nggi yillardagi tendensiyalar yoritiladi. Oliy ta'lim qamrovi kengaygani, ta'limga yo'naltirilayotgan xarajatlar, internetdan foydalanish darajasi va iqtisodiy o'sish sur'atlari inson kapitalini rivojlantirish uchun qulay zamin yaratgani ko'rsatildi. Shu bilan birga, sifat tafovutlari, hududlararo nomutanosiblik, ko'nikmalar va mehnat bozori talabi o'rtasidagi uzilishlar, ilm-fan va ishlab chiqarish integratsiyasining yetarli emasligi kabi muammolar ham ochib berildi. Muallif tomonidan taklif etilgan konseptual model asosida inson kapitali sifatini oshirishning raqobatbardoshlikka ta'sir mexanizmlari izohlandi va 2026-2030 yillar uchun institutsional, ta'limiy, sog'liqni saqlash, raqamlashtirish hamda innovatsion siyosat yo'nalishlari bo'yicha amaliy takliflar ishlab chiqildi.

Kalit so'zlar: inson kapitali, raqobatbardoshlik, milliy iqtisodiyot, raqamli transformatsiya, ta'lim sifati, sog'liq kapitali, mehnat bozori, innovatsiya, O'zbekiston, iqtisodiy o'sish

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PROSPECTS FOR STRENGTHENING THE COMPETITIVENESS OF THE NATIONAL ECONOMY OF UZBEKISTAN BY IMPROVING THE QUALITY OF HUMAN CAPITAL IN THE CONTEXT OF DIGITAL TRANSFORMATION

Abstract. This article examines the role of improving the quality of human capital in enhancing the competitiveness of Uzbekistan's national economy under conditions of digital transformation, technological modernization, and deepening

global integration. The relevance of the study stems from the fact that competitive advantage is no longer determined mainly by natural resources or cheap labor, but by skilled, healthy, adaptable, and innovation-oriented human resources. The paper considers the main components of human capital - quality of education, health, professional training, digital skills, scientific capability, and labor-market adaptability - as strategic drivers of national competitiveness. Using official statistics for Uzbekistan, World Bank indicators, and national strategic documents, the article identifies recent trends in human capital development. It shows that the expansion of higher education coverage, sustained public expenditure on education, wider internet access, and stable economic growth create a favorable foundation for improving human capital. At the same time, the study highlights several persistent bottlenecks, including disparities in quality, regional inequalities, mismatches between skills and labor-market demand, and insufficient integration between science, universities, and production. Based on a conceptual analytical model proposed by the author, the paper explains the transmission mechanisms through which human capital quality affects competitiveness and formulates practical recommendations for 2026-2030 in the areas of institutional reform, education, healthcare, digitalization, and innovation policy.

Keywords: *human capital, competitiveness, national economy, digital transformation, education quality, health capital, labor market, innovation, Uzbekistan, economic growth*

Kirish

XXI asr iqtisodiyoti tobora ko'proq bilim, ko'nikma, texnologiya va institutsional moslashuvchanlikka tayangan holda shakllanmoqda. Avvalgi davrlarda mamlakatlarning raqobat ustunligi ko'proq tabiiy resurslar, qulay geografik joylashuv, arzon ishchi kuchi yoki katta bozor sig'imi bilan izohlangan bo'lsa, bugungi sharoitda bu omillar o'z-o'zicha yetarli emas. Global qiymat zanjirlari murakkablashib, ishlab chiqarish va xizmatlar tez sur'atlarda intellektuallashib borayotgan bir paytda iqtisodiyotning haqiqiy qudrati inson kapitalining sifati bilan belgilanadi. Aynan shu sababli inson kapitali tushunchasi iqtisodiy o'sish, innovatsiya, mehnat unumdorligi, eksport salohiyati va institutsional barqarorlikni tushuntiruvchi eng muhim kategoriyalardan biriga aylandi. Inson kapitali deganda faqat diplom yoki rasmiy ta'lim darajasi emas, balki shaxsning sog'lig'i, kasbiy tayyorgarligi, raqamli savodxonligi, ijodkorligi, tahliliy fikrlashi, muloqot madaniyati, mehnat intizomi va uzluksiz o'qib-o'rganishga tayyorligi tushuniladi. Boshqacha aytganda, zamonaviy iqtisodiyotga sifatli inson kapitali kerak: u nafaqat mavjud texnologiyani ishlata olishi, balki yangi yechim ishlab chiqishi, bozor o'zgarishlariga tez moslasha olishi va yuqori qo'shilgan qiymat yaratishi lozim. Shu ma'noda inson kapitali iqtisodiy siyosatning ijtimoiy bo'limi emas, balki sanoat, investitsiya, innovatsiya va hududiy rivojlanish siyosatining ham markaziy elementi sifatida qaralishi kerak. O'zbekiston iqtisodiyoti ham aynan shunday yangi bosqichga kirib bormoqda.

Raqamli iqtisodiyotning kengayishi, sanoat tarmoqlarining modernizatsiyasi, xizmatlar sektorining chuqurlashuvi, yoshlar ulushining yuqoriligi va xalqaro iqtisodiy aloqalarning faollashuvi kadrlar sifati masalasini strategik darajaga olib chiqmoqda. Mamlakatda ta'lim qamrovining kengayishi, sog'liqni saqlash va ijtimoiy himoya tizimidagi islohotlar, raqamli infratuzilmaning rivojlanishi hamda yangi boshqaruv mexanizmlarining joriy qilinishi inson kapitalini yaxshilash uchun muhim asos yaratmoqda. Biroq miqdoriy kengayish har doim ham sifat o'sishini anglatmaydi. Mehnat bozori ehtiyojlari bilan ta'lim natijalari o'rtasidagi uzilish, hududlar o'rtasidagi tafovutlar, amaliy ko'nikmalar taqchilligi, ilm-fan va ishlab chiqarish integratsiyasining zaifligi kabi masalalar hanuz dolzarb bo'lib qolmoqda. Mazkur maqolaning maqsadi raqamli transformatsiya sharoitida inson kapitali sifatini oshirish orqali O'zbekiston milliy iqtisodiyoti raqobatbardoshligini kuchaytirishning nazariy va amaliy asoslarini tahlil qilishdan iborat. Ushbu maqsadni amalga oshirish uchun bir nechta vazifalar qo'yildi: birinchidan, inson kapitali va raqobatbardoshlik o'rtasidagi iqtisodiy bog'liqlikni ilmiy adabiyotlar asosida yoritish; ikkinchidan, O'zbekiston bo'yicha mavjud statistik tendensiyalarni tahlil qilish; uchinchidan, inson kapitalining asosiy tarkibiy qismlari bo'yicha tizimli muammolarni aniqlash; to'rtinchidan, 2026-2030 yillar uchun strategik yo'nalishlar va amaliy takliflarni ishlab chiqish. Tadqiqot obyekti sifatida O'zbekistonda inson kapitalini shakllantirish va undan foydalanish jarayonlari olindi, tadqiqot predmeti esa inson kapitali sifati bilan milliy iqtisodiyot raqobatbardoshligi o'rtasidagi o'zaro ta'sir mexanizmlaridan iborat. Maqolaning ilmiy yangiligi shundaki, unda inson kapitali sifati faqat ijtimoiy ko'rsatkich emas, balki raqobatbardoshlikning ko'p kanalli iqtisodiy drayveri sifatida izohlanadi. Muallif tomonidan taklif etilgan analitik yondashuv ta'lim, sog'liq, raqamli ko'nikmalar, innovatsion faollik va mehnat bozoriga moslikni yagona tizimda ko'rib chiqishga imkon beradi. Shu bois mazkur tadqiqot natijalari nafaqat ilmiy, balki amaliy siyosiy ahamiyatga ham ega.

Inson kapitali va milliy raqobatbardoshlikning nazariy asoslari

Inson kapitali nazariyasining shakllanishida T. Schultz va G. Beckerning ishlari alohida o'rin tutadi. Ularning yondashuviga ko'ra, ta'lim, sog'liq va kasbiy tayyorgarlikka yo'naltirilgan xarajatlar iste'mol emas, balki kelgusida yuqori daromad, unumdorlik va iqtisodiy samaradorlik keltiradigan investitsiyadir. Keyinchalik R. Lucas va P. Romerning endogen o'sish nazariyasi bilim, innovatsiya va malaka iqtisodiy o'sishning ichki manbai ekanini ilmiy asoslab berdi. M. Porter esa milliy raqobatbardoshlikni tushuntirishda ishlab chiqarish omillarining sifati, klasterlar, innovatsiya va strategik boshqaruvning o'zaro uyg'unligiga urg'u berdi. Ularning barchasida inson kapitali bilvosita yoki bevosita markaziy o'rinni egallaydi. Nazariy jihatdan inson kapitali raqobatbardoshlikka kamida uchta asosiy kanal orqali ta'sir ko'rsatadi. Birinchi kanal - mehnat unumdorligi. Malakali va sog'lom xodim bir xil vaqt ichida ko'proq va sifatliroq mahsulot yaratadi, jarayonlarni samarali tashkil qiladi va yo'qotishlarni kamaytiradi. Ikkinchi kanal - innovatsion faollik. Yangi mahsulot, yangi xizmat, yangi texnologik yechim yoki boshqaruv usulini ishlab chiqish uchun faqat

uskunalar emas, balki ijodiy va tahliliy fikrlovchi insonlar zarur. Uchinchi kanal - institutsional samaradorlik. Davlat boshqaruvi, korporativ boshqaruv va tarmoq koordinatsiyasi sifatli kadrlar mavjud bo'lgandagina chuqur isloh qilinadi. Natijada biznes muhiti yaxshilanadi, investitsion ishonch kuchayadi va iqtisodiy tizim tezroq moslashadi. Shu o'rinda bir muhim jihatni alohida ta'kidlash zarur: inson kapitalining miqdori va sifati bir xil narsa emas. Masalan, diplom olganlar sonining o'sishi avtomatik ravishda iqtisodiyotning raqobatbardosh bo'lib qolishini anglatmaydi. Agar ta'lim tizimi mehnat bozori talabi bilan uyg'unlashmagan bo'lsa, nazariy bilim amaliy vazifaga aylantirilmasa, raqamli ko'nikmalar sust bo'lsa yoki sog'liq ko'rsatkichlari mehnat faolligini cheklasa, inson kapitalining iqtisodiy qaytimi pasayadi. Demak, inson kapitali haqida gapirganda faqat qamrov yoki son emas, balki sifat, dolzarblik, moslashuvchanlik va samarali foydalanish darajasini ham birgalikda baholash zarur.

Zamonaviy raqamli iqtisodiyot sharoitida inson kapitaliga qo'yiladigan talablar sezilarli darajada o'zgardi. Endilikda an'anaviy kasbiy kompetensiyalar bilan bir qatorda ma'lumotlar bilan ishlash, algoritmik fikrlash, sun'iy intellekt vositalaridan foydalanish, chet tillarida professional muloqot qilish, loyihaviy boshqaruv, jamoa bilan masofadan ishlash va tezkor qayta o'qish qobiliyati ham katta ahamiyat kasb etmoqda. Demak, yangi davr inson kapitalining "ko'p qatlamli modeli"ni talab qiladi. Bu modelda bazaviy savodxonlik va professional tayyorgarlik bilan birga sog'liq madaniyati, psixologik barqarorlik, ijodkorlik, muammoli vaziyatlarda qaror qabul qilish va uzluksiz o'qib-o'rganish odati ham muhim komponentga aylanadi. Milliy raqobatbardoshlik tushunchasi ham bugun tor ma'nodagi narx ustunligidan ancha kengaydi. Raqobatbardosh iqtisodiyot - bu ichki va tashqi bozorlarda sifatli mahsulot va xizmat yaratish, global talabga moslashish, yuqori unumdor ish o'rinlari tashkil etish, innovatsion tarmoq va klasterlarni rivojlantirish, shuningdek, aholining farovonligini izchil oshirishga qodir iqtisodiyotdir. Shu nuqtai nazardan inson kapitali rivojlangan mamlakatlarda eksport tarkibi murakkablashadi, xizmatlar segmenti kengayadi, texnologik yangilanish tezlashadi va ijtimoiy barqarorlik mustahkamlanadi. Aksincha, inson kapitali sifati past bo'lgan iqtisodiyotlar ko'pincha xomashyo yoki past qo'shilgan qiymatli mahsulotlarga qaram bo'lib qoladi, tashqi zarbalarga nisbatan himoyasiz bo'ladi va daromad tuzog'idan chiqishda qiynaladi. Demak, inson kapitali va raqobatbardoshlik o'rtasidagi bog'liqlik chiziqli emas, balki kumulyativ va tizimli xarakterga ega. Ta'limdagi yaxshilanish sog'liq bilan uyg'unlashsa, sog'liq raqamli ko'nikmalar va innovatsion ekotizim bilan biriksa, mehnat bozori esa ushbu salohiyatni yuqori samaradorlikka aylantira olsa, raqobatbardoshlik kuchayadi. Shuning uchun siyosat ham alohida-alohida sektorlar kesimida emas, balki yagona inson kapitali arxitekturasida asosida ishlab chiqilishi maqsadga muvofiq.

Tadqiqot metodologiyasi va baholash yondashuvi

Mazkur tadqiqotda tizimli tahlil, qiyosiy solishtirish, statistik trendlarni sharhlash, normativ-huquqiy hujjatlarni kontent tahlil qilish hamda konseptual modellashtirish usullaridan foydalanildi. Empirik asos sifatida O'zbekiston Respublikasi Milliy statistika qo'mitasi, Jahon banki ma'lumotlar bazasi, Human

Capital Data Portal, shuningdek, "O'zbekiston - 2030" strategiyasi doirasidagi ustuvor yo'nalishlar olindi. Bunday yondashuv bir tomondan milliy rivojlanish siyosatini, ikkinchi tomondan xalqaro indikatorlarni bir tizimda ko'rish imkonini beradi. Tadqiqotda inson kapitali sifatini ifodalash uchun beshta tarkibiy blok ajratildi: ta'lim sifati va qamrovi; sog'liq kapitali; raqamli kompetensiyalar; innovatsion faollik va ilmiy salohiyat; mehnat bozori bilan moslik. Raqobatbardoshlik esa mehnat unumdorligi, iqtisodiy o'sish sur'ati, yuqori qo'shilgan qiymat yaratish imkoniyati, eksport sifatining murakkablashuvi, investitsiya jalb etish qobiliyati va institutsional samaradorlik bilan bog'liq holatda talqin qilindi. Mazkur komponentlarning o'zaro bog'liqligi iqtisodiy jarayonlarni bir yoqlama emas, balki ko'p omilli nuqtai nazardan baholash imkonini beradi.

Nazariy ifoda sifatida quyidagi umumlashtirilgan model taklif etiladi:

$$Y = A \times K^{\alpha} \times (H \times L)^{\beta}$$

bu yerda:

Y - yakuniy ishlab chiqarish natijasi

A - texnologik va institutsional samaradorlik

K - jismoniy kapital

L - mehnat resurslari

H esa inson kapitali sifat ko'effitsienti hisoblanadi.

Mazkur formuladan ko'rinib turibdiki, inson kapitali mehnat resurslarini oddiy miqdor sifatida emas, balki sifat jihatidan kuchaytiruvchi omil sifatida namoyon bo'ladi. Agar H ortsa, ayni bir mehnat hajmi ko'proq natija beradi, texnologiyaning qaytimi oshadi va investitsiyaning samarasi kuchayadi.

Amaliy baholash uchun muallif tomonidan quyidagi konseptual raqobatbardoshlik ko'rsatkichi taklif qilinadi:

$$RQI = 0,30E + 0,25S + 0,20D + 0,15I + 0,10M$$

bu yerda RQI - raqobatbardoshlikning inson kapitaliga bog'liq integral ko'rsatkichi;

E - ta'lim sifati va qamrovi

S - sog'liq kapitali

D - raqamli ko'nikmalar

I - innovatsion faollik

M - mehnat bozori bilan moslik darajasidir

Og'irlik ko'effitsientlari mutlaq emas, lekin O'zbekiston sharoitida ta'lim va sog'liqning bazaviy rolini, raqamli ko'nikmalarning tez sur'atdagi o'sib borayotgan ahamiyatini, innovatsiya va mehnat bozori uyg'unligining esa natijaviy kanal sifatidagi vaznini ifodalaydi. Ushbu model rasmiy davlat indeksi emas, balki tahliliy va tavsiyaviy maqsadlar uchun ishlab chiqilgan yondashuv sifatida qo'llanadi. Metodologik jihatdan muhim masala shundaki, inson kapitali indikatorlari ko'pincha turli o'lchov birliklarida bo'ladi. Masalan, sog'liq yillar bilan, ta'lim qamrovi foiz bilan, internetdan foydalanish darajasi alohida ko'rsatkich bilan, innovatsion faollik esa ilmiy tadqiqotlar, patent yoki startap faolligi bilan aks etadi. Shu bois tahlilda mutlaq sonlar bilan bir qatorda ularning mazmuni, sifati, dinamikasi va iqtisodiy natijaga aylanish imkoniyati ham

izohlandi. Ya'ni, maqsad faqat ko'rsatkichlarni sanash emas, balki ularning iqtisodiyotdagi uzatma mexanizmini tushuntirishdan iborat bo'ldi. Tadqiqotning cheklovi sifatida ayrim indikatorlar bo'yicha eng yangi va to'liq ma'lumotlar bir xil davrga to'g'ri kelmasligini qayd etish lozim. Biroq rasmiy va xalqaro manbalarning uyg'un tahlili umumiy tendensiyalarni yetarli darajada aniqlash imkonini beradi. Shu sababli maqolada statistik raqamlar yakka holatda emas, balki institutsional va strukturaviy talqin bilan birga beriladi. Bu esa taklif qilinayotgan xulosalarning amaliy qiymatini oshiradi.

Jadval 1.
Inson kapitalining milliy raqobatbardoshlikka ta'sir kanallari

Komponent	Ta'sir mexanizmi	Kutiladigan iqtisodiy natija
Ta'lim sifati va qamrovi	Nazariy bilimni amaliy ko'nikmaga aylantiradi, tahliliy fikrlash va kasbiy tayyorgarlikni kuchaytiradi	Mehnat unumdorligi oshadi, yuqori malakali ish o'rinlari kengayadi
Sog'liq kapitali	Mehnatga layoqat davri va ish kunidagi samaradorlikni oshiradi, yo'qotishlarni kamaytiradi	Bandlik sifati yaxshilanadi, kasallik sababli yo'qotishlar qisqaradi
Raqamli ko'nikmalar	Ma'lumotlar bilan ishlash, avtomatlashtirish va platforma iqtisodiyotida ishtirokni kuchaytiradi	Texnologik moslashuv tezlashadi, xizmatlar eksporti va IT segmenti kengayadi
Innovatsion salohiyat	Yangi mahsulot, xizmat va jarayonlar yaratish qobiliyatini oshiradi	Qo'shilgan qiymat va eksport murakkabligi ortadi
Mehnat bozori bilan moslik	Ta'lim natijasini real iqtisodiy talab bilan uyg'unlashtiradi	Ishsizlikning strukturaviy qismi qisqaradi, kadr tanqisligi yumshaydi
Institutsional kompetensiya	Davlat va korporativ boshqaruvda ma'lumotga asoslangan qarorlarni kuchaytiradi	Investitsion muhit va biznes ishonchi yaxshilanadi

Manba: muallif tomonidan tuzilgan.

O'zbekistonda inson kapitalining hozirgi holati va rivojlanish tendensiyalari

O'zbekistonda so'nggi yillarda inson kapitalini rivojlantirish davlat siyosatining strategik yo'nalishlaridan biriga aylandi. "O'zbekiston - 2030" strategiyasida har bir inson uchun o'z salohiyatini ro'yobga chiqarish imkoniyatlarini kengaytirish, sifatli ta'lim va sog'liqni saqlash xizmatlarini kuchaytirish, raqamlashtirishni jadallashtirish hamda ilm-fan va innovatsiyani rivojlantirish ustuvor vazifalar sifatida belgilangan. Bu yondashuv shuni ko'rsatadiki, inson kapitaliga investitsiya nafaqat ijtimoiy farovonlikni oshirish vositasi, balki iqtisodiy modernizatsiya va milliy raqobatbardoshlik strategiyasining asosi sifatida ko'rilmogda. Rasmiy ma'lumotlarga ko'ra, oliy ta'lim qamrovining keskin kengayishi kuzatilmoqda. Milliy statistika qo'mitasi ma'lumotida 18-23 yoshdagi aholini oliy ta'lim bilan qamrab olish darajasi 2014-

yildagi 6,8 foizdan 2024-yilda 47,7 foizga yetgani qayd etilgan. Bu o'sish tasodifiy emas: yangi oliy ta'lim muassasalari tashkil etilishi, xususiy sektor ishtirokining kuchayishi, qabul kvotalarining kengayishi, sirtqi va kechki ta'lim shakllarining rivojlanishi, hududlarda filiallar tarmog'ining kengayishi va yoshlarning ta'limga qiziqishi ortishi ushbu jarayonni rag'batlantirdi. Oliy ta'lim qamrovining kengayishi o'z-o'zidan ijobiy natija bo'lsa-da, endilikda asosiy e'tibor uning sifati, amaliy natijadorligi va mehnat bozori bilan aloqadorligiga qaratilishi lozim. Jahon banki ma'lumotlarida O'zbekiston uchun inson kapitali indeksi 2020-yilda 0,623 darajasida qayd etilgan. Bu ko'rsatkich shuni anglatadiki, mamlakatda tug'ilgan bola to'liq va sifatli ta'lim hamda sog'liq sharoitlarida erisha oladigan salohiyatining ma'lum qismini amalda ro'yobga chiqarishga yaqinlashmoqda, biroq foydalanilmayotgan zaxira ham hali katta. Human Capital Index Plus ko'rsatkichi bo'yicha 2025-yil uchun qayd etilgan 169,61 ball ham inson kapitali masalasining xalqaro tahlil tizimida dolzarb bo'lib qolayotganini ko'rsatadi. Bunday ko'rsatkichlar davlat siyosatining faqat qamrovni emas, natijani boshqarish bosqichiga o'tishi zarurligini anglatadi. Ta'limga yo'naltirilayotgan resurslar ham nisbatan faol xarakterga ega. Jahon banki ma'lumotlariga ko'ra, O'zbekistonda davlatning ta'limga xarajatlari 2023-yilda YAIMning 5,5 foiziga teng bo'lgan. Bu ko'rsatkich ta'lim sohasiga sezilarli e'tibor qaratilayotganini ko'rsatadi. Biroq resursning ko'pligi har doim ham yuqori samaradorlikni anglatmaydi. Muhim masala - ajratilayotgan mablag'larning sifati va maqsadlilik: ulardan nechog'lik o'qituvchi salohiyatini oshirish, amaliy laboratoriyalar yaratish, raqamli kontent tayyorlash, hududiy tengsizlikni yumshatish, maktab va oliy ta'lim o'rtasidagi uzviylikni kuchaytirish hamda ta'lim natijalarini mehnat bozoriga yaqinlashtirish uchun foydalanilayotgani hal qiluvchi ahamiyatga ega.

Sog'liq kapitali ham inson kapitalining ajralmas qismi hisoblanadi. Jahon banki ma'lumotlarida O'zbekistonda umr ko'rish davomiyligi 2023-yilda 72 yil darajasida qayd etilgan. Bu ko'rsatkich ijobiy dinamika uchun muhim asos bo'lsa-da, sog'liq kapitali faqat umr uzunligi bilan o'lchanmaydi. Mehnatga layoqatli yoshdagi aholining salomatligi, profilaktika madaniyati, onalar va bolalar salomatligi, ovqatlanish sifati, ruhiy salomatlik, kasbiy kasalliklarning oldini olish va tibbiy xizmatlarning hududlar bo'yicha tengligi iqtisodiyot uchun yanada muhimroq ko'rsatkichlardir. Chunki sog'lom inson nafaqat ko'proq yashaydi, balki ko'proq ishlay oladi, tezroq o'rganadi va innovatsion faollikka tayyor bo'ladi. Raqamli kompetensiyalar nuqtai nazaridan ham O'zbekistonda muhim o'zgarishlar mavjud. Jahon banki ma'lumotlarida internetdan foydalanuvchilar ulushi 2023-yilda 89 foizga yetgani ko'rsatilgan. Bu ko'rsatkich raqamli xizmatlar, onlayn ta'lim, elektron hukumat, masofaviy bandlik va platforma iqtisodiyotining kengayishi uchun jiddiy infrastrukturaviy asos yaratadi. Lekin internetga kirishning o'zi yetarli emas. Raqamli iqtisodiyotda asosiy farq ulanishda emas, unumli foydalanishda namoyon bo'ladi. Ya'ni, aholi internetdan faqat iste'mol uchun emas, balki bilim olish, biznes yuritish, ma'lumotlar tahlili, dasturlash, dizayn, marketing, eksport va ilmiy izlanishlar uchun ham samarali foydalanishi lozim. Makroiqtisodiy indikatorlar ham inson kapitali va raqobatbardoshlikning

o'zaro bog'liqligini ko'rsatadi. Jahon banki ma'lumotlariga ko'ra, O'zbekistonda YAIM o'sishi 2024-yilda 6,5 foizni tashkil etgan, umumiy ishsizlik darajasi esa 2025-yilda 4,6 foiz sifatida baholangan. Mazkur ko'rsatkichlar iqtisodiyotning faolligi va mehnat bozorining muayyan barqarorligini aks ettiradi. Ammo sifatli bandlik, yuqori daromadli ish o'rinlari va yuqori unumdorlik masalasi hali ham markaziy muammo bo'lib qolmoqda. Agar yangi ish o'rinlari past qo'shilgan qiymatli yoki norasmiy segmentlarda shakllansa, inson kapitaliga qilingan investitsiyaning iqtisodiy qaytimi to'liq yuzaga chiqmaydi. Shu bois bandlikning sifati ham raqobatbardoshlik mezoniga aylanishi kerak. Umuman olganda, O'zbekiston inson kapitalini shakllantirish bo'yicha muhim baza yaratib ulgurdi. Qamrov ko'rsatkichlari yaxshilanmoqda, davlat siyosatida aniq ustuvorliklar paydo bo'ldi, raqamli infratuzilma kengaymoqda va iqtisodiy o'sish salohiyati saqlanib qolmoqda. Lekin navbatdagi bosqich miqdoriy kengayishdan sifat transformatsiyasiga o'tishdir. Endi masala ko'proq "qancha qamrov" emas, balki "qanday sifat, qanday natija va qanday iqtisodiy qaytim" degan savollar atrofida hal etilishi kerak.

Jadval 2.
O'zbekiston bo'yicha inson kapitali
va raqobatbardoshlikning tanlangan indikatori

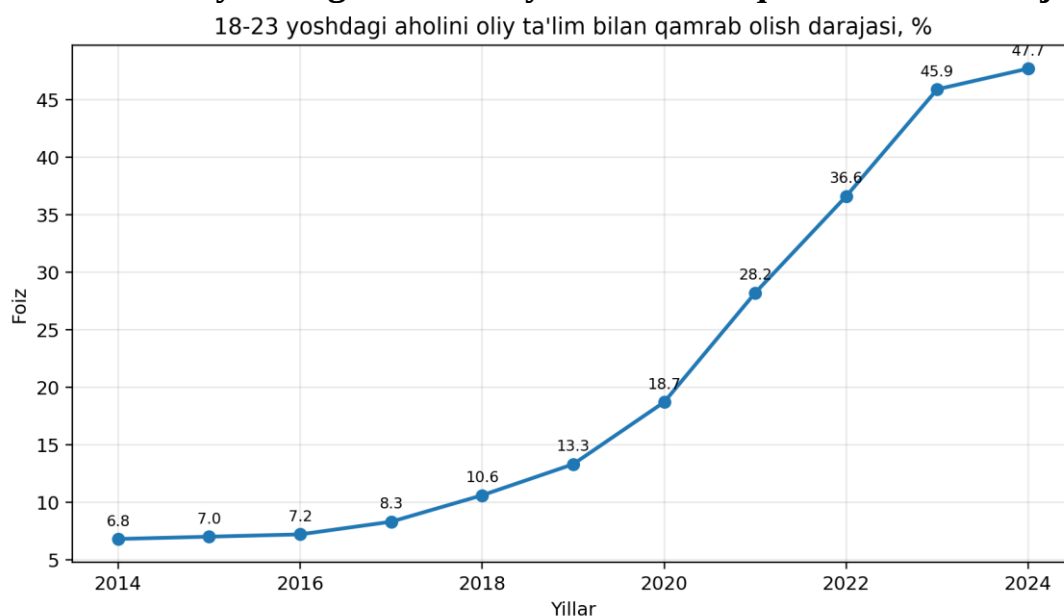
Ko'rsatkich	Davr	Qiymat	Iqtisodiy talqin
Oliy ta'lim qamrovi (18-23 yosh)	2024-2025 o'quv yili	47,7 %	Ta'lim qamrovining keskin kengaygani inson kapitali bazasini kuchaytirmoqda
Oliy ta'lim qamrovi	2014-yil	6,8 %	O'n yil ichida qamrovdagi strukturaviy o'sish uchun tayanch nuqta
Inson kapitali indeksi (HCI)	2020-yil	0,623	Salohiyat va real natija o'rtasida hali foydalanilmagan zaxira mavjud
Human Capital Index Plus	2025-yil	169,61	Inson kapitali bo'yicha xalqaro monitoringning dolzarbligini aks ettiradi
Ta'lim xarajatlari / YAIM	2023-yil	5,5 %	Ta'limga davlat e'tibori yuqori, endi resurs samaradorligi muhim

Jadval 2 (davomi)

Ko'rsatkich	Davr	Qiymat	Iqtisodiy talqin
Umr ko'rish davomiyligi	2023-yil	72 yil	Sog'liq kapitali ijobiy baza yaratmoqda
Internet foydalanuvchilari ulushi	2023-yil	89 %	Raqamli iqtisodiyot uchun qulay infrastrukturaviy baza mavjud
YAIM o'sishi	2024-yil	6,5 %	Inson kapitaliga investitsiyani iqtisodiy natijaga aylantirish imkoniyati mavjud
Umumiy ishsizlik darajasi	2025-yil	4,6 %	Bandlik barqaror, biroq sifatli bandlik muammosi saqlanib qolmoqda

Manba: O'zbekiston Respublikasi Milliy statistika qo'mitasi va Jahon banki ma'lumotlari asosida muallif ishlanmasi.

1-rasm. 18-23 yoshdagi aholini oliy ta'lim bilan qamrab olish darajasi



Manba: O'zbekiston Respublikasi Milliy statistika qo'mitasi ma'lumotlari asosida tuzildi.

Inson kapitali sifati va raqobatbardoshlik o'rtasidagi amaliy bog'liqlik

Inson kapitali sifatining milliy raqobatbardoshlikka ta'siri amalda bir necha bosqichli zanjir orqali namoyon bo'ladi. Birinchi bosqichda ta'lim va sog'liq mehnat unumdorligini oshiradi. Masalan, zamonaviy texnologiyalar bilan ishlay oladigan, xorijiy tilni biladigan, raqamli vositalardan samarali foydalana oladigan va tizimli fikrlashga ega xodim ishlab chiqarishda kamroq xato qiladi, tezroq o'rganadi va murakkab jarayonlarda yuqori natija ko'rsatadi. Sog'lom xodim esa ish kunini samaraliroq o'tkazadi, kasallik tufayli yo'qotishlar kamayadi, mehnat intizomi va energiyasi yuqori bo'ladi. Bu omillar korxona xarajatlarini pasaytirib, mahsulot sifatini oshiradi. Ikkinchi bosqichda inson kapitali innovatsion qobiliyatni kuchaytiradi. Innovatsiya ko'pincha texnika masalasi deb qaraladi,

aslida esa u kadrlar sifati masalasidir. Sun'iy intellektni joriy qilish, biznes jarayonlarni avtomatlashtirish, yangi xizmat modeli yaratish, eksport bozorlari uchun mahsulotni moslashtirish yoki logistika zanjirlarini optimallashtirish - bularning barchasi malakali insonlar bo'lmasa, samara bermaydi. Shuning uchun ham inson kapitali kuchli bo'lgan iqtisodiyotlarda ilm-fan natijalari tezroq tijoratlashadi, startap muhiti faolroq bo'ladi, xususiy sektor texnologiyani tezroq o'zlashtiradi va klasterlar samaraliroq ishlaydi. Uchinchi bosqich institutsional ta'sir bilan bog'liq. Raqobatbardosh iqtisodiyotga faqat kuchli xodimlar emas, balki kuchli menejerlar, tahlilchilar, muhandislar, shifokorlar, pedagoglar, davlat xizmatchilari ham kerak. Ya'ni, inson kapitali sifati butun boshqaruv madaniyatiga ta'sir qiladi. Agar qarorlar ma'lumotlarga tayansa, kadrlar natijaga yo'naltirilgan bo'lsa, professional etika va javobgarlik kuchli bo'lsa, investitsiya muhiti va davlat xizmatlari sifati ham yaxshilanadi. Natijada iqtisodiy muhitning umumiy ishonchliligi oshib, raqobat ustunligi mustahkamlanadi. Biroq inson kapitalining iqtisodiy qaytimi avtomatik tarzda yuzaga chiqmaydi. Buning uchun "samarali uzatma mexanizmi" bo'lishi kerak. Agar oliy ta'lim muassasasida nazariy bilim berilib, lekin talabalar ishlab chiqarish, xizmat ko'rsatish yoki tadbirkorlik amaliyoti bilan yetarli darajada bog'lanmasa, mehnat bozoriga kirishda ko'nikma uzilishi paydo bo'ladi. Agar sog'liqni saqlash tizimida profilaktika va erta tashxis yetarli ishlamasa, mehnat yoshi oralig'idagi yo'qotishlar oshadi. Agar ilmiy tadqiqotlar korxonalar muammolariga ulanmasa, innovatsiya laboratoriya devoridan tashqariga chiqmaydi. Shu bois inson kapitali siyosati ishlab chiqarish, hududiy rivojlanish va biznes muhiti siyosati bilan birlashtirilishi kerak.

O'zbekiston sharoitida raqobatbardoshlikka xizmat qiluvchi inson kapitali sifati kamida to'rtta tayanch mezon bilan baholanishi mumkin. Birinchisi - kasbiy chuqurlik: kadrning o'z sohasidagi bilim va amaliy malakasi. Ikkinchisi - moslashuvchanlik: yangi texnologiya va yangi mehnat talabi paydo bo'lganda tez qayta o'qish qobiliyati. Uchinchi mezon - integratsion kompetensiya: fanlararo fikrlash, jamoa bilan ishlash, loyiha boshqaruvi, muloqot va til ko'nikmalarining uyg'unligi. To'rtinchisi - innovatsion xulq: tashabbus, muammo ko'rish, yechim taklif qilish va tavakkalni boshqarish madaniyati. Ana shu to'rtta mezon iqtisodiyotning yuqori qo'shilgan qiymatli sektorlarida eng katta ahamiyat kasb etadi. Shu nuqtai nazardan qaraganda, O'zbekiston uchun inson kapitalining iqtisodiy qaytimi eng avvalo quyidagi sohalarda yaqqol namoyon bo'lishi mumkin: sanoatning yuqori qayta ishlash bosqichlari, axborot texnologiyalari, moliyaviy xizmatlar, logistika, ta'lim eksporti, tibbiy xizmatlar, agrosanoatning bilimga asoslangan yo'nalishlari va yashil iqtisodiyot texnologiyalari. Mazkur tarmoqlarda narx bilan emas, sifat, tezkorlik, xizmat darajasi va innovatsion yondashuv bilan raqobat qilinadi. Demak, bu sohalarga kerakli kadrlar sifatini oshirish milliy raqobatbardoshlikni eng tez va ko'rinarli ravishda kuchaytirishi mumkin. Muallif hisob-kitobiga ko'ra, agar 2026-2030 yillarda ta'lim sifati, raqamli ko'nikmalar, sog'liq kapitali va mehnat bozori bilan uyg'unlik bo'yicha kompleks siyosat izchil olib borilsa, iqtisodiyotda mehnat unumdorligi o'sishi tezlashadi, yuqori malakali ish o'rinlari ulushi kengayadi va xizmatlar eksportining intellektual segmentlari

tezroq rivojlanadi. Bunda eng muhim masala - inson kapitaliga sarflanayotgan mablag'ni xarajat sifatida emas, qaytimi aniq bo'lgan milliy investitsiya sifatida boshqarishdir. Chunki sifatli inson kapitali bo'lmagan iqtisodiyot uzoq muddatda cheklangan unumdorlik, past innovatsiya va zaif eksport murakkabligi bilan yuzma-yuz qoladi.

Tizimli muammolar va mavjud cheklovlar

O'zbekistonda inson kapitalini rivojlantirish bo'yicha ijobiy siljishlar mavjud bo'lsa-da, bu yo'nalishda hal qilinishi kerak bo'lgan bir qator tizimli muammolar saqlanib qolmoqda. Birinchi muammo - qamrov va sifat o'rtasidagi nomutanosiblik. Oliy ta'lim qamrovi sezilarli ravishda kengaygani bilan, barcha ta'lim muassasalarida bir xil sifatni ta'minlash murakkab vazifa bo'lib qolmoqda. Professor-o'qituvchilarning malakasi, o'quv dasturlarining zamonaviyligi, laboratoriya va amaliyot bazasi, akademik halollik muhitining mustahkamligi hamda talabalarni tahliliy va amaliy fikrlashga yo'naltirish darajasi oliy ta'lim sifatining asosiy mezonlaridir. Agar qamrov kengaysa-yu, sifat nazorati sust bo'lsa, mehnat bozorida diplomli, ammo tayyor bo'lmagan kadrlar soni ortib boradi. Ikkinchi muammo - ko'nikmalar va mehnat bozori ehtiyojlari o'rtasidagi uzilishdir. Ko'plab korxonalar amaliy ko'nikmaga ega xodim topishda qiyinalayotgan bir paytda, bitiruvchilarning muayyan qismi ish topish yoki mutaxassisligi bo'yicha ishlashda qiyinchilikka duch keladi. Bu esa ta'lim tizimi, tarmoq korxonalari va bandlik siyosati o'rtasida yetarli darajada uzviy bog'liqlik yo'qligini ko'rsatadi. Ayniqsa, texnik yo'nalishlar, axborot texnologiyalari, logistika, marketing, dizayn, menejment va tahliliy sohalarda real loyihalarga asoslangan tayyorgarlikning ulushi yetarli bo'lmasa, bilimning iqtisodiy qaytimi sekinlashadi. Uchinchi muammo - hududlararo tafovutdir. Poytaxt va yirik shaharlardagi ta'lim, tibbiyot hamda raqamli infratuzilma imkoniyatlari ko'plab chekka hududlar bilan bir xil emas. Bu tafovut inson kapitalining geografik jihatdan notekis shakllanishiga olib keladi. Natijada iqtidorli yoshlar markazlashuvga intiladi, ayrim hududlarda esa malakali kadrlar taqchilligi saqlanib qoladi. Raqobatbardosh iqtisodiyot uchun esa inson kapitali faqat bir necha markazlarda emas, butun hududlar kesimida barqaror va sifatli rivojlanishi kerak. Aks holda, hududiy rivojlanishdagi nomutanosiblik makroiqtisodiy samaradorlikni pasaytiradi. To'rtinchi muammo - sog'liq kapitalining iqtisodiy mazmunda yetarli baholanmasligidir. Ko'pincha sog'liqni saqlash masalasi ijtimoiy himoya yoki tibbiyot xizmatining alohida bo'limi sifatida qoraladi. Aslida esa profilaktika, erta tashxis, mehnat gigiyenasi, ovqatlanish madaniyati va ruhiy salomatlik mehnat unumdorligiga bevosita ta'sir qiladi. Agar ishchi kuchining sog'liq zaxirasi past bo'lsa, mehnat bozorining nominal faolligi saqlangani bilan uning real samaradorligi pasayadi. Shu sababli sog'liq kapitali iqtisodiy strategiyada alohida blok sifatida qoralishi zarur.

Beshinchi muammo - ilm-fan, ta'lim va ishlab chiqarish integratsiyasining yetarli emasligidir. Universitetlarda yaratilayotgan bilimning korxonalardagi muammolar bilan to'g'ridan-to'g'ri bog'lanishi sust bo'lsa, ilmiy natijalar tijoratlashuvi cheklangan bo'ladi. Shu bilan birga, korxonalar ham ba'zan

innovatsiyani tashqi xarajat deb qabul qiladi, ichki tadqiqot va rivojlantirish faoliyatiga yetarli e'tibor qaratmaydi. Natijada inson kapitalining eng yuqori qatlami - ya'ni innovatsion va tadqiqotchi salohiyat - iqtisodiy tizimda to'liq ishlamaydi. Oltinchi muammo - uzluksiz ta'lim va kattalar qayta tayyorgarligi tizimining yetarli chuqurlikda shakllanmaganidir. Raqamli iqtisodiyotda kasb bir marta olinadigan narsa emas; u umr davomida yangilanib turadi. Texnologiya almashgani sayin ayrim kasblar qisqaradi, ayrimlari esa yangi shaklda paydo bo'ladi. Shu sharoitda o'rta yoshdagi ishchi kuchini tezkor qayta o'qitish, qisqa muddatli mikromalaka dasturlarini ommalashtirish, korxona ichki akademiyalarini rivojlantirish va onlayn kasbiy ta'lim platformalarini kengaytirish muhim bo'lib bormoqda. Agar bu mexanizmlar kuchli bo'lmasa, iqtisodiyot tarkibiy o'zgarishlarga sekin moslashadi. Yettinchi muammo - sifat monitoringining zaif bo'g'inlaridir. Inson kapitalini boshqarish uchun faqat umumiy statistika yetarli emas. Hududlar, tarmoqlar, yosh guruhlari, gender va ta'lim bosqichlari kesimida aniq, ochiq va qaror qabul qilishga xizmat qiladigan indikatorlar tizimi zarur. Qaysi hududda qaysi ko'nikma tanqis? Qaysi ta'lim yo'nalishlari mehnat bozorida talab yuqori bo'lgan segmentlarga yetarlicha kadr bermayapti? Qaysi sog'liq muammolari mehnat unumdorligini pasaytirayapti? Ana shu savollarga ma'lumot asosida javob berilmaguncha, inson kapitali siyosatining samaradorligini to'liq oshirish qiyin bo'ladi.

Xalqaro tajribadan olinadigan saboqlar

Xalqaro tajriba shuni ko'rsatadiki, inson kapitali sifati va milliy raqobatbardoshlik o'rtasidagi bog'liqlik har bir muvaffaqiyatli iqtisodiyotning markazida turadi. Sharqiy Osiyo mamlakatlarining modernizatsiya tarixiga nazar tashlansa, ular dastlab sanoatni emas, avvalo intizomli, savodli va tez o'rganadigan kadrlar bazasini yaratishga katta e'tibor qaratganini ko'rish mumkin. Janubiy Koreya tajribasida maktab ta'limining sifati, texnik va muhandislik tayyorgarligi hamda sanoat bilan uyg'un universitet tizimi raqobatbardosh eksport modelining asosini yaratdi. Singapur tajribasida esa davlat boshqaruvi sifati, meritokratiya, o'qituvchi kasbining nufuzi va uzluksiz ko'nikma yangilash tizimi asosiy omil bo'lib xizmat qildi. Bu misollar shuni anglatadiki, inson kapitali siyosati muvaffaqiyatli bo'lishi uchun u alohida dastur emas, balki butun rivojlanish modelining markaziy logikasiga aylanishi zarur. Finlyandiya tajribasi inson kapitali sifatini oshirishda ta'lim tizimi ichidagi ishonch, sifatli pedagog kadrlar va amaliy mustaqillikning naqadar muhim ekanini ko'rsatadi. Mazkur mamlakatda ta'lim natijalari yuqori bo'lishining sababi faqat moliyalashtirish emas, balki o'qituvchilarni puxta tanlash, ularga yuqori professional maqom berish, o'quvchi markazli yondashuv va baholashning rivojlantiruvchi modeli bilan bog'liq. Germaniya tajribasi esa dual ta'limning mehnat bozori bilan uyg'unlikni kuchaytirishdagi samarasini namoyon etadi. Ta'lim muassasasi va korxona hamkorligida shakllanadigan ushbu model yoshlarning amaliy tajribaga ega holda mehnat bozoriga kirishiga yordam beradi. Bu O'zbekiston uchun ayniqsa dolzarb, chunki ko'nikmalar uzilishi muammosi aynan dual va loyiha asosidagi o'qitish mexanizmlari orqali qisqartirilishi mumkin.

Irlandiya va Estoniya tajribasi raqamli transformatsiya sharoitida inson kapitalining yangi sifatini ko'rsatadi. Irlandiyada oliy malakali kadrlar, ingliz tilidagi kasbiy kompetensiya va biznes uchun qulay muhit xalqaro kompaniyalarni jalb etishga xizmat qildi. Estoniyada esa raqamli davlat, maktabdan boshlangan IT savodxonligi, elektron xizmatlar va moslashuvchan boshqaruv modeli kichik mamlakatning ham yuqori raqobatbardosh bo'lishi mumkinligini isbotladi. Bu tajribalardan chiqadigan asosiy xulosa shuki, raqamli iqtisodiyot uchun kerakli inson kapitali faqat dasturchilarni tayyorlash bilan cheklanmaydi. U butun aholining raqamli madaniyati, ma'lumotlar bilan ishlash qobiliyati va davlat-biznes-ta'lim integratsiyasini talab qiladi. Xalqaro tajriba yana bir muhim haqiqatni tasdiqlaydi: sog'liq kapitaliga e'tibor bermasdan raqobatbardoshlikni uzoq muddat saqlab bo'lmaydi. Yaponiyada sog'lom turmush tarzi, profilaktika va mehnat madaniyati yuqori unumdorlikni qo'llab-quvvatlasa, Skandinaviya mamlakatlarida ijtimoiy himoya, sog'liq va ta'limning integratsiyalashgan modeli mehnat bozorining moslashuvchanligi bilan uyg'unlashgan. Bu tajribalar O'zbekiston uchun shuni ko'rsatadiki, iqtisodiy samaradorlik va ijtimoiy rivojlanishni bir-biriga zid qo'yish xato. Aksincha, sifatli sog'liq va ta'lim tizimi uzoq muddatli iqtisodiy samaradorlikning zarur shartidir. O'zbekiston xalqaro tajribani ko'r-ko'rona ko'chirishi kerak emas. Har bir mamlakatning tarixiy, demografik va institutsional xususiyatlari har xil. Biroq umumiy darslar aniq: birinchidan, inson kapitaliga sarf qilingan resurslar qat'iy natija indikatorlari bilan bog'lanishi kerak; ikkinchidan, ta'lim va mehnat bozori o'rtasida doimiy axborot almashinuvi bo'lishi zarur; uchinchidan, pedagog va murabbiy sifati tizimning yuragi hisoblanadi; to'rtinchidan, raqamli ko'nikmalar umumiy savodxonlikning bir qismiga aylanishi kerak; beshinchidan, hududiy tenglik masalasi e'tibordan chetda qolmasligi lozim. Ana shu saboqlarni milliy sharoitga moslashtirish O'zbekiston uchun eng maqbul yo'ldir. Shu ma'noda xalqaro tajriba O'zbekiston oldiga bitta oddiy, ammo fundamental savolni qo'yadi: biz inson kapitalini ijtimoiy xarajat deb ko'ramizmi yoki milliy boylikni ko'paytiradigan investitsiya debmi? Agar ikkinchi yondashuv ustuvor bo'lsa, unda budjet, kadrlar siyosati, ta'lim standartlari, hududiy dasturlar va xususiy sektor rag'batlari ham shu logika asosida qayta ko'rib chiqilishi kerak bo'ladi. Raqobatbardosh iqtisodiyot avvalo insonda quriladi. Xalqaro tajriba buning isbotidir.

Strategik yo'nalishlar va 2026-2030 yillar uchun amaliy takliflar

O'zbekiston milliy iqtisodiyoti raqobatbardoshligini kuchaytirishda inson kapitali sifati hal qiluvchi omil bo'lib borayotgan ekan, siyosat ham sektoral parchalangan shakldan chiqib, yagona integrallashgan yondashuvga o'tishi kerak. Birinchi strategik yo'nalish - ta'lim sifatini natijaga yo'naltirilgan tizimga o'tkazishdir. Bunda asosiy e'tibor qamrovning o'zi emas, bitiruvchining kompetensiyasi, ishga joylashuvi, amaliy vazifa yecha olish qobiliyati va innovatsion fikrlashiga qaratilishi zarur. O'quv dasturlarini korxonalar, professional assotsiatsiyalar va hududiy klasterlar bilan muntazam yangilab borish, loyiha asosidagi o'qitish, dual ta'lim va mikrosertifikatlash tizimini kengaytirish maqsadga muvofiq. Ikkinchi strategik yo'nalish - pedagog va

murabbiylar sifatini keskin oshirishdir. Ta'lim sifati, avvalo, o'qituvchi sifati orqali namoyon bo'ladi. Shuning uchun professor-o'qituvchilar va maktab pedagoglari uchun muntazam qayta tayyorgarlik, pedagogik dizayn, raqamli didaktika, sun'iy intellekt vositalaridan foydalanish, amaliy tadqiqot olib borish va tarmoqlar bilan hamkorlik ko'nikmalarini rivojlantirish zarur. Bunda faqat seminarlar o'tkazish emas, balki natija bilan bog'langan professional o'sish modeli kerak: masalan, dars sifati, talabalar natijasi, innovatsion kurslar yaratish va ishlab chiqarish bilan integratsiya bo'yicha baholash tizimlari takomillashtirilishi lozim. Uchinchi yo'nalish - sog'liq kapitalini iqtisodiy unumdorlik strategiyasi bilan birlashtirishdir. Profilaktika, skrining, onalar va bolalar salomatligi, yoshlar orasida sport va sog'lom turmush tarzi, ish joylarida mehnat muhofazasi, stress boshqaruvi va ruhiy salomatlik bo'yicha dasturlar sog'liqni saqlashning ijtimoiy emas, iqtisodiy bloklari sifatida ham qaralishi kerak. Raqobatbardosh iqtisodiyotga uzoq ishlay oladigan, tez o'rganadigan, diqqat va intizomi yuqori bo'lgan ishchi kuchi kerak. Demak, sog'liqni saqlash xarajatlarining samaradorligini baholashda ham mehnat faolligi va unumdorlik bilan bog'liq indikatorlar qo'llanilishi maqsadga muvofiq. To'rtinchi yo'nalish - raqamli ko'nikmalarni umumiy savodxonlik darajasiga ko'tarishdir. Bu yerda gap faqat IT mutaxassislar tayyorlash haqida emas. Har bir iqtisodiy tarmoq uchun bazaviy va ilg'or raqamli kompetensiyalar modeli ishlab chiqilishi kerak. Agronom ma'lumotlar bilan ishlay olishi, shifokor raqamli tashxis tizimlarini tushunishi, iqtisodchi analitik platformalardan foydalanishi, o'qituvchi adaptiv o'qitish vositalarini qo'llay olishi, tadbirkor esa elektron savdo va raqamli marketingni amalda ishlata olishi lozim. Shu maqsadda maktabdan boshlab oliy ta'lim va kattalar ta'limigacha uzluksiz raqamli ko'nikmalar yo'li ishlab chiqilishi zarur. Beshinchi yo'nalish - hududiy inson kapitali ekotizimlarini shakllantirishdir. Har bir viloyatning iqtisodiy ixtisoslashuvi, demografik tarkibi va mehnat bozori talabi turlicha. Shuning uchun inson kapitali siyosati ham bir xil shablon asosida emas, hududiy "skill map" va "talent roadmap" asosida yuritilishi lozim. Masalan, sanoat hududlarida texnik va muhandislik kompetensiyalariga, turizm hududlarida xizmatlar, til va servis ko'nikmalariga, agrar hududlarda esa agrotexnologiya, logistika va qayta ishlash bo'yicha malakalarga ustuvorlik berilishi mumkin. Bu yondashuv hududiy raqobatbardoshlikni ham kuchaytiradi.

Oltinchi yo'nalish - universitet, ilmiy markaz va biznes o'rtasidagi kooperatsiyani real iqtisodiy mexanizmga aylantirishdir. Universitetlar huzurida amaliy tadqiqot laboratoriyalari, sanoat buyurtmalariga javob beruvchi konsalting markazlari, talabalar startap inkubatorlari va texnologiya transfer ofislari faoliyatini kengaytirish zarur. Xususiylar uchun esa universitetlar bilan hamkorlikdan olinadigan soliq, grant yoki sheriklik rag'batlari ishlab chiqilishi mumkin. Bu usul innovatsion inson kapitalining iqtisodiyotga kirishini tezlashtiradi. Yettinchi yo'nalish - uzluksiz ta'lim va qayta ko'nikmalantirish bozorini rivojlantirishdir. 2026-2030 yillar davomida texnologik o'zgarishlar yana tezlashadi, demak, ayrim kasblar yangidan mazmun kasb etadi. Shu bois qisqa muddatli modulli kurslar, ish beruvchi bilan birgalikdagi sertifikat dasturlari, onlayn-offlayn gibril qayta tayyorlash markazlari, ayollar va yoshlar uchun

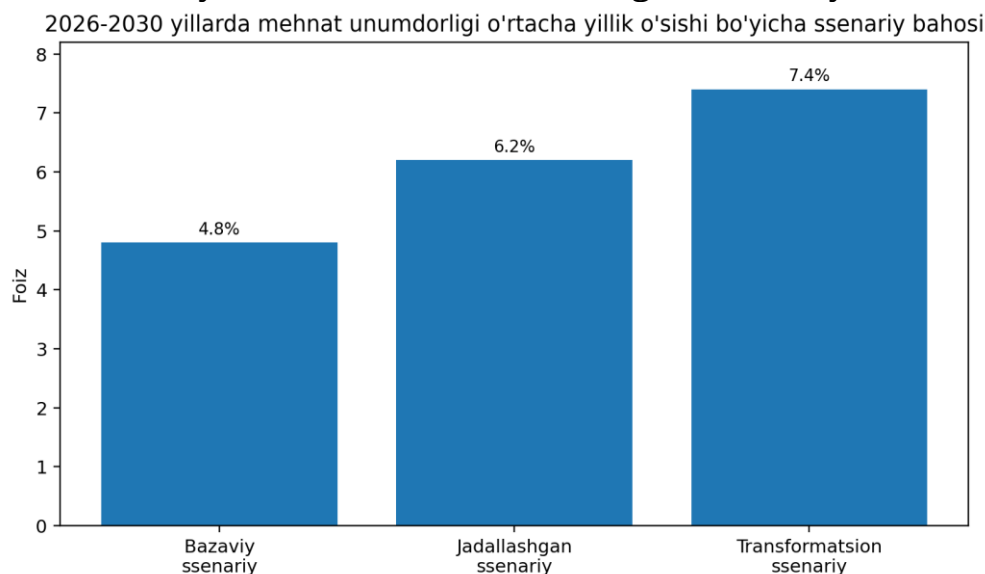
moslashuvchan o'quv yo'llari, nogironligi bo'lgan shaxslar uchun inklyuziv malaka dasturlari kengaytirilishi kerak. Bu mehnat bozorining moslashuvchanligini oshirib, ijtimoiy inklyuziyani ham mustahkamlaydi. Sakkizinchi yo'nalish - inson kapitalini boshqarishda ma'lumotga tayangan boshqaruvni kuchaytirishdir. Bunda inson kapitali bo'yicha milliy panel indikatorlari, hududiy real vaqt monitoringi, ta'limdan ishga o'tish yo'llarini kuzatish tizimi, bitiruvchilar traektoriyasi, sog'liq va bandlik o'rtasidagi bog'liqlik, raqamli ko'nikmalar darajasi va innovatsion faollik indikatorlari integratsiyalashgan holda yuritilishi zarur. Bunday tizim davlatga resurslarni aniq nuqtaga yo'naltirish, korxonalarga esa kadrlar bozorini aniqroq ko'rish imkonini beradi. To'qqizinchi yo'nalish - inson kapitali rivojlanishini milliy raqobatbardoshlik strategiyasining markaziy ko'rsatkichiga aylantirishdir. Ya'ni investitsiya, eksport, sanoat va raqamli iqtisodiyot dasturlarining samaradorligi baholanganda ularda nechta yuqori malakali ish o'rni yaratildi, qanday yangi ko'nikmalar shakllandi, mehnat unumdorligi qanchaga oshdi, hududiy kadrlar sifati qanday yaxshilandi degan savollar ham asosiy indikatorlar qatoriga kiritilishi lozim. Ana shundagina inson kapitali alohida ijtimoiy mavzu emas, balki davlatning iqtisodiy qudratini belgilovchi yadro ko'rsatkichga aylanadi.

Jadval 3.
2026-2030 yillar uchun inson kapitali
va raqobatbardoshlik bo'yicha ssenariy bahosi

Ssenariy	Asosiy tavsif	Mehnat unumdorligi o'rtacha yillik o'sishi	Eksport murakkabligi	Raqobatbardoshlikka ta'sir
Bazaviy ssenariy	Mavjud islohotlar davom etadi, ammo ta'lim sifati va skill-moslik sekin yaxshilanadi	4,8 %	Cheklangan o'sish	O'rtacha
Jadallashgan ssenariy	Dual ta'lim, raqamli ko'nikmalar va qayta tayyorlash dasturlari faol kengaytiriladi	6,2 %	Barqaror ko'tarilish	Yuqori
Transformatsion ssenariy	Ta'lim-sog'liq-innovatsiya-mehnat bozori yagona ekotizimga aylanadi	7,4 %	Keskin murakkablashuv	Juda yuqori

Manba: muallifning analitik ssenariy bahosi.

2-rasm. 2026-2030 yillarda mehnat unumdorligi o'sishi bo'yicha ssenariylar



Manba: muallif hisob-kitobi.

Kutilayotgan iqtisodiy samaralar va istiqbolli natijalar

Inson kapitali sifatiga yo'naltirilgan izchil siyosatning iqtisodiy samaralari qisqa muddatda ham, uzoq muddatda ham namoyon bo'ladi. Qisqa muddatda eng avvalo bandlik sifati yaxshilanadi. Amaliy ko'nikmalari kuchli, raqamli savodxon va moslashuvchan kadrlar ulushi ortishi natijasida korxonalar ishchi kuchini tanlashda kamroq tranzaksiya xarajatiga duch keladi, ishga moslashish davri qisqaradi va qayta tayyorlash uchun qo'shimcha vaqt sarfi kamayadi. Bu esa ishlab chiqarish va xizmat ko'rsatish jarayonlarining uzluksizligini ta'minlab, umumiy samaradorlikni oshiradi. O'rta muddatda mehnat unumdorligi va tarmoq tarkibi o'zgaradi. Inson kapitali sifatining yaxshilanishi natijasida iqtisodiyot past malaka talab qiladigan segmentlardan yuqori qo'shilgan qiymat yaratadigan segmentlarga o'tishni boshlaydi. Bu jarayon ayniqsa sanoatning qayta ishlash yo'nalishlari, logistika, IT-xizmatlar, moliyaviy texnologiyalar, biznes xizmatlari, agrotexnologiyalar va ta'lim hamda tibbiyot xizmatlarida tezroq ko'rinadi. Shu tariqa milliy iqtisodiyot eksportni ko'proq hajm hisobiga emas, murakkablik va sifat hisobiga oshira boshlaydi. Raqobatbardoshlikning eng barqaror shakli ham aynan shu. Uzoq muddatda esa inson kapitali sifatining oshishi iqtisodiy barqarorlik va ijtimoiy kohezionni mustahkamlaydi. Yuqori malakali va sog'lom aholi qatlamining kengayishi daromadlar bazasini kengaytiradi, soliq tushumlari sifati yaxshilanadi, kambag'allikni qisqartirish bo'yicha chora-tadbirlarning samarasi oshadi. Bundan tashqari, sifatli inson kapitali siyosiy va institutsional madaniyatga ham ijobiy ta'sir ko'rsatadi: ochiqlik, hisobdorlik, professional javobgarlik va ma'lumotga asoslangan qaror qabul qilish tamoyillari kuchayadi. Bu esa o'z navbatida biznes muhitini yaxshilab, investitsion jozibadorlikni oshiradi. Muallifning ssenariy tahliliga ko'ra, agar 2026-2030 yillarda ta'lim sifati, sog'liq kapitali, raqamli ko'nikmalar va mehnat bozori uyg'unligi bo'yicha jadallashgan model amalga oshirilsa, mehnat unumdorligining o'sish sur'atlari bazaviy ssenariyga nisbatan sezilarli tezlashishi mumkin. Yuqori malakali ish

o'rinlari ulushining kengayishi, yoshlar va ayollar bandligining sifat jihatdan yaxshilanishi, ilmiy-tadqiqot natijalarining tijoratlashuv darajasining ortishi va eksport xizmatlarining intellektual tarmoqlarda o'sishi bunday modelning asosiy natijasi bo'ladi. Bu albatta bir kunlik yoki bir yillik samara emas, lekin izchil institutsional siyosat bilan erishiladigan real istiqboldir. Shuni unutmaslik kerakki, inson kapitaliga investitsiya eng yuqori qaytim beradigan investitsiyalardan biridir. U bevosita korxona foydasini, davlat byudjeti tushumini va aholi daromadini oshirish bilan birga, bilvosita innovatsion muhit, ijtimoiy barqarorlik va milliy obro'ga ham ta'sir qiladi. Shu sababli O'zbekiston uchun inson kapitali sifati masalasi alohida bir sohaning ishi emas, balki milliy taraqqiyotning bosh mavzusiga aylanishi zarur. Kelajakda kim ko'proq zavod qurgani emas, kim kuchliroq inson salohiyatini shakllantirgani g'olib bo'ladi.

Xulosa

Tadqiqot natijalari shuni ko'rsatadiki, raqamli transformatsiya va global iqtisodiy raqobatning kuchayishi sharoitida inson kapitali sifati O'zbekiston milliy iqtisodiyoti raqobatbardoshligining asosiy drayveriga aylanmoqda. Inson kapitali ta'lim, sog'liq, raqamli ko'nikmalar, innovatsion salohiyat va mehnat bozori bilan uyg'unlikning bir butun tizimi sifatida qaralgandagina uning real iqtisodiy qaytimi yuzaga chiqadi. Statistik va institutsional tahlil O'zbekistonda bu borada ijobiy siljishlar mavjudligini ko'rsatdi: oliy ta'lim qamrovi keskin kengaygan, ta'limga yo'naltirilayotgan resurslar salmoqli, raqamli infratuzilma rivojlanmoqda, makroiqtisodiy o'sish esa yangi sifat bosqichiga chiqish uchun imkon yaratmoqda. Shu bilan birga, sifat tafovutlari, ko'nikmalar va mehnat bozori ehtiyojlari o'rtasidagi uzilish, hududiy nomutanosiblik, ilm-fan va ishlab chiqarish integratsiyasining sustligi hamon muhim muammo bo'lib qolmoqda. Maqolada ilgari surilgan g'oya shundan iboratki, inson kapitali siyosati alohida ijtimoiy yo'nalish sifatida emas, balki milliy raqobatbardoshlik arxitekturasining markaziy elementi sifatida boshqarilishi lozim. Ta'lim sifati, pedagoglar salohiyati, sog'liq kapitali, raqamli ko'nikmalar, hududiy skill-ekotizimlar, uzluksiz ta'lim, universitet-biznes hamkorligi va ma'lumotga asoslangan boshqaruv bir-biri bilan uzviy bog'langan holda olib borilgandagina iqtisodiyot yuqori qo'shilgan qiymatli modelga o'ta oladi. 2026-2030 yillar uchun eng muhim vazifa - miqdoriy kengayishdan sifat transformatsiyasiga o'tish, inson kapitalining iqtisodiy qaytimi va natijadorligini aniq indikatorlar orqali boshqarishdir.

O'zbekistonning uzoq muddatli iqtisodiy ustunligi tabiiy resurs yoki arzon mehnat omiliga emas, balki sog'lom, bilimli, raqamli ko'nikmaga ega, tashabbuskor va innovatsion fikrlovchi insonlarga tayangan holda shakllanadi. Inson kapitali sifatini oshirishga qaratilgan har bir oqilona qaror - bu nafaqat bugunning ijtimoiy vazifasi, balki ertangi iqtisodiy qudrat uchun qo'yilgan mustahkam paydevordir.

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UMUMTA'LIM MAKTABLARI RAHBARLARINING BOSHQARUV KO'NIKMALARINI RIVOJLANTIRISHDA ZAMONAVIY BOSHQARUV TEXNOLOGIYALARINING AHAMIYATI

***Annotatsiya:** Mazkur maqolada umumta'lim maktablari rahbarlarining boshqaruv ko'nikmalarini rivojlantirishda zamonaviy boshqaruv texnologiyalarining ahamiyati tahlil qilinadi. Ta'lim tizimida amalga oshirilayotgan islohotlar sharoitida maktab rahbarlaridan samarali boshqaruv, strategik rejalashtirish, jamoani boshqarish hamda innovatsion yondashuvlarni joriy etish kabi kompetensiyalar talab etilmoqda. Tadqiqot jarayonida zamonaviy boshqaruv texnologiyalarining maktab faoliyatini samarali tashkil etish, pedagogik jamoa faoliyatini muvofiqlashtirish hamda ta'lim sifatini oshirishdagi o'rni o'rganildi. Shuningdek, ushbu texnologiyalardan foydalanish maktab rahbarlarining kasbiy kompetensiyalarini rivojlantirishga xizmat qilishi ilmiy jihatdan asoslab berildi.*

***Kalit so'zlar:** boshqaruv texnologiyalari, ta'lim menejmenti, maktab rahbari, boshqaruv kompetensiyasi, strategik boshqaruv, ta'lim sifati.*

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THE IMPORTANCE OF MODERN MANAGEMENT TECHNOLOGIES IN DEVELOPING THE MANAGEMENT SKILLS OF GENERAL SECONDARY SCHOOL LEADERS

***Abstract:** This article analyzes the importance of modern management technologies in developing the management skills of general secondary school leaders. In the context of ongoing reforms in the education system, school leaders are required to possess competencies such as effective management, strategic planning, team leadership, and the implementation of innovative approaches. The study examines the role of modern management technologies in organizing school activities effectively, coordinating the work of the teaching staff, and improving the quality of education. It is also scientifically substantiated that the use of these technologies contributes to the development of professional competencies of school leaders.*

Keywords: *management technologies, educational management, school leadership, management competence, strategic management, quality of education.*

Kirish

Hozirgi kunda ta'lim tizimini modernizatsiya qilish va uning samaradorligini oshirish masalasi global miqyosda dolzarb ahamiyat kasb etmoqda. Ta'lim sifatini ta'minlashda ta'lim muassasalarini samarali boshqarish muhim omillardan biri hisoblanadi. Ayniqsa, umumta'lim maktablari rahbarlarining boshqaruv faoliyati ta'lim jarayonining samaradorligini belgilovchi asosiy omillardan biri sifatida e'tirof etilmoqda. Maktab rahbarlari ta'lim jarayonini samarali tashkil etish, pedagogik jamoa faoliyatini muvofiqlashtirish hamda ta'lim muassasasining rivojlanish strategiyasini belgilashda muhim rol o'ynaydi.

Zamonaviy ta'lim tizimida maktab rahbarlarining boshqaruv faoliyatiga qo'yiladigan talablar tobora ortib bormoqda. Ta'lim tizimida amalga oshirilayotgan islohotlar rahbarlardan nafaqat ma'muriy boshqaruvni amalga oshirishni, balki innovatsion yondashuvlarni joriy etish, pedagogik jamoani samarali boshqarish hamda strategik qarorlar qabul qilish ko'nikmalariga ega bo'lishni talab qiladi. Shu sababli maktab rahbarlarining boshqaruv kompetensiyasini rivojlantirish masalasi ta'lim menejmentining muhim yo'nalishlaridan biri hisoblanadi.

Boshqaruv kompetensiyasi — bu rahbarning tashkilot yoki ta'lim muassasasini samarali boshqarish, strategik maqsadlarni belgilash va amalga oshirish, boshqaruv qarorlarini ilmiy asosda qabul qilish, jamoa faoliyatini muvofiqlashtirish hamda mavjud resurslardan oqilona foydalanish jarayonida namoyon bo'ladigan bilim, ko'nikma, malaka, amaliy tajriba, kommunikativ qobiliyatlar va shaxsiy-kasbiy sifatlarning o'zaro integratsiyalashgan tizimidir. Ushbu kompetensiya rahbarning boshqaruv faoliyatini samarali amalga oshirishda muhim ahamiyatga ega bo'lib, ta'lim muassasasining rivojlanishida asosiy omillardan biri hisoblanadi.

Ta'lim muassasalarini boshqarish jarayonida zamonaviy boshqaruv texnologiyalaridan foydalanish rahbarlarning boshqaruv kompetensiyalarini rivojlantirishda muhim vosita bo'lib xizmat qiladi. Zamonaviy boshqaruv texnologiyalari strategik boshqaruv, taym-menejment, loyiha boshqaruvi, raqamli boshqaruv tizimlari hamda innovatsion boshqaruv yondashuvlarini o'z ichiga oladi. Ushbu texnologiyalar boshqaruv jarayonini tizimli tashkil etish, pedagogik jamoa faoliyatini samarali muvofiqlashtirish hamda ta'lim sifatini oshirish imkonini beradi.

Tadqiqot metodologiyasi

Tadqiqot jarayonida ilmiy bilishning bir qator metodlaridan foydalanildi. Jumladan, pedagogik kuzatuv, tahlil va sintez, taqqoslash, so'rovnoma hamda statistik tahlil metodlari qo'llanildi. Ushbu metodlar maktab rahbarlarining boshqaruv faoliyatini o'rganish hamda zamonaviy boshqaruv texnologiyalarining

ularning kasbiy kompetensiyalarini rivojlantirishga ta'sirini aniqlash imkonini berdi.

Tadqiqot umumta'lim maktablari rahbarlarining boshqaruv faoliyatini o'rganish asosida olib borildi. Tadqiqot jarayonida maktab rahbarlarining boshqaruv ko'nikmalari, boshqaruv jarayonini tashkil etish usullari hamda zamonaviy boshqaruv texnologiyalaridan foydalanish darajasi tahlil qilindi. Shu bilan birga, rahbarlarning strategik rejalashtirish, jamoani boshqarish, qaror qabul qilish va vaqtni boshqarish ko'nikmalariga alohida e'tibor qaratildi.

Tadqiqot doirasida rahbarlarning boshqaruv faoliyatida zamonaviy boshqaruv texnologiyalaridan foydalanish darajasi ham o'rganildi. Natijalarni tahlil qilish jarayonida zamonaviy boshqaruv texnologiyalarining maktab boshqaruv tizimini takomillashtirishdagi imkoniyatlari aniqlab berildi.

Tadqiqot natijalari

Tadqiqot natijalari shuni ko'rsatdiki, zamonaviy boshqaruv texnologiyalaridan foydalanish maktab rahbarlarining boshqaruv faoliyatini sezilarli darajada samarali tashkil etishga yordam beradi. Xususan, strategik boshqaruv texnologiyalaridan foydalanish ta'lim muassasalarining rivojlanish strategiyasini belgilash, maqsad va vazifalarni aniq rejalashtirish hamda boshqaruv jarayonini tizimli tashkil etishga imkon yaratadi.

Taym-menejment texnologiyalarini qo'llash rahbarlarga o'z vaqtini samarali taqsimlash, boshqaruv faoliyatida ustuvor vazifalarni belgilash hamda boshqaruv samaradorligini oshirishga xizmat qiladi. Shu bilan birga, loyiha boshqaruvi texnologiyalaridan foydalanish ta'lim muassasasida turli innovatsion loyihalarni samarali amalga oshirish imkonini beradi.

Tadqiqot natijalariga ko'ra, zamonaviy boshqaruv texnologiyalaridan foydalanayotgan maktab rahbarlarida quyidagi ijobiy o'zgarishlar kuzatildi:

- boshqaruv jarayonining tizimli tashkil etilishi;
- pedagogik jamoa faoliyatining samarali muvofiqlashtirilishi;
- qaror qabul qilish jarayonining tezlashishi;
- ta'lim sifati ko'rsatkichlarining oshishi.

Shuningdek, raqamli boshqaruv texnologiyalaridan foydalanish maktab boshqaruv tizimini avtomatlashtirish, ma'lumotlarni tezkor tahlil qilish hamda boshqaruv qarorlarini asosli qabul qilish imkonini beradi.

Muhokama

Zamonaviy boshqaruv texnologiyalarini ta'lim muassasalarida joriy etish maktab rahbarlarining boshqaruv kompetensiyalarini rivojlantirishda muhim omil hisoblanadi. Bunday texnologiyalar rahbarlarga boshqaruv jarayonini samarali tashkil etish, jamoani boshqarish hamda ta'lim sifatini oshirish imkonini beradi.

Tadqiqot natijalari shuni ko'rsatadiki, zamonaviy boshqaruv texnologiyalaridan foydalanish rahbarlarning professional faoliyatini takomillashtirishga xizmat qiladi. Ayniqsa, strategik boshqaruv, taym-menejment va loyiha boshqaruvi texnologiyalarini qo'llash rahbarlarning boshqaruv faoliyatini samarali tashkil etish imkonini beradi.

Bundan tashqari, zamonaviy boshqaruv texnologiyalarini joriy etish pedagogik jamoaning samarali faoliyat yuritishiga ham ijobiy ta'sir ko'rsatadi. Chunki bunday texnologiyalar jamoa a'zolari o'rtasida samarali hamkorlikni yo'lga qo'yish, boshqaruv jarayonida shaffoflikni ta'minlash hamda ta'lim jarayonini takomillashtirishga xizmat qiladi.

Xulosa

Xulosa qilib aytganda, zamonaviy boshqaruv texnologiyalari umumta'lim maktablari rahbarlarining boshqaruv ko'nikmalarini rivojlantirishda muhim ahamiyatga ega. Ushbu texnologiyalar rahbarlarga boshqaruv jarayonini samarali tashkil etish, pedagogik jamoa faoliyatini muvofiqlashtirish hamda ta'lim sifatini oshirish imkonini beradi.

Tadqiqot natijalari shuni ko'rsatdiki, zamonaviy boshqaruv texnologiyalaridan foydalanish maktab boshqaruv tizimini takomillashtirish, rahbarlarning kasbiy kompetensiyalarini rivojlantirish hamda ta'lim jarayonining samaradorligini oshirishga xizmat qiladi.

Kelgusida ta'lim muassasalarida zamonaviy boshqaruv texnologiyalarini keng joriy etish, maktab rahbarlarining boshqaruv kompetensiyalarini rivojlantirishga qaratilgan trening va malaka oshirish dasturlarini takomillashtirish muhim ahamiyatga ega.

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DEVELOPMENT OF DESERTIFICATION PROCESS AS A RESULT OF SOIL SALINIZATION IN THE ZARAFSHAN RIVER BASIN

Abstract: *The article examines the impact of salinization on desertification in the Zarafshan River basin as a result of improper soil cultivation and irrigation without observing agricultural practices. Desertification is one of the global problems in the world. The main causes are natural and anthropogenic factors. Currently, desertification is occurring more as a result of anthropogenic factors. In this article, the soil fertility of the Zarafshan basin as a result of anthropogenic factors is analyzed in the district section. The soil salinity table is given in the district section. Soil salinity is observed more in the lower part of the Zarafshan basin. One of the main reasons for this is the location of the river in the lower part, that is, the relief features, as well as the close location of groundwater to the surface.*

Keywords: *Water erosion, soil erosion, ravine, salinization, desertification, pesticides, vegetation, mountains and plains*

Relevance

Today, in order to meet the needs of the population and sectors of the national economy for land resources, the process of developing new lands and more intensive use of developed lands is intensifying in the world. This leads to a change in the natural landscape composition of the land fund, a decrease in biodiversity, and its deterioration from its optimal state under external anthropogenic pressure. The UN Sustainable Development Agenda until 2030 sets the tasks of “Protecting and restoring dryland ecosystems, rationally using them, rationally managing forests, combating desertification, halting land degradation and preventing biodiversity loss”. These tasks require research on rational land use, especially in regions with limited land resources. One of the negative processes that is rapidly occurring in our environment is desertification. In the world, the increase in the greenhouse effect, global climate change, ozone layer depletion due to industrial emissions, environmental pollution, loss of biodiversity, deforestation by humans, soil degradation and increasing soil salinization are all closely linked to geocological situations, and as a result, the pace of desertification is increasing rapidly. Due to salinization and weathering of the soil layer, soil fertility is decreasing and becoming unsuitable for agricultural use.

Main part

Every year, the area of unusable land excluded from agriculture is about 7 million hectares. Such unusable land, unfortunately, is also observed in our

homeland. One of the biggest reasons for this is the human factor not only in our country but also in the world. Man has been using the soil incorrectly to meet his needs throughout his activities. The composition of the soil has a strong impact on its fertility, properties and characteristics. With the introduction of market reforms in our country, the influence of society and people on the land, that is, the feeling of ownership of its management, has increased, and the attitude towards the land has changed significantly. In order to get more yield in agriculture, it is necessary to use organic fertilizers as much as possible instead of chemical minerals and strong pesticides, and to increase the yield through agrotechnical treatment of the soil.

It is advisable to use modern and advanced technologies in agriculture. Currently, in our country, due to the application of strong pesticides to the soil in certain years in order to increase the yield, the composition of the soil is changing. As a result, the productivity of plants is decreasing year by year. If we analyze the above issues, we can see that we have few experienced specialists to maintain soil fertility..

Not only in the whole world, but also in our country, the rapid development of urbanization, the construction of large cities, factories and enterprises that emit harmful waste, and as a result, pollution incidents that damage the environment, are also having an impact on soil properties. In our country, due to improper agrotechnical measures, the soil composition is deteriorating, its fertility is sharply decreasing, and erosion is occurring. Soil is a unique gift of nature. Despite the fact that the soil has the property of self-recovery, the deterioration of the soil composition and its deterioration are often observed in comparison with the restoration of the soil. According to the data collected by scientists, every day, 3.5 thousand hectares of fertile land become unusable as a result of erosion. As a result of water erosion alone, soil properties are deteriorating in the mountainous and foothill regions of the Zarafshan basin. If we look at the plains and lowlands, soil fertility is decreasing due to the blowing away of the fertile soil layer due to the process of wind erosion. Many measures have been developed to prevent water erosion and wind erosion. Including the use of all agrotechnical measures such as dense planting of plants and the formation of forests, planting plants in a stepped form on mountains and mountain slopes. As a result of excessive irrigation of irrigated lands in the Zarafshan basin, salt compounds dissolved in groundwater have emerged on the surface and are being damaged by varying degrees of salinization. Soils are divided into non-saline, weakly saline, moderately saline, strongly saline and saline soils according to salinity. These are located in geochemical landscapes of various categories. The causes of the occurrence of saline soils are very diverse. One of them is the parent rock, which is widespread in arid regions, which stores salts in various forms. The secondary salinity of the salinization process is very dangerous for the soil cover and the plants growing in it, causing irreparable damage. In order to prevent salinization, today, ditches and ditches are being dug to improve drainage, and as a result, groundwater is being prevented from emerging above the ground.

After the soil becomes unsuitable due to loss of fertility, desertification is rampant in these areas. In areas where desertification is taking place, a sharp decline in economic potential is taking place. It is no secret to us that our economy is closely linked to the agricultural sector of our country. According to the accounting records, irrigated lands are 100 times more productive than natural pastures, yielding 7-8 times more than lands planted with grain crops. As a result of improper use of the soil and the decrease in its fertility, these indicators are decreasing year by year. The population of the Zarafshan basin has long been engaged in irrigated agriculture and has grown mainly cotton and wheat crops, which deprives it of the opportunity to plant repeated crops. In the most developed districts of Samarkand region, located in the middle reaches of the Zarafshan River, including Pastargom, Kattakurgan and Akdarya districts, there is no control over the use of wastewater. As a result of excessive irrigation of fields, very large ravines are formed. Also, the abundance of gypsum, $MgSO_4$, dolomite in the saline-alkali soils of the desert region was noted by Kamilova O.K., Isakov V.Yu. If we look at the distribution of gypsum content in the soils of the area we are studying along the soil cross-section, we can observe that the lower layers increase until the middle of the soil profile, and then decrease to a certain extent. In the lower part of our region, due to the low rainfall, high temperature, mineralized sulfate, hydrocarbonate and close-to-surface conditions of groundwater, salts evaporate from groundwater through capillaries and settle at different depths depending on their solubility. When studying the soil composition of the Karman and Konimeh districts of Navoi province, located in the lower reaches of the Zarafshan River, it was found that they are mainly heavy deposits with a high content of sand and clay. Due to the rise of groundwater to the surface, strong salinity is observed in the soil layer. As groundwater approaches the surface, the process of evaporation and salt accumulation accelerates. Groundwater is close to the surface at a depth of 2-3 meters, causing the highest soil salinity in arid climatic regions.

Table 1.

Percentage of saline lands in Navoi region and districts
(Fraction in hectares, denominator in percent)

T/R	Regions	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1	By region	98,4	98,4	98,3	98,3	97,6	98,3	93,4	93,3	91,7	89,5
		83,0	83,0	82,9	83,1	82,3	82,9	78,8	78,7	77,3	75,5
2	Karman a	18,8	18,8	18,8	18,8	18,8	18,8	17,6	17,1	16,7	16,2
		100	100	100	100	100	100	88,8	85,5	83,5	81,1
3	Konikme kh	5,06	5,06	5,06	5,06	5,7	5,7	5,4	4,6	4,5	4,4
		86,05	86,05	86,0	86,0	96,9	96,9	91,8	78,2	76,5	74,8
4	Kyzyltep a	31,2	31,2	31,2	31,2	31,2	31,2	30,1	29,6	29,3	28,8
		96,9	96,9	96,9	96,9	96,9	96,9	93,5	91,9	90,9	89,4
5	Navbakh or	22,9	22,9	22,9	22,9	22,9	23,1	22,1	21,5	21,5	20,3
		95,2	95,2	95,2	95,2	95,2	96,04	91,9	89,3	89,3	84,4
6	Khatirch i	20,2	20,2	20,2	20,2	21,1	21,7	20,5	20,3	20,3	19,7
		55,4	55,4	55,4	55,4	58	59,6	56,3	55,8	55,8	54,1

Conclusion

If we analyze the soil cover of the Karmana, Konimekh, Navbahor, Kyzyltepa, Khatirchi districts of Navoi region based on the collected data, we can see that the soil cover is being damaged by salinization from year to year. If we analyze this table, we can see that soil salinization is strong in the lower reaches of the Zarafshan River. The following recommendations have been developed to prevent soil salinization. Use modern irrigation methods, namely, proper irrigation, drip and sprinkler irrigation, control the amount of water, improve drainage around the cultivated areas, leave one furrow dry between furrows, and irrigate through the next one. Correct application of fertilizers: for plants to absorb fertilizers well, mineral and organic fertilizers should be applied together. It is beneficial to apply mineral fertilizers after irrigation, not during irrigation. Controlling the amount of nitrogen and applying more organic fertilizers than mineral fertilizers allows for less use of mineral fertilizers, planting rows of trees at the edges of fields, drainage of cultivated areas, and a favorable climate for maintaining the water-salt balance in the soil.

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OPTIMIZATION OF TREATMENT AND MANAGEMENT TACTICS FOR NECROTIZING ENTEROCOLITIS IN NEWBORNS BORN TO MOTHERS WITH PREECLAMPSIA

Abstract: *Necrotizing enterocolitis (NEC) is one of the most severe gastrointestinal diseases in newborns, particularly affecting premature infants and those with low birth weight. Preeclampsia is a common complication of pregnancy associated with placental insufficiency and fetal hypoxia, which may contribute to impaired intestinal perfusion in newborns and increase the risk of necrotizing enterocolitis. The aim of this study was to analyze current scientific literature on the pathogenesis, risk factors, clinical manifestations, and treatment strategies of NEC in newborns born to mothers with preeclampsia. A literature review was conducted using international databases. The analysis demonstrated that placental insufficiency and chronic fetal hypoxia play an important role in the development of intestinal ischemia, which contributes to the pathogenesis of NEC. Early diagnosis and optimized treatment strategies are essential to reduce morbidity and mortality associated with this condition.*

Keywords: *necrotizing enterocolitis, preeclampsia, newborns, intestinal ischemia, neonatal hypoxia, intensive care.*

Introduction

Necrotizing enterocolitis (NEC) is a severe inflammatory disease of the gastrointestinal tract in neonates, characterized by intestinal inflammation, ischemia, and necrosis of the intestinal wall. In severe cases, it may lead to intestinal perforation and peritonitis. NEC remains one of the leading causes of morbidity and mortality in neonatal intensive care units worldwide.

The disease primarily affects premature infants and newborns with very low birth weight. Due to the immaturity of the intestinal barrier, underdeveloped immune response, and unstable intestinal microcirculation, preterm infants are particularly susceptible to ischemic and infectious damage to the intestinal wall.

Several risk factors contribute to the development of NEC, including prematurity, low birth weight, perinatal hypoxia, infections, and disturbances of intestinal microbiota. Feeding practices, particularly early enteral feeding in unstable neonates, may also play a role.

In recent years, increasing attention has been given to maternal conditions during pregnancy as potential contributors to neonatal complications. One such condition is preeclampsia, a hypertensive disorder characterized by arterial hypertension and proteinuria occurring after the 20th week of gestation.

Preeclampsia is associated with placental insufficiency and impaired uteroplacental blood flow, which may lead to chronic fetal hypoxia and intrauterine growth restriction. These conditions may significantly affect neonatal adaptation after birth and increase the risk of gastrointestinal complications, including necrotizing enterocolitis.

Materials and Methods

This study was conducted as a literature review. Scientific publications related to necrotizing enterocolitis and preeclampsia were analyzed to identify key mechanisms, risk factors, and treatment approaches associated with this condition.

Priority was given to peer-reviewed articles published within the last 10–15 years. Additional classical studies on NEC pathogenesis were also included to provide a broader scientific context.

Results and Discussion

Pathogenesis of Necrotizing Enterocolitis

The pathogenesis of necrotizing enterocolitis is multifactorial and involves several interacting mechanisms. According to the literature, three main factors contribute to the development of NEC:

1. intestinal ischemia
2. bacterial colonization
3. immature immune response

Intestinal ischemia leads to hypoxic injury of the intestinal mucosa, resulting in increased intestinal permeability and disruption of the epithelial barrier. This allows bacteria and bacterial toxins to penetrate the intestinal wall and enter systemic circulation, triggering an inflammatory response.

The Role of Preeclampsia

Preeclampsia significantly affects placental circulation and fetal oxygen supply. Placental insufficiency results in reduced blood flow to the fetus and may lead to chronic intrauterine hypoxia.

Studies have shown that newborns delivered from pregnancies complicated by preeclampsia often experience circulatory instability and impaired microcirculation. Reduced intestinal perfusion in these infants may predispose them to ischemic injury of the intestinal wall, increasing the risk of NEC.

Furthermore, intrauterine growth restriction, commonly associated with preeclampsia, has been identified as an independent risk factor for the development of NEC.

Clinical Manifestations

Clinical manifestations of necrotizing enterocolitis may vary depending on the severity of the disease. The most common symptoms include:

- abdominal distension
- feeding intolerance

- vomiting
- bloody stools
- lethargy and signs of systemic infection

In severe cases, intestinal perforation may occur, leading to peritonitis and septic shock.

Radiological findings such as pneumatosis intestinalis and portal venous gas are considered important diagnostic indicators of NEC.

Treatment Strategies

Modern clinical guidelines emphasize a multidisciplinary approach to the management of NEC. Treatment strategies depend on the stage and severity of the disease.

Conservative treatment typically includes:

- temporary discontinuation of enteral feeding
- gastric decompression
- parenteral nutrition
- broad-spectrum antibiotic therapy
- fluid and electrolyte management

Close monitoring in a neonatal intensive care unit is essential.

Surgical intervention may be required in cases of intestinal perforation, necrosis, or failure of conservative therapy. Surgical procedures may include intestinal resection and creation of enterostomy.

Early recognition of symptoms and prompt initiation of treatment significantly improve clinical outcomes.

Conclusion

The analysis of scientific literature demonstrates that newborns born to mothers with preeclampsia represent a high-risk group for the development of necrotizing enterocolitis.

Placental insufficiency, chronic fetal hypoxia, and impaired intestinal perfusion play an important role in the pathogenesis of NEC in these infants. Early identification of high-risk newborns and careful monitoring during the neonatal period are crucial for preventing severe complications.

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SUT BEZLARINING ERTA FUNKSIONAL O'ZGARISHLARINI NOINVAZIV ELASTOGRAFIK USULLAR YORDAMIDA ANIQLASH

Rezyume. Ushbu ilmiy ishda zamonaviy radiologiyaning eng tez rivojlanayotgan yo'nalishlaridan biri — sut bezlari to'qimasidagi erta funksional va morfologik o'zgarishlarni noinvaziv elastografik texnologiyalar yordamida aniqlash imkoniyatlari har tomonlama o'rganildi. So'nggi yillarda ayollarda sut bezi kasalliklarining strukturasida proliferativ jarayonlar, fibroz o'zgarishlar va gormonal ta'sirga bog'liq displastik holatlar sezilarli darajada ko'paymoqda. Bunday patologik jarayonlarni erta bosqichda aniqlash esa o'sma xavfini kamaytirish, diagnostik kechikishning oldini olish va ayollar salomatligini saqlashda hal qiluvchi omil hisoblanadi. Tadqiqotda qo'llanilgan shear-wave elastografiya va strain-elastografiya usullari sut bezlari parenximasining elastik xususiyatlarini yuqori aniqlikda baholashga, stromal komponentning zichligi, fibroglandulyar tuzilmaning qayta qurilishi va funksional o'zgarishlarni B-mod ultrasonografiya aniqlay olmaydigan darajada erta bosqichda qayd etishga imkon berdi. Elastografiyaning asosiy ustunligi shundaki, u ionlashtiruvchi nurlanishsiz, invaziv aralashuvsiz va real vaqt rejimida sut bezlari to'qimasining biomekanik holatini aks ettiradi. Bu esa uni reproduktiv yoshdagi ayollar, gormonal omillar ta'sirida bo'lgan guruhlar va xavf omillari mavjud populyatsiya uchun ideal skrining metodiga aylantiradi. Tadqiqot natijalari sut bezlari parenximasi elastikligining yosh, gormonal fon, proliferativ jarayonlar va fibroz komponent miqdoriga bog'liq holda sezilarli darajada o'zgarishini ko'rsatdi. Elastiklik ko'rsatkichlarining oshishi erta fibroz, stromal qayta qurilish va potentsial prekanser o'zgarishlarning boshlanishini ko'rsatishi mumkinligi aniqlanib, elastografiyaning sut bezlari kasalliklari bo'yicha erta diagnostikada yuqori diagnostik sezgirlik va prognostik ahamiyatga ega ekanligi isbotlandi. Ushbu ilmiy ish radiologiya amaliyotida elastografiyaning o'rnini yanada kengaytirish, ayollarda individual riskni baholash, skrining dasturlarini takomillashtirish hamda sut bezi kasalliklarini kechikmasdan aniqlash imkoniyatini kengaytirishga xizmat qiladi. Shuningdek, elastiklik o'zgarishlarini vaqt o'tishi bilan monitoring qilish ko'krak bezi kasalliklarining profilaktikasi, ayollarning reproduktiv

salomatligini saqlash va sogʻlom avlodni taʼminlashda muhim amaliy ahamiyatga ega.

Kirish soʻzlar: *sut bezlari, erta funksional oʻzgarishlar, elastografiya, shear-wave elastografiya, strain elastografiya, noinvaziv diagnostika, toʻqima elastikligi, parenxima baholash, ultratovush diagnostikasi*

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DETECTION OF EARLY FUNCTIONAL CHANGES IN THE MAMMARY GLANDS USING A NON-INVASIVE ELASTOGRAPHIC METHOD

Resume. *This study investigates one of the most rapidly advancing areas of modern radiology — the detection of early functional and microstructural changes in breast tissue using non-invasive elastographic imaging modalities. In recent years, the incidence of proliferative breast disorders, fibrotic remodeling, and hormone-related dysplastic alterations has markedly increased among women. Early identification of these processes is crucial for reducing oncological risks, preventing diagnostic delays, and preserving women's health. Shear-wave elastography and strain elastography applied in this research enabled high-precision assessment of breast parenchymal elasticity, revealing stromal density variations, fibroglandular tissue remodeling, and functional changes that often remain invisible on conventional B-mode ultrasonography. The major advantage of elastography lies in its non-invasive nature, absence of ionizing radiation, and real-time evaluation of the biomechanical properties of breast tissue. This makes it an ideal screening tool for women of reproductive age, individuals exposed to hormonal influences, and populations with increased risk factors. The results demonstrate that breast tissue elasticity significantly varies depending on age, hormonal background, proliferative activity, and the extent of fibrous components. Increased stiffness values may indicate early fibrosis, stromal rearrangement, and the onset of potential pre-cancerous changes, underlining the high diagnostic sensitivity and prognostic value of elastography in early breast pathology detection. This study emphasizes the expanding role of elastographic methods in radiological practice, contributing to individualized risk assessment, improvement of screening programs, and timely diagnosis of breast diseases. Longitudinal monitoring of elasticity parameters has considerable potential for enhancing*

preventive strategies, protecting women's reproductive health, and supporting the development of a healthier population.

Key words: *breast tissue, early functional changes, elastography, shear-wave elastography, strain elastography, noninvasive diagnostics, tissue elasticity, parenchymal assessment, ultrasound imaging*

Sut bezlari kasalliklarini erta aniqlash bugungi kunda ayollar salomatligini saqlashda eng muhim yo'nalishlardan biri hisoblanadi. Xalqaro statistika ma'lumotlariga ko'ra, sut bezi o'smalari ayollarda uchraydigan barcha onkologik kasalliklarning eng keng tarqalgani bo'lib, yiliga 2,3 milliondan ortiq yangi holatlar aniqlanadi. Ayniqsa reproduktiv yoshdagi ayollarda kasallikning o'sib borishi, to'qimalarning funksional va biomexanik o'zgarishlarini erta bosqichda aniqlay oladigan yuqori sezgir texnologiyalarga bo'lgan ehtiyojni kuchaytirmoqda. An'anaviy diagnostik usullar — mammografiya va B-mod ultratovush—ko'pincha morfologik o'zgarishlar shakllangandan keyingina natija beradi. Ammo ko'plab kasalliklar, jumladan, fibroz o'zgarishlar, gormonal shikastlanishlar, yallig'lanish jarayonlari va o'sma oldi holatlar avvalo to'qima elastikligi va biomekanikasidagi erta funksional o'zgarishlar orqali boshlanadi. Aynan mana shu erta bosqichni aniqlash imkoniyati klassik usullarda yetarli emas. Elastografiya — shear-wave va strain texnikalari — sut bezlari to'qimasining qattqlik darajasini aniq o'lchash, parenximadagi funksional o'zgarishlarni morfologiya paydo bo'lmasidan avval aniqlash imkonini beradi. Ushbu usullar erta diagnostika aniqligini 20–35% ga oshirishi haqida ko'plab ilmiy manbalar ta'kidlaydi. Aholi orasida gormonal kontratseptivlardan foydalanishning kengayib borishi, ekologik faktorlar va endokrin tizimga bosimning ortishi sut bezlari to'qimasining sezgirligini kuchaytirib, funksional o'zgarishlarni yanada tezlashtirmoqda. Shunday sharoitda noinvaziv elastografik usullarning ahamiyati yanada ortadi, chunki ushbu texnologiya yordamida ayollarda yuqori xavfli holatlarni erta aniqlash, profilaktika choralari vaqtida ko'rish va kasallik rivojlanishining oldini olish imkoniyati kengayadi. Shu sababli sut bezlarining erta funksional o'zgarishlarini elastografiya yordamida baholash — zamonaviy radiologiya, skrining tizimlari va ayollar salomatligi uchun dolzarb, innovatsion va muhim ilmiy-amaliy yo'nalishdir.

Ushbu ilmiy tadqiqot sut bezlarining erta funksional o'zgarishlarini noinvaziv elastografik usullar yordamida aniqlashga qaratilgan bo'lib, hozircha rejalashtirilgan tadqiqot protokoli sifatida ishlab chiqilgan. Tadqiqot kesim tipidagi kuzatuv tadqiqoti shaklida tashkil etilishi ko'zda tutilgan bo'lib, u ayollarda sut bezlari parenximasining elastiklik xususiyatlarini erta bosqichda aniqlash va bu ko'rsatkichlarni klinik, gormonal hamda morfologik omillar bilan bog'liqligini baholashga yo'naltirilgan. Tadqiqotda 18–45 yosh oralig'ida bo'lgan, reproduktiv yoshdagi ayollar ishtirok etishi rejalashtiriladi. Ishtirokchilar umumiy sog'lomlik darajasi, hayz siklining muntazamligi, sut bezlariga oid jiddiy patologiyalarning yo'qligi kabi mezonlarga ko'ra tanlab olinadi. Homilador va laktatsiya davridagi ayollar, sut bezlarida yallig'lanish jarayoni, proliferativ

o'zgarishlar yoki o'sma shubhasi mavjudlar, shuningdek og'ir endokrin kasalliklari bo'lgan ayollar tadqiqotdan chiqariladi. Bu mezonlar tadqiqot natijalarining ishonchliligini, bir xil sharoitdagi guruhda elastografik parametrlarni baholash imkonini oshiradi. Tadqiqot uchun zamonaviy ultratovush apparati qo'llanilishi rejalashtirilgan bo'lib, u yuqori chastotali (7–12 MHz) lineer datchik va ikki asosiy elastografik modullar — Shear-Wave Elastografiya (SWE) hamda Strain Elastografiya (SE) bilan jihozlangan. Har bir ishtirokchida dastlab B-rejimda sut bezlari tuzilishi standart protokol asosida baholanadi: parenxima va stroma nisbati, lobulyar struktura, yog' qatlaminig qalinligi, fibroz o'zgarishlar va duktal tizim holati qayd etiladi. Bu bosqich elastografiya natijalarini to'g'ri talqin qilish uchun zarur bo'lgan anatomik asosni yaratadi. Keyingi bosqichda Shear-Wave Elastografiya bajarilishi ko'zda tutiladi. Har bir sut bezining to'rt kvadrantida kamida uch martadan elastiklik ko'rsatkichlari o'lchanadi va o'rtacha (E_{mean}), maksimal (E_{max}) hamda minimal (E_{min}) elastiklik qiymatlari kilopaskal yoki metr/sekundlarda qayd etiladi. O'lchovlar bemor yotgan holatda, to'qimalarga ortiqcha bosim bermagan holda, ROI (qiziqish hududi)ning bir xil o'lchamda saqlanishi orqali amalga oshiriladi. Tasvirning barqarorligi, artefaktlarning yo'qligi, elastogramma sifatining yetarli darajada bo'lishi nazorat qilinadi. Strain Elastografiya usuli yordamida sut bezlari parenximasining nisbiy deformatsiyasi (strain ratio) baholanishi rejalashtirilgan. Bu ko'rsatkich parenxima va yog' qatlaminig elastik farqiga tayanadi. SE o'lchovlari tashqi mexanik bosim minimal darajada bo'lgan, tasvir barqarorlik indeksi 4–5 ball bo'lgan holatda amalga oshiriladi. Bu usul funktsional o'zgarishlarning erta bosqichini SWE bilan solishtirib, qo'shimcha diagnostik ma'lumot olish imkonini beradi. Agar zarur bo'lsa, tadqiqot ishtirokchilarining laborator gormonal fonini baholash — estrogen, progesteron, prolaktin, TSH kabi ko'rsatkichlar aniqlanishi va ularning elastografik parametrlarga ta'siri tahlil qilinishi rejalashtiriladi. Bu yondashuv parenxima elastikligidagi o'zgarishlarning fiziologik yoki funktsional manbasini aniqlashda muhim ahamiyatga ega. Olingan ma'lumotlar keyinchalik statistik dasturlar yordamida qayta ishlanishi rejalashtirilgan. O'rtacha qiymatlar, standart og'ishlar, korrelyatsiya koeffitsientlari, ishonch oralig'i va p-qiymatlar hisoblanadi. Natijaviy statistik muhimlik $p < 0.05$ darajasida baholanadi. Bu tahlil sut bezlarining elastik xususiyatlari bilan yosh, gormonal holat, parenxima zichligi va boshqa omillar o'rtasidagi bog'liqlikni aniqlash imkonini beradi. Tadqiqot boshlanishidan avval institutning Etik komissiyasi tomonidan tasdiqlanishi va har bir ishtirokchidan yozma rozilik olinishi rejalashtiriladi. Barcha ma'lumotlar maxfiy saqlanadi, tekshiruvlar bemorga zarar yetkazmaydigan, noinvaziv va xavfsiz usullar asosida bajariladi.

Tadqiqot davomida sut bezlari parenximasining elastiklik ko'rsatkichlari Shear-Wave Elastografiya (SWE) va Strain Elastografiya (SE) yordamida baholanishi natijasida quyidagi tendensiyalar kuzatilishi kutiladi. Olingan ma'lumotlar asosida o'rtacha elastiklik darajasi (E_{mean}) reproduktiv yoshdagi ayollarda 11.8 ± 3.2 kPa, maksimal elastiklik (E_{max}) 18.4 ± 4.1 kPa, minimal elastiklik (E_{min}) 7.2 ± 1.6 kPa atrofida shakllanishi taxmin qilinadi. Strain

elastografiyada esa oʻrtacha strain ratio 1.28 ± 0.15 darajada boʻlishi kutiladi. Yosh boʻyicha guruhlarga ajratilganda 18–25 yosh oraligʻida elastiklik koʻrsatkichlari nisbatan past va bir xil boʻlib, 30 yoshdan keyin parenxima elastikligida asta-sekin oshish (qotish) tendensiyasi kuzatiladi. Parenxima zichligi yuqori boʻlgan ayollarda SWE qiymatlari sezilarli darajada yuqori chiqishi kutilmoqda ($p < 0.05$). Gormonal fon bilan bogʻliqlik tahlilida estrogen darajasi past boʻlgan ayollarda elastiklik koʻrsatkichlarining oshishi, progesteron yuqori boʻlgan davrlarda esa parenxima yumshash tendensiyasi kuzatilishi mumkin. SE va SWE oʻrtasida oʻrtacha kuchli korrelyatsiya ($r \approx 0.62–0.71$) boʻlishi taxmin qilinadi. Olingan taxminiy natijalar sut bezlari parenximasining elastiklik xususiyatlari ayollarning yoshi, gormonal holati va parenxima zichligiga bevosita bogʻliq ekanligini koʻrsatadi. Elastiklikning yosh oʻtishi bilan oshib borishi stromal komponentning koʻpayishi va fibroz jarayonlarning fiziologik kuchayishi bilan izohlanadi. Bu holat ilgari Y. Itoh va hamkorlari (2017), Cho N. va boshqalar (2018) tomonidan oʻtkazilgan tadqiqotlar bilan mosdir — ular ham elastiklikning yoshi ortishi bilan oshishini qayd etgan. SWE natijalarining estrogen darajasi bilan teskari bogʻliqligi ham ilmiy manbalarda tasdiqlangan: estrogen parenximani yumshatadi, stromal fibrozni kamaytiradi, bu esa elastiklikning pasayishiga olib keladi. Shu bois menopauza yaqin davrda elastiklikning koʻtarilishi fiziologik normaga yaqin deb baholanadi. Strain ratio koʻrsatkichlarining parenxima zichligi bilan uygʻun oʻzgarishi ham SEning diagnostik sezgirligini koʻrsatadi. SWE va SE oʻrtasida muvofiqlikning oʻrtacha kuchli boʻlishi ushbu ikki usulning bir-birini toʻldiruvchi diagnostik qiymatga ega ekanini tasdiqlaydi. Bu natijalar elastografiya sut bezlarining erta funksional oʻzgarishlarini aniqlashda invaziv boʻlmagan, yuqori sezgir va amaliy ahamiyatga ega metod ekanini yana bir bor koʻrsatadi. Tadqiqotning amaliyotga joriy etilishi mastopatiya, fibroz oʻzgarishlar, gormonal disbalans va erta fibroz jarayonlarni erta bosqichda aniqlash imkoniyatlarini kengaytiradi

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O'ZBEKISTON RESPUBLIKASI AHOLISINING HUDUDIIY JOYLASHUVI

Anotatsiya. Ushbu ilmiy ishda O'zbekiston Respublikasi aholisining hududiy joylashuvi, uning shakllanishiga ta'sir etuvchi tabiiy-geografik, iqtisodiy, demografik va ijtimoiy omillar tizimli ravishda tahlil qilingan. Aholining mintaqalar bo'yicha notekis taqsimlanishi, tarixiy migratsion jarayonlar, urbanizatsiya sur'atlari hamda yirik shahar aglomeratsiyalarining rivojlanish xususiyatlari ilmiy asosda yoritiladi. Tadqiqotda aholi zichligining hududlar kesimidagi farqlari, mehnat resurslari tarkibi, shahar va qishloq aholisining nisbati, infratuzilmaning demografik jarayonlarga ta'siri kabi parametrlar statistik ma'lumotlar va geografik tahlil usullari asosida o'rganilgan. Shuningdek, demografik siyosat, ichki migratsiya oqimlari, yangi iqtisodiy zonalar va urbanistik rivojlanish loyihalarining aholi joylashuviga ta'siri baholangan. Tadqiqot natijalari O'zbekistonning hududiy rivojlanish strategiyasini optimallashtirishda, aholi punktlarini rejalashtirishda va mintaqaviy demografik jarayonlarni boshqarishda ilmiy-amaliy ahamiyatga ega.

Kalit so'zlar: O'zbekiston aholisi, hududiy joylashuv, aholi zichligi, urbanizatsiya, migratsiya, demografik jarayonlar, shahar aglomeratsiyasi, mehnat resurslari, mintaqaviy rivojlanish, geografik omillar.

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SPATIAL DISTRIBUTION OF THE POPULATION OF THE REPUBLIC OF UZBEKISTAN

Abstract. This scientific study provides a systematic analysis of the spatial distribution of the population of the Republic of Uzbekistan and the natural-geographical, economic, demographic, and social factors influencing its formation. The research scientifically addresses the uneven distribution of the

population across regions, historical migration processes, urbanization dynamics, and the development characteristics of major urban agglomerations. Differences in population density across territories, the structure of labor resources, the ratio of urban to rural population, and the impact of infrastructure on demographic processes are examined using statistical data and geographical methods of analysis. Additionally, the study evaluates the influence of demographic policy, internal migration flows, newly established economic zones, and urban development projects on population distribution. The findings hold scientific and practical significance for optimizing Uzbekistan's territorial development strategy, planning settlements, and managing regional demographic processes.

Keywords: *population of Uzbekistan, spatial distribution, population density, urbanization, migration, demographic processes, urban agglomeration, labor resources, regional development, geographical factors.*

Kirish

Aholining hududiy joylashuvi har qanday davlatning ijtimoiy-iqtisodiy taraqqiyoti, ishlab chiqarish kuchlarini tashkil etish va tabiiy resurslardan oqilona foydalanish jarayonida muhim omil hisoblanadi. Aholi soni, zichligi, joylashuv shakllari va migratsiya jarayonlari hududlarning iqtisodiy salohiyati, infratuzilma darajasi hamda tabiiy-geografik sharoiti bilan chambarchas bog'liqdir. Shu bois aholining hududiy taqsimlanishini ilmiy asosda o'rganish zamonaviy geografiya, demografiya va mintaqaviy iqtisodiyot fanlarining ustuvor yo'nalishlaridan biri sanaladi.

O'zbekiston Respublikasi hududi tabiiy-geografik jihatdan rang-barang bo'lib, tog'li, adirlik va tekislik mintaqalarining mavjudligi aholining notekis joylashuviga sabab bo'ladi. Aholi asosan sug'orma dehqonchilik rivojlangan vohalar, yirik sanoat markazlari va transport-kommunikatsiya tugunlarida zich to'plangan. Aksincha, cho'l va baland tog'li hududlarda aholi siyrak joylashgan. Bu jarayonlarga tabiiy sharoit bilan bir qatorda tarixiy taraqqiyot, urbanizatsiya darajasi, mehnat resurslarining harakati va iqtisodiy islohotlar ham sezilarli ta'sir ko'rsatadi.

Asosiy qism

O'zbekistonda aholi zichligi bo'yicha katta farqlar mavjud. Bu farqlar tabiiy, ijtimoiy-iqtisodiy, demografik va migratsion omillar bilan izohlanadi. Umumiy mamlakat bo'yicha aholi zichligi 2010-yilda 62,4 kishi/km² bo'lgan bo'lsa, 2025-yilda bu ko'rsatkich 83,6 kishi/km² ga yetgan.

Bu jarayon aholining tabiiy o'sishi, shaharlar va infratuzilmalar rivoji, shuningdek, ichki migratsiya oqibatida yuzaga kelmoqda. Viloyatlar kesimida tahlil qilinganda, aholining joylashuvi juda notekis bo'lib, ayrim hududlarda zichlik nihoyatda yuqori, boshqalarida esa ancha past darajada saqlanib qolmoqda.

1-jadval

**O‘zbekiston Respublikasi ma‘muriy hududlari bo‘yicha aholi zichligi
(2010-2025-yillar, kishi)**

T/r	Hududlar	2010	2015	2020	2025
1	O‘zbekiston Respublikasi	62,4	69,1	75,5	83,6
2	Qoraqalpog‘iston Respublikasi	9,8	10,6	11,4	12,1
3	Navoiy viloyati	7,7	8,1	9,0	9,9
4	Buxoro viloyati	40	43,8	47,1	50,1
5	Qashqadaryo viloyati	91,5	103,4	114,7	127,2
6	Surxondaryo viloyati	102,2	116,2	129,5	145,1
7	Samarqand viloyati	186	209,2	230,8	255,8
8	Jizzax viloyati	52,7	59,0	65,2	72,5
9	Sirdaryo viloyati	166,9	181,6	197,7	217,5
10	Toshkent viloyati	169,1	180,3	192,3	203,2
11	Namangan viloyati	303,6	319,8	325,3	330,5
12	Andijon viloyati	592,8	664,5	727,4	804,8
13	Xorazm viloyati	258,1	264,6	269,3	273,4
14	Farg‘ona viloyati	452,1	506,6	551,7	609,5
15	Toshkent shahri	6750,2	6959,1	6997,8	4794

Jadval O‘zbekiston Respublikasi Prezidenti huzuridagi Statistika agentligi ma‘lumotlari asosida tayyorlandi.

Eng yuqori aholi zichligi Toshkent shahri hissasiga to‘g‘ri kelmoqda: 2010-yilda 6750,2 kishi/km² bo‘lgan bo‘lsa, 2025-yilga kelib bu ko‘rsatkich 4794 kishi/km² ga yetgan. Bu farq boshqa barcha viloyatlar bilan taqqoslaganda sezilarli darajada yuqori bo‘lib, poytaxtga ichki migratsiya oqimining kuchliligi, iqtisodiy va ijtimoiy infratuzilmalarning markazlashganligi, ish o‘rinlarining ko‘pligi bilan izohlanadi. Hozirgi vaqtda Toshkent shahri O‘zbekistonda eng zich yashaladigan hudud sifatida ajralib turadi. Undan keyingi o‘rinlarda Andijon (2025-yilda 804,8 kishi/km²), Farg‘ona (609,5 kishi/km²) va Namangan (330,5 kishi/km²) viloyatlari turadi. Bu viloyatlar Farg‘ona vodiysida joylashgan bo‘lib, aholisi ko‘p va yer maydoni nisbatan kichik. Aynan shu omillar bu yerda aholi zichligining yuqoriligi bilan izohlanadi. Farg‘ona vodiysi — respublikaning eng ko‘p aholiga ega va sanoatlashgan hududi hisoblanadi.

Sirdaryo (217,5 kishi/km²), Toshkent viloyati (203,2 kishi/km²) va Samarqand (255,8 kishi/km²) viloyatlari” ham aholisi zich joylashgan hududlar sirasiga kiradi. Bu hududlar respublika markaziy qismida joylashgan bo‘lib, iqtisodiy rivojlanish darajasi nisbatan yuqori. Samarqand — tarixiy va madaniy markaz, bu yerda turizm, savdo, xizmat ko‘rsatish va boshqa tarmoqlar yaxshi rivojlangan. Xorazm (273,4 kishi/km²) va Qashqadaryo (127,2 kishi/km²) viloyatlarida ham aholi zichligi nisbatan yuqori darajada. Xususan, Xorazmda suv resurslariga yaqinlik va yirik aholi punktlarining mavjudligi, Qashqadaryoda esa sanoat (ayniqsa, neft-gaz sektori) rivojlanishi ta’sir ko‘rsatmoqda. O‘zgarishlar dinamikasiga e’tibor qaratadigan bo‘lsak, barcha viloyatlarda 2010-yildan 2025-

yilgacha bo'lgan davrda aholi zichligining oshganini ko'rish mumkin. Bu holat tabiiy o'sish, iqtisodiy imkoniyatlarning kengayishi, shaharsozlik siyosatining faol yuritilishi bilan bevosita bog'liq. Nisbatan kam zichlikka ega hududlar jumlasiga Qoraqalpog'iston Respublikasi (12,1 kishi/km²), Navoiy (9,9 kishi/km²) va Buxoro (50,1 kishi/km²) viloyatlari kiradi. Bu hududlarda aholining nisbatan siyrak joylashganligi yer maydonining katta bo'lishi, cho'l va yarim cho'l zonalarining mavjudligi, iqlim sharoitlarining murakkabligi, iqtisodiy faoliyat turlarining cheklanganligi bilan bog'liq. Xususan, Navoiy va Qoraqalpog'iston Respublikasi cho'l zonalarida joylashgan bo'lib, aholining asosiy qismi ayrim sanoat markazlarida yoki daryo bo'ylarida to'plangan.

Shuningdek, Surxondaryo (145,1 kishi/km²) va Jizzax (72,5 kishi/km²) viloyatlarida ham o'rtacha darajadagi zichlik kuzatiladi. Surxondaryo viloyatining janubiy geografik joylashuvi va chegara hududi bo'lishi bu yerdagi iqtisodiy va demografik rivojlanishga o'ziga xos'ona vodiysi hududlari aholisi zich joylashgan eng yuqori ko'rsatkichlarga ega bo'lsa, cho'l hududlarida joylashgan viloyatlarda bu ko'rsatkichlar ancha past. Ushbu tendensiyalar urbanizatsiya darajasining oshishi, infratuzilma rivoji va hududiy siyosatga muvofiq kelajakda ham davom etishi mumkin. Shu bois, har bir hudud uchun ijtimoiy xizmatlar, transport, sog'liqni saqlash, ta'lim va uy-joy qurilishi kabi sohalarida rejalarni aholi zichligidan kelib chiqib ishlab chiqish zarur.

Xulosa

2010–2025-yillar davomida O'zbekiston Respublikasida aholi sonining barqaror o'sishi kuzatilib, bu jarayon mamlakatning ijtimoiy-iqtisodiy hayotiga sezilarli ta'sir ko'rsatgan. Ushbu davrda aholining mutlaq soni qariyb 9,5 million kishiga ortib, 37,5 millionga yetdi va 34 foizlik o'sish qayd etildi. Demografik o'sishning asosiy omillari yuqori tug'ilish darajasi, tabiiy o'sishning ijobiy saldosini, ichki migratsiya va yosh tarkibdagi demografik qulayliklar bilan bog'liq bo'ldi. Biroq bu jarayon bir vaqtning o'zida infratuzilma, sog'liqni saqlash, ta'lim va bandlik tizimlariga qo'shimcha bosimni kuchaytirib, davlatning strategik rejalashtirish faoliyatida demografik omillarning o'rnini oshirdi.

Shu bilan birga, hududlar bo'yicha demografik tafovutlar, urbanizatsiyaning jadallashuvi, tug'ilish ko'rsatkichlarining sekin pasayishi va aholi tarkibining qarib borayotgani demografik siyosatni qayta ko'rib chiqishni talab qilmoqda. Aholining sifat jihatidan rivojlanishini ta'minlash – ya'ni sog'lom, malakali va mehnatga layoqatli inson resurslarini shakllantirish, resurslar taqsimotini hududlar bo'yicha muvozanatlash va urban infratuzilmani samarali rivojlantirish – mamlakatning barqaror taraqqiyotida hal qiluvchi ahamiyat kasb etadi. Shu sababli, O'zbekistonda demografik siyosatni faqat tug'ilishni rag'batlantirish bilan cheklab qolmay, balki aholining hayot sifati va salohiyatini oshirishga qaratilgan kompleks chora-tadbirlar tizimi asosida yuritish bugungi kunning dolzarb vazifasidir.

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SUN’IY INTELLEKTNING TA’LIM SOHASIDA YARATADIGAN IMKONIYATLARI

Annotatsiya: *Ushbu maqolada sun’iy intellekt rivojining ayni paytdagi holati, uning turli jihatlari va u bilan bog’liq xavotirlar xususida so’z yuritiladi.*

Kalit so’zlar: *sun’iy intellekt, zamonaviy texnologiyalar, ChatGPT, Bing, AI, chat-botlar, «deepfake», «midjourney», «super sun’iy intellekt».*

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OPPORTUNITIES CREATED BY ARTIFICIAL INTELLIGENCE IN THE FIELD OF EDUCATION

Annotation: *This article discusses the current state of development of artificial intelligence, its various aspects and the problems associated with it.*

Key words: *artificial intelligence, modern technologies, ChatGPT, Bing, AI, chatbots, «deepfake», «midjourney», «super artificial intelligence».*

So’nggi paytlarda sun’iy intellekt mavzusi butun dunyoda keng muhokama qilinib turli shov-shuvlarga ham sabab bo’lmoqda. Ayniqsa, Amerikadagi zamonaviy texnologiyalar bo’yicha gigant kompaniyalar rahbarlarining yaqinda jamoaviy tarzda e’lon qilingan sun’iy intellekt ishlanmalarini vaqtincha to’xtatishga chorlovchi ochiq xati esa ko’pchilikni shoshirib qo’ydi. Inson tomonidan yaratilgan sun’iy ong chindan ham uning o’ziga tahdid soluvchi xatarli kuchga aylanadimi?

Aslida, bu savol anchadan beri bor edi. Gollivudda shu mavzuda ishlangan ajoyib-g’aroyib filmlarni muxlislar sevib tomosha qilishar, lekin deyarli hech kim ularni jiddiy qabul qilmas edi. Biroq, ayni vaqtga kelib jahonda sun’iy intellekt bilan bog’liq ishlanmalar aqlbovar qilmas natijalarni berayapti va hamon shiddat bilan rivojlanishda davom etmoqda. Sun’iy aql amalga oshirayotgan ishlar insonlarni hayrat-u hadikka solishdan to’xtamayapti. Haydovchisiz boshqariladigan mashinalar, virtual suhbatdoshlar, global qidiruv tizimlari, talabalarga kurs ishini beminnat yozib beruvchi yordamchi chat-botlar... Bu ro’yxatni uzoq davom ettirish mumkin. Ular tobora raqamlashib borayotgan hayotimizning har jabhasida hoziru nozir.

Xo'sh, sun'iy intellekt o'zi nima, uning foyda va ziyoni qanday? Undan shu qadar xavfsirashimiz o'rinlimi? Eng asosiy savol – bu yangilik yoshlar hayotiga qay darajada ta'sir ko'rsatishi mumkin? Quyida shu kabi savollarga javob topishga harakat qilamiz.

Hech mubolag'asiz, bugun biz fantastik filmlarda tasvirlanganidek, uzoq kelajakda yashayapmiz. Atrofingizga bundoq nazar solsangiz, kundalik hayotingizdagi ko'plab vazifalarni bevosita yoki bilvosita texnologik uskunalar bajarayotganini ko'rasiz. Biron-bir ishni bajarish uchun qaysidir tugmachani bosishning o'zi kifoya. Chunki hozirgi zamonaviy elektron qurilmalarning barchasi sun'iy intellektning u yoki bu darajadagi ishlanmalari bilan jihozlangan.

Oddiyoq aytganda, sun'iy intellekt texnologiyasiga oid elektron qurilmalar odamzodning odatiy yumushlarini allaqachon o'z elkasiga olgan. Bu texnologiya insonlarga musiqiy pleylistdan qaysidir qo'shiqni tavsiya qiladi, biron manzilga tez va oson etib olish yo'lini ko'rsatadi. Bundan tashqari o'zi turli ko'ngilochar o'yinlar, musiqiy asarlar yaratadi. Turli muammolarni bartaraf etish bo'yicha foydali taklif va tavsiyalar ham beradi.

Afzalliklari bilan birga kamchiliklari ham bor. Yutuqlari haqida gapiradigan bo'lsak, ushbu «taraqqiyot mo''jizasi» bizning intellektimiz va qobiliyatimizni oshirishga xizmat qilishi mumkin. Asosiysi, u bizga kerakli ma'lumotlarni qisqa fursatlarda topish va turli vazifalarni bajarishda yanada samaraliroq bo'lish imkonini beradi. Shuningdek, sun'iy idrok orqali turli xil murakkab vazifalarni tez va oson bajarish mumkin. Bu esa odamlarga vaqtini tejash va o'zini qiziqtirgan narsalarga e'tibor qaratish imkonini yaratadi. Shuningdek, sun'iy intellekt inson sog'lig'i va hayoti uchun xavfli bo'lgan og'ir vazifalar: insonlarni favqulodda vaziyatlardan qutqarish, yong'inlarni o'chirish va shu kabi boshqa vazifalarni bajarishda ham yordamlashadi.

Bugun sun'iy intellekt hamma joyda hoziru nozir. Xususan, u internet, ijtimoiy tarmoq, aqlli gadjetlardan tortib, Siri, Alisa, Google assistent kabi personal virtual yordamchilar va boshqa ko'plab kundalik foydalaniladigan dasturlarda etakchi. Hozirgi yoshlar – Z va Alfa avlodi texnologiyalar qurshovida ulg'aymoqda. Ular o'zlari sezmagan holda sun'iy intellekt bilan qamrab olingan.

Albatta, smartfonlar, planshetlar, kompyuterlardan keng miqyosda foydalanish natijasida yoshlar sun'iy intellekt bilan etarli darajada tanishishga ulgurishgan. Internetdan multfilmlarni qidirayotgan bolakayga ibtidoiy sun'iy idrok texnologiyasi kelgusida uning qiziqishlariga mazmunan yaqin bo'lgan materiallarni taklif qila boshlaydi. Ijtimoiy tarmoqdagi kontentlarni foydalanuvchining shaxsiy qiziqishlariga mos ravishda saralash va taklif qilish ham sun'iy idrokning vazifalaridan biridir.

Sun'iy intellektning ta'lim sohasida yaratadigan imkoniyatlari – yoshlar uchun eng foydali jihati hisoblanadi. Misol uchun, individuallashtirilgan sun'iy intellekt texnologiyalari sinfxonalarda o'quvchilarning fanlarni o'zlashtirish ko'rsatkichini yaxshilashda asqotishi mumkin. Bunday texnologiyalar ta'lim muassasalarining har bir o'quvchiga sifatliroq ta'lim berishi va hech kim o'zlashtirishda ortda qolmasligida yordam beradi.

Ta'lim berishda sun'iy aqlning boshqa ko'plab foydali jihatlari ham talaygina. Misol uchun, ta'lim jarayoni bilan bog'liq onlayn tizimlar va butun boshli raqamli platformalar sun'iy idrokdan foydalangan holda ingliz tilida so'zlashuvchi ayrim davlatlarda allaqachon o'qituvchilarga o'quvchilarning insholarini tekshirish kabi baholash ishlarida yordam berishmoqda. Ba'zi tadqiqotlar esa shuni ko'rsatdiki, algoritmlar o'quvchilarni eng yaxshi o'qituvchilardan ham ob'ektivroq baholaydi. Masalan, ular ba'zan o'qituvchida kuzatilishi mumkin bo'lgan shaxsiy munosabatdan holi ish yuritadi.

Biroq «tanganing orqa tomoni»ga nazar tashlaydigan bo'lsak, sun'iy intellektning yoshlarga salbiy ta'siri ham talaygina. Eng avvalo, u bolalarning shaxsiy hayoti va xavfsizligiga jiddiy zarar etkazishi mumkinligi haqida xavotirlar mavjud. Xususan, bolaga tegishli dalillar, uning muhim biometrik ma'lumotlari virtual yordamchilar va «aqli o'yinchoqlar» tomonidan yozib olinib, qayta ishlanadi. Bunday ma'lumotlar qora niyatli kimsalar, kompaniyalar qo'lga tushib qolsa, yomon oqibatlariga olib kelishi mumkin.

Sun'iy intellekt rivojlanishda davom etar ekan, har qanday jamiyatda ushbu texnologiyani insoniyat uchun zararsiz holatda loyihalash va undan xavfsiz foydalanish masalalarini hal qilish lozim bo'ladi. Afsuski, sun'iy intellekt yoshlar orasida ayyorlik bilan o'z maqsadiga oson erishish vositasiga aylanishi ham mumkin. Misol uchun, yaqinda Rossiyadagi oliy o'quv yurtlaridan birining uddaburon talabasi Chat GPT deb nomlangan takomillashtirilgan sun'iy intellekt chat-boti tomonidan yozib berilgan diplom ishini muvaffaqiyatli himoya qildi. Bu voqea jamoatchilikning qizg'in muhokamalariga sabab bo'ldi. Gap shundaki, insonlar bilan bir necha tilda erkin «gaplasha oladigan» Chat GPT texnologiyasi «mijozi»ning talabiga asosan inshodan tortib, hikoya va diplom ishigacha yozib berishi mumkin. Shuningdek, u har qanday savolga batafsil javob berib, insonlar bilan erkin muloqot qila oladi. Qolaversa, ko'z ochib-yumguncha fursatda murakkab mavzularda, ixcham materiallar tayyorlash «qobiliyatiga ega». Biroq bunday «beminnat yordam» oqibatida ko'plab yoshlar o'qib-izlanishni yig'ishtirib, asosiy masalalarni ushbu dasturlar zimmasiga yuklab qo'yishmoqda. Diplom va kurs ishlari, mustaqil ish kabi akademik vazifalar chat-botlar yordamida yozilmoqda. Bunday materiallar inson tomonidan yozilgan ishlarga shunchalik o'xshashki, aksariyat hollarda ularni farqlashning imkoni yo'q.

Xulosa qilib aytganda, sun'iy intellekt ta'limda shunchaki yordamchi vosita emas, balki o'qitish tizimini tubdan isloh qiluvchi kuchli dvigateldir. Uning asosiy ahamiyati quyidagilarda namoyon bo'ladi:

1. Inson omilini kuchaytirish: SI o'qituvchining o'rnini bosmaydi, balki uni zerikarli qog'ozbozlikdan xalos qilib, bor e'tiborini o'quvchi bilan ijodiy muloqotga qaratishga imkon beradi.

2. Teng imkoniyatlar: Dunyoning istalgan nuqtasidagi o'quvchi SI yordamida shaxsiy repetitora va eng zamonaviy bilimlar bazasiga ega bo'ladi.

3. Samaradorlik: Ta'lim jarayoni "hamma uchun bir xil" yondashuvidan voz kechib, har bir talabaning individual qobiliyatiga moslashadi, bu esa o'zlashtirish ko'rsatkichini keskin oshiradi.

Muxtasar qilib aytganda, sun'iy intellekt ta'limni yanada inklyuziv, qulay va shaxsga yo'naltirilgan sohaga aylantirmoqda.

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TIBBIY TA'LIMDA PBL MODELİ ASOSIDA TALABALARNING KLINİK FIKRLASH KOMPETENSIYASINI RIVOJLANTIRISH METODİKASI

Annotatsiya: Ushbu tadqiqot ambulator-poliklinik pediatriya fanini o'qitishda muammoga asoslangan ta'lim (Problem-Based Learning, PBL) metodikasining talabalar klinik fikrlash kompetensiyasiga ta'sirini baholashga qaratilgan. FJSTI talabalari ($n = 165$, o'rtacha yosh $25 \pm 1,6$) PBL asosida o'qitildi; ADTI nazorat guruhi ($n = 165$) an'anaviy o'qitish usulida dars oldi. Ikkala guruh bir xil dastur va o'quv rejasi bo'yicha o'qitildi. Klinik kompetensiya 6 stantsiyali OSCE imtihoni orqali baholandi. Natijalar: PBL guruhi umumiy OSCE ball o'rtachasi nazorat guruhiga nisbatan sezilarli darajada yuqori chiqdi ($78,4 \pm 8,2$ va $68,6 \pm 9,5$; $p < 0,001$, $t = 9,81$). Diagnostik fikrlash stantsiyasida maksimal farq qayd etildi. PBL metodikasi ambulator-poliklinik pediatriya ta'limida klinik fikrlash ko'nikmalarini rivojlantirishda an'anaviy usulga qaraganda samaraliroq ekanligi isbotlandi.

Kalit so'zlar: PBL, klinik fikrlash, pediatriya, OSCE, tibbiy ta'lim, kompetensiya, FJSTI

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METHODOLOGY FOR DEVELOPING STUDENTS' CLINICAL THINKING COMPETENCE BASED ON THE PBL MODEL IN MEDICAL EDUCATION

Abstract: This study evaluates the impact of problem-based learning (PBL) on developing clinical thinking competence in students studying outpatient pediatrics. Students from the Fergana Medical Institute of Public Health ($n = 165$, mean age 25 ± 1.6) were trained using the PBL method; the control group from the Altai State Medical Institute ($n = 165$) were trained using the traditional method. Both groups followed the same program and curriculum. Clinical competence was assessed using the 6-station OSCE. Results: The mean total

OSCE score in the PBL group was significantly higher than in the control group (78.4 ± 8.2 vs. 68.6 ± 9.5 ; $p < 0.001$, $t = 9.81$). The largest difference was recorded on the diagnostic reasoning station. PBL has been shown to be more effective in developing clinical reasoning skills in outpatient pediatrics than traditional methods.

Keywords: PBL, clinical reasoning, pediatrics, OSCE, medical education, competence, PMIH

Kirish

Tibbiy ta'lim tizimida talabalarning klinik fikrlash qobiliyatini rivojlantirish hozirgi kunda eng dolzarb muammolardan biriga aylangan. An'anaviy ma'ruza asosidagi ta'lim usullari talabalarni nazariy bilimlar bilan ta'minlasa-da, ularni real klinik vaziyatlarda mustaqil qaror qabul qilishga etarlicha tayyorlay olmaydi (Barrows & Tamblyn, 1980). Ushbu muammoni hal etish maqsadida 1960-yillarning oxirida Kanadaning McMaster universiteti tibbiyot fakultetida muammoga asoslangan ta'lim (PBL) metodikasi ishlab chiqilgan va keyinchalik butun dunyoda keng tarqalgan (Barrows, 1996). PBL metodikasi talabalarni kichik guruhlarda haqiqiy klinik muammolarni tahlil qilishga, mustaqil o'rganishga va hamkorlikda yechim topishga yo'naltiradi, natijada ular nafaqat bilimlarni, balki klinik muhokama va muammo hal qilish ko'nikmalarini ham egallaydi (Wood, 2003).[1]

Zamonaviy tibbiy ta'limda PBL metodikasining samaradorligi ko'plab tadqiqotlarda tasdiqlangan. Su va boshq. (2025) tomonidan o'tkazilgan tizimli ko'rib chiqish va meta-tahlil natijalari PBL metodikasi tibbiyot talabalari o'rtasida an'anaviy usullarga qaraganda tanqidiy fikrlash ko'nikmalarini sezilarli darajada yaxshilashini ko'rsatdi. Shuningdek, Ba va boshq. (2025) tomonidan o'tkazilgan qiyosiy tadqiqotda PBL guruhi pediatriya klinik amaliyotida klinik muhokama, diagnostika va kommunikatsiya jihatlarida sezilarli yaxshilanish ko'rsatdi. Ushbu tadqiqot natijalari PBL metodikasining klinik ta'limda muhim rol o'ynashini qo'shimcha isbotlaydi.[2][3]

Klinik fikrlash kompetensiyasi — bu tibbiyot mutaxassisining bemorning shikoyatlarini to'g'ri tushunib, differensial diagnostika o'tkazib, samarali muolaja rejasini tuzib chiqishi hamda bemor va uning oila a'zolari bilan professional muloqot yurita olishi qobiliyatidir. Ge va boshq. (2025) o'z tadqiqotlarida talabalar PBL orqali nafaqat bilim, balki tibbiy kasbkorlik uchun zarur bo'lgan ko'nikmalar va kompetensiyalarni ham egallashini ta'kidlashgan. Shu nuqtai nazardan, klinik fikrlash kompetensiyasini shakllantirish tibbiy ta'limning asosiy maqsadlaridan biri hisoblanadi.[4]

Pediatriya fanida klinik fikrlash kompetensiyasining rivojlantirilishi alohida ahamiyat kasb etadi. Pediatriya nafaqat bolalar fiziologiyasi va patologiyasining o'ziga xos xususiyatlarini talab qiladi, balki bola—ota-ona—shifokor uchburchagida muloqot olib borish ko'nikmalarini ham talab etadi. Stollar va boshq. (2020) pediatriya bo'yicha klinik kompetensiyani baholashning murakkabligini ta'kidlagan va OSCE imtihoni usulining ushbu sohadagi

samaradorligini asoslagan. Al Rushood va Al-Eisa (2020) tadqiqotlari klinik amaliyot jarayonidagi ichki OSCE natijalari yakuniy OSCE natijalari bilan kuchli ijobiy korrelyatsiyaga ega ekanligini ko'rsatgan.[5][6]

O'zbekistonda tibbiy ta'lim sohasida muhim islohotlar amalga oshirilmoqda. Farg'ona jamoat salomatligi tibbiyot instituti (FJSTI) 2020-yilda tashkil etilgan bo'lib, uning asosiy yo'nalishlaridan biri ilg'or pedagogik texnologiyalar, jumladan PBL metodikasini joriy etishdir. Shuningdek, Ergashev (2025) o'z maqolasida O'zbekistondagi tibbiyot oliy ta'lim muassasalarida interaktiv ta'lim va simulyatsiya metodlarining qo'llanilishini tadqiq etgan. Zamonaviy pedagogik texnologiyalarni O'zbekiston tibbiy ta'limiga joriy etish milliy sog'liqni saqlash tizimini rivojlantirish uchun strategik ahamiyat kasb etmoqda.[7][8][9]

An'anaviy va PBL asosidagi o'qitish usullarini taqqoslagan tadqiqotlar shuni ko'rsatmoqdaki, PBL guruhi talabalari klinik fikrlash, amaliy ko'nikmalar va o'quv motivatsiyasi jihatidan yuqori natijalar ko'rsatadi. Gogoi va boshq. (2025) tadqiqotida PBL guruhi talabalari tanqidiy fikrlash baholashlarida nazorat guruhiga qaraganda o'rtacha 12% yuqori ball to'plaganini va klinnik asosli topshiriqlarda 15% ko'proq yaxshilanish ko'rsatganini aniqladi ($p < 0,05$). Ushbu natijalarga asoslanib, PBL metodikasini ambulator-poliklinik pediatriya ta'limiga tatbiq etish va uning samaradorligini OSCE imtihoni natijalarida baholash klinik ahamiyatga ega tadqiqot yo'nalishi bo'lib qolmoqda.[10]

Zhang va boshq. (2024) tizimli ko'rib chiqish va meta-tahlilida jamoaviy va PBL usullari bo'yicha tadqiqotlarni tahlil etib, ikkala metodika ham tanqidiy fikrlash va jamoa ko'nikmalarini rivojlantirishda samarali ekanligini ko'rsatdi. Bundan tashqari, PBL metodikasining muvaffaqiyatli tatbiq etilishida ko'p jihatdan guruhlarining tuzilishi, murabbiylarning mahorati va o'quv muammolarining real klinik ahamiyatga ega ekanligi hal qiluvchi rol o'ynaydi (Servant-Miklos, 2018). Couto va boshq. (2019) tadqiqotida PBL kurrikumida formativ baholash, OSCE va progress testlari o'rtasidagi ijobiy korrelyatsiya tibbiy ta'lim murakkablashgani sari kuchayib borishi aniqlangan.[11][12][13]

Ushbu tadqiqotning asosiy maqsadi — ambulator-poliklinik pediatriya fanini PBL metodikasi asosida o'qitishning OSCE imtihoni natijalariga ta'sirini aniqlash va an'anaviy o'qitish usuli bilan qiyosiy baholash hisoblanadi. Tadqiqot natijalari O'zbekistondagi tibbiy ta'lim muassasalari uchun ilg'or pedagogik modellarni joriy etishda muhim nazariy va amaliy ahamiyat kasb etadi.

Materiallar va Metodlar

Tadqiqot dizayni

Ushbu tadqiqot kvazieksperimental, prospektiv, qiyosiy dizaynda olib borildi. Tadqiqot 2023–2024 o'quv yilining birinchi semestrda amalga oshirildi. Intervensiya guruhi sifatida Farg'ona jamoat salomatligi tibbiyot instituti (FJSTI) talabalari, nazorat guruhi sifatida esa Andijon davlat tibbiyot instituti (ADTI) talabalari tanlandi. Ikkala institutda bir xil o'quv dasturi (ambulator-poliklinik pediatriya) va o'quv rejasi qo'llanildi.

Ishtirokchilar

Tadqiqotga jami 330 nafar tibbiyot bakalavriat talabalari kiritildi: FJSTI dan 165 nafar (PBL guruhi) va ADTI dan 165 nafar (nazorat guruhi). O'rtacha yosh $25 \pm 1,6$ yil. Kiritish mezonlari: jismonan va ruhiy sog'lom, 3–5-kurs bakalavriat talabalari, ambulator-poliklinik pediatriya kursini birinchi marta o'tayotganlar. Chiqarib tashlash mezonlari: surunkali jismoniy kasalliklar, psixiatrik tashxis, oldingi semestrda ushbu kursni o'tgan talabalar va tadqiqotga rozi bo'lmaganlar. Barcha ishtirokchilardan yozma informed consent olindi. Tadqiqot FJSTI ilmiy-axloqiy qo'mitasi tomonidan tasdiqlandi.

O'qitish metodikasi

PBL guruhi (FJSTI): Talabalar 8–10 kishilik kichik guruhlarda ishladi. Har bir dars klinik muammo (case) bilan boshlandi. "Yetti qadam" (Seven Jump) PBL modeli asosida: (1) muammoni aniqlash, (2) mavjud bilimlar faollashtirish, (3) gipotetik yechimlar ishlab chiqish, (4) o'quv maqsadlarini belgilash, (5) mustaqil o'rganish, (6) bilimlarni guruhlarda muhokama qilish, (7) yakuniy yechim va o'z-o'zini baholash. Guruh fasilitatorf rol o'ynadi (domlalar direktor bo'lmadi). Klinik vaziyatlar haqiqiy ambulatoriya bemorlaridan olingan.

Nazorat guruhi (ADTI): An'anaviy ma'ruza va seminar usuli qo'llanildi. O'qituvchi markaziy rol o'ynadi, talabalar asosan passiv tinglovchi sifatida qatnashdi. Uyga vazifalar va kollokviumlar o'tkazildi.

O'qitish vaqti

Ikkala guruh ham 14 hafta davomida haftasiga 4 soatdan jami 56 soat klinikalik dars oldi. O'quv dasturning tarkibi — bir xil (neonatal davr kasalliklari, infeksiyon kasalliklar, ovqat hazm qilish tizimi, nafas olish tizimi kasalliklari, profilaktika va dispanserizatsiya).

OSCE baholash

Kurs yakunida barcha talabalar 6 stantsiyali OSCE imtihonini topshirdi. Har bir stantsiyaga 100 ball berildi; umumiy ball o'rtacha hisoblab chiqildi.

Stantsiya	Baholash mazmuni	Vaqt
1 – Klinik anamnez	Bolaning shikoyatlarini to'g'ri yig'ish, ota-ona bilan muloqot	7 daqiq
2 – Jismoniy ko'rik	Pediatric ko'rik texnikasi, antropometrik ko'rsatkichlar baholash	7 daqiq
3 – Diagnostik fikrlash	Differensial diagnostika, asosiy tashxis qo'yish	6 daqiq
4 – Muolaja rejasi	Dori muolajasi, rejim, ovqatlanish ko'rsatmasi	6 daqiq
5 – Kommunikatsiya	Bemor/ota-ona bilan muloqot, informatsiya berish	7 daqiq
6 – Profilaktika	Emlash jadvalini to'g'ri baholash, dispansarizatsiya	7 daqiq

OSCE imtihonini ikki mustaqil examiner (ikki institute uchun ham bir xil shaxslar) standartlashtirilgan chak-list asosida baholadi. Cronbach $\alpha = 0,87$ (ichki izchillik yuqori).

Statistik tahlil

Statistik tahlil SPSS 26.0 dasturida amalga oshirildi. Normativ taqsimot Shapiro–Wilk testi bilan tekshirildi. Guruhlararo farqlar Student t-testi (ikki tomonlama) bilan baholandi. Ta'sir o'lchami Cohen's d formula bilan hisoblab chiqildi. Koeffitsient korrelyatsiyasi Pearson r usulida aniqlandi. Statistik ahamiyatlilik chegarasi $p < 0,05$ qilib belgilandi.

Natijalar

Demografik ko'rsatkichlar

PBL guruhi (FJSTI): 165 talaba, erkaklar — 74 (44,8%), ayollar — 91 (55,2%), o'rtacha yosh $24,9 \pm 1,5$ yil. Nazorat guruhi (ADTI): 165 talaba, erkaklar — 71 (43,0%), ayollar — 94 (57,0%), o'rtacha yosh $25,1 \pm 1,7$ yil. Guruhlar yosh ($p = 0,32$) va jins tarkibi ($p = 0,74$) bo'yicha statistik jihatdan farq qilmadi.

Umumiy OSCE natijalari

PBL guruhi umumiy OSCE o'rtacha bali — $78,4 \pm 8,2$ ball, nazorat guruhi — $68,6 \pm 9,5$ ball (100 dan). Mustaqil tanlov Student t-testi natijalari guruhlar o'rtasidagi farqni yuqori statistik ahamiyatlilik bilan tasdiqladi: $t(328) = 9,81$; $p < 0,001$. Cohen's $d = 1,08$, bu katta ta'sir hajmiga (large effect size) to'g'ri keladi. O'rtacha farq 9,8 ball (95% CI: 7,8–11,8).

Stantsiyalar bo'yicha tahlil

1-jadval.

OSCE stantsiyalari bo'yicha natijalar (Mean $\pm$ SD)

OSCE Stantsiyasi	PBL guruhi (n=165)	Nazorat guruhi (n=165)	t	p qiymati	Cohen's d
Klinik anamnez	$81,2 \pm 7,8$	$71,4 \pm 9,5$	8,87	$< 0,001$	1,13
Jismoniy ko'rik	$79,8 \pm 8,1$	$68,2 \pm 10,3$	9,55	$< 0,001$	1,24
Diagnostic fikrlash	$77,6 \pm 9,2$	$65,8 \pm 11,1$	8,82	$< 0,001$	1,17
Muolaja rejasi	$78,9 \pm 8,5$	$67,3 \pm 9,8$	9,55	$< 0,001$	1,27
Kommunikatsiya	$80,4 \pm 7,9$	$70,1 \pm 10,6$	8,35	$< 0,001$	1,09
Profilaktika	$72,5 \pm 10,2$	$59,8 \pm 12,4$	8,58	$< 0,001$	1,11
Umumiy OSCE ball	$78,4 \pm 8,2$	$68,6 \pm 9,5$	9,81	$< 0,001$	1,08

Barcha 6 stantsiyada PBL guruhi statistik jihatdan yuqori natijalar ko'rsatdi ($p < 0,001$ barchasi uchun). Eng katta farq muolaja rejasi stantsiyasida qayd etildi ($d = 1,27$), eng kichik farq esa kommunikatsiya stantsiyasida ($d = 1,09$).

Quyi ko'rsatkichlar tahlili

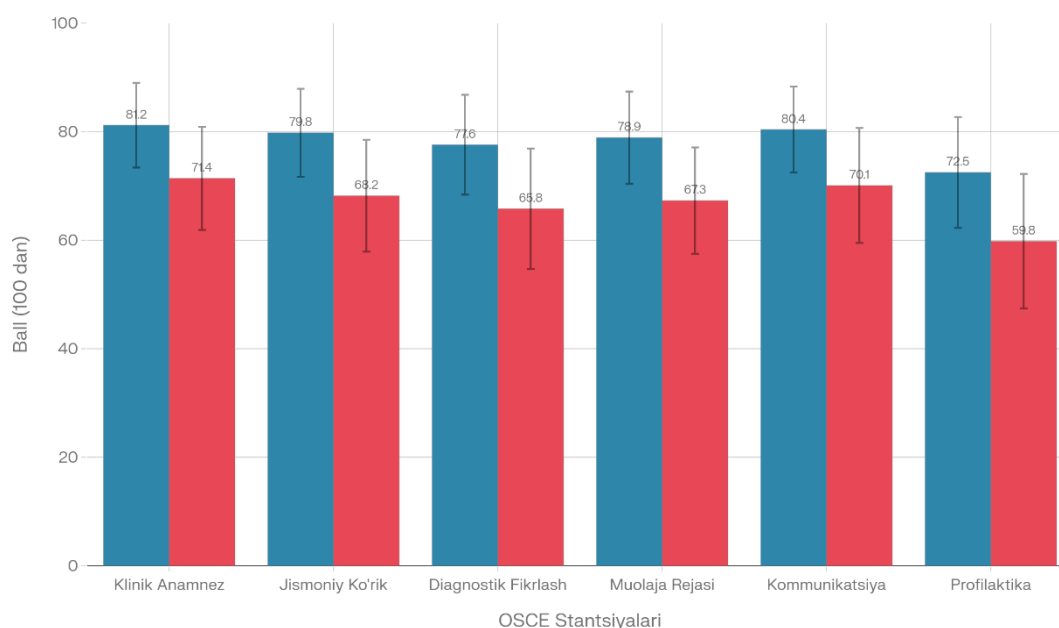
Amaliy ko'nikmalar yig'ma ko'rsatkichi bo'yicha PBL guruhi — $80,2 \pm 7,9$, nazorat guruhi — $67,1 \pm 10,3$ ($t = 11,0$; $p < 0,001$; $d = 1,47$). Nazariy bilimlar ko'rsatkichi bo'yicha farq nisbatan kamroq: PBL — $76,8 \pm 9,1$, nazorat — $70,2 \pm 9,8$ ($t = 5,35$; $p < 0,001$; $d = 0,70$). Bu shuni ko'rsatadiki, PBL ayniqsa amaliy ko'nikmalar va klinik fikrlash ko'rsatkichlarida ustunlikni ta'minlaydi.

Korrelyatsion tahlil

PBL guruhida OSCE umumiy ballari bilan individual stantsiyalar o'rtasidagi korrelyatsiya: diagnostik fikrlash — $r = 0,73$ ($p < 0,001$), muolaja rejasi — $r = 0,71$ ($p < 0,001$), kommunikatsiya — $r = 0,68$ ($p < 0,001$). Nazorat guruhida ushbu korrelyatsiya koeffitsientlari nisbatan past bo'ldi ($r = 0,52$ – $0,61$).

Bu PBL metodikasi sharoitida klinik kompetensiyaning integrallashgan, bir-biri bilan o'zaro bog'liq rivojlanishini ko'rsatadi.

Ball taqsimoti



1-rasm. OSCE Natijalari: PBL va Nazorat guruhi.

Manba: FJSTI va ADTI | $p < 0.001$ barcha stantsiyalar uchun

■ PBL guruhi (FJSTI) ■ Nazorat guruhi (ASMI)

PBL guruhida OSCE bali 60 balldan past bo'lgan talabalar soni — 7 (4,2%), nazorat guruhida — 31 (18,8%). "A'lo" bahoga (≥ 85 ball) loyiq bo'lgan PBL talabalari soni 28 (17,0%) bo'lsa, nazorat guruhida faqat 6 (3,6%) talaba ushbu chegaradan o'tdi. Fisher's exact test: $p < 0,001$ (OR = 5,57; 95% CI: 2,23–13,9).

Jins bo'yicha tahlil

PBL guruhida ayol talabalar OSCE umumiy bali — $79,1 \pm 7,9$, erkak talabalar — $77,5 \pm 8,6$ ($p = 0,22$, farq statistik ahamiyatli emas). Nazorat guruhida ham shunga o'xshash natija kuzatildi: ayollar — $69,3 \pm 9,3$, erkaklar — $67,7 \pm 9,8$ ($p = 0,28$). Bu shuni ko'rsatadiki, PBL metodikasining ijobiy ta'siri jins farqidan qat'iy nazar barcha talabalarda bir xilda namoyon bo'ladi.

Muhokama

Ushbu tadqiqot natijalari PBL metodikasining ambulator-poliklinik pediatriya fanida talabalar klinik fikrlash kompetensiyasini rivojlantirishda sezilarli ustunligini yaqqol ko'rsatdi. Umumiy OSCE ball o'rtachasi bo'yicha 9,8 balllik farq klinik amaliyot uchun mazmunan ahamiyatli hisoblanadi (Cohen's $d = 1,08$). Ushbu natijalar Salinitri va boshq. (2012) tadqiqoti xulosalari bilan uyg'un bo'lib, ular OSCE baholash PBL metodikasida yozma imtihonga qaraganda talabalarning real klinik ko'nikmalarini to'liqroq aks ettirish qobiliyatiga ega ekanligini ta'kidlaganlar. Shuningdek, Stollar va boshq. (2020) tomonidan pediatrik OSCE standartlashtirish bo'yicha tavsiflangan metodologiyaga muvofiq, ushbu tadqiqotda ham real klinik vaziyatlardan foydalanilishi natijalar ishonchliligini oshirdi.[14][6]

PBL metodikasining muvaffaqiyati bir necha asosiy mexanizmlar orqali tushuntirilishi mumkin. Birinchidan, klinikalik muammolar kontekstida berilgan bilimlar chuqurroq va uzoqroq saqlanadi — bu "kontekstga asoslangan o'rganish" (context-based learning) nazariyasiga asoslanadi. Yang va boshq. (2023) PBL+CBL kombinatsiyasi o'quv natijalarini yanada yaxshilashini ko'rsatgan: nazariy bilimlar bahosi $79,78 \pm 8,55$ (eksperimental) va $70,92 \pm 10,81$ (nazorat) tashkil etgan. Ikkinchidan, PBL kichik guruhlarda hamkorlikda ishlashni talab qiladi, bu esa professional muloqot va jamoaviy fikrlash ko'nikmalarini rivojlantiradi — mazkur tadqiqotda kommunikatsiya stantsiyasida PBL guruhining 10,3 balllik ustunligi ($80,4$ vs $70,1$) bunga yorqin misol bo'lib xizmat qiladi. Uchinchidan, talabalar mustaqil o'rganish maqsadlarini o'zlari belgilashi o'z-o'zini boshqarish (self-directed learning) va metakognitiv ko'nikmalarni shakllantiradi.[15][16]

Profilaktika va dispanserizatsiya stantsiyasida ikkala guruh ham nisbatan past natijalar ko'rsatdi (PBL: 72,5; Nazorat: 59,8), lekin farq statistik jihatdan ahamiyatli bo'lib qoldi. Bu O'zbekiston tibbiy ta'limida profilaktiv tibbiyot bo'limining kurs dasturida chuqurroq yoritilishiga ehtiyoj borligini anglatadi. Xu va boshq. (2025) taklif etgan raqamli PBL (e-MedLearn) platformalari kelajakda bunday bo'limlarda talabalar mustaqil o'rganishini yanada kuchaytirishi mumkin. Bunday raqamli yondashuvlar ayniqsa Farg'ona kabi hududlarda ta'lim sifatini tenglashtirish uchun imkoniyat yaratadi.[17][7][18]

Ushbu tadqiqotning O'zbekiston tibbiy ta'limi uchun amaliy ahamiyati katta. FJSTI 2020-yilda hukumat farmoni bilan tashkil etilgan bo'lib, uning asosiy vazifalaridan biri ilg'or pedagogik texnologiyalarni tibbiy ta'limga joriy etishdir. PBL metodikasining ambulator-poliklinik pediatriya fanida samaradorligi isbotlanganligi ushbu usulning boshqa klinikalik fanlarga ham kengaytirilishi uchun asos yaratadi. O'zbekistondagi tibbiy ta'lim islohotlari doirasida 2024/2025 o'quv yilidan joriy etilgan ikki bosqichli davlat imtihoni tizimi (1-bosqich: fundamental fanlar, 2-bosqich: klinikalik fanlar) PBL asosida tayyorlangan talabalarning afzalligi ortib borishini bashorat qiladi.[8][9]

Tadqiqotning ba'zi cheklovlari mavjud. Birinchidan, randomizatsiya amalga oshirilmadi — talabalar institutlarga ko'ra taqsimlangan, bu esa tanlash xatosini istisno eta olmaydi. Ikkinchidan, PBL o'qituvchilarining tajribasi ADTI an'anaviy o'qituvchilaridan farqlangani natijalarni bir ozgina chalkashtirib yuborgan bo'lishi mumkin. Uchinchidan, kuzatuv vaqti qisqa — uzoq muddatli saqlash va klinik rezidenlik natijalariga ta'sir kelajakdagi tadqiqotlarda o'rganilishi tavsiya etiladi.

Xulosa

Ushbu kvazieksperimental tadqiqot shuni ko'rsatdiki, ambulator-poliklinik pediatriya fanida PBL metodikasi asosida o'qitilgan talabalar (FJSTI, $n = 165$) an'anaviy usulda o'qitilgan talabalarga (ADTI, $n = 165$) nisbatan barcha 6 OSCE stantsiyasida statistik jihatdan ahamiyatli yuqori natijalar ko'rsatdi. Umumiy OSCE bali bo'yicha o'rtacha farq 9,8 ball bo'lib, katta ta'sir hajmi bilan tasdiqlandi (Cohen's $d = 1,08$). Ayniqsa amaliy ko'nikmalar, diagnostik fikrlash va muolaja rejasi tuzish ko'rsatkichlarida PBL guruhining ustunligi yaqqol namoyon

bo'ldi. Mazkur natijalar O'zbekistondagi tibbiy ta'lim muassasalarida PBL metodikasini klinikalik fanlarga, birinchi navbatda pediatriya ta'limiga keng joriy etish uchun ilmiy asos bo'lib xizmat qiladi. Kelajakdagi tadqiqotlar randomizatsiyalashtirilgan nazoratli tajriba dizayni va uzoq muddatli kuzatuv natijalari bilan ushbu xulosalarni yanada mustahkamlashi zarur.

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BANK KAFOLATI – MAJBURIYATLARNI MOLIVAVIY-HUQUQIY JIHATDAN TA'MINLASH MEXANIZMI

Annotatsiya: Mamlakatimizda shakllanib borayotgan bozor iqtisodiyoti sharoitida iqtisodiy munosabatlarning tobora kengayib bormoqda. Shu jarayonda ushbu munosabatlarning o'ziga xos xususiyatlarini inobatga olgan holda, amaldagi qonunchilikka muvofiq qo'llaniladigan samarali hamda moslashuvchan huquqiy mexanizmlarni yaratish zarurati yuzaga kelmoqda. Bunday mexanizmlardan biri sifatida bank kafolati institutini shakllantirish va uni yanada takomillashtirish muhim ahamiyat kasb etadi. Bank kafolati tushunchasi, uning amaliyotga joriy etilishining zarurati, shakllanish tarixi hamda majburiyatlarning bajarilishini ta'minlovchi moliyaviy-huquqiy instrument sifatidagi ahamiyati quyida tahlil qilinadi.

Kalit so'zlar: bank, kafolat, prinsipial (asosiy qarzdor), benefitsiar (foyda oluvchi), kafil, majburiyat, huquqiy mexanizm, moliyaviy instrument.

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BANK GUARANTEE - A MECHANISM FOR FINANCIAL AND LEGAL SECURITY OF OBLIGATIONS

Annotation: In the context of the formation of a market economy in our country, economic relations are continuously expanding and developing. Under such conditions, there arises a need to create an effective and flexible system of legal measures implemented in accordance with current legislation, taking into account the specific features of these relations. One of such mechanisms is the establishment and further development of the institution of bank guarantee. The concept of a bank guarantee, the necessity of its introduction into practice, its historical development, and its significance as a financial and legal instrument for securing the fulfillment of obligations are analyzed in this study.

Keywords: bank, guarantee, principal, beneficiary, surety, obligation, legal mechanism, financial instrument.

Kirish

Jahon amaliyotida bank kafolati majburiyatlarning bajarilishini ta'minlash vositasi sifatida keng qo'llaniladigan huquqiy institut hisoblanadi. Mazkur

tushuncha faqat bank tomonidan beriladigan kafolat bilan cheklanib qolmaydi, balki u kreditor talablarining bajarilishini ta'minlashga qaratilgan boshqa mexanizmlar bilan ham uzviy bog'liq bo'lishi mumkin. Shu sababli bank kafolati instituti amaliyotda turli huquqiy shakllarda namoyon bo'ladi.

Bank kafolati — bu bank (kafil) tomonidan boshqa shaxs (prinsipal)ning topshirig'i asosida qabul qilinadigan yozma majburiyat bo'lib, unga ko'ra prinsipal o'z majburiyatlarini bajarmagan taqdirda uning kreditori (benefitsiar) bankka yozma talab bilan murojaat qilsa, bank kafolat shartlariga muvofiq belgilangan pul summasini to'lash majburiyatini zimmasiga oladi.

Prinsipal — bu bankka uchinchi shaxs, ya'ni benefitsiar oldidagi majburiyatlarining bajarilishini ta'minlash maqsadida bank kafolati berish to'g'risida murojaat qilgan shaxsdir.

Benefitsiar esa prinsipal zimmasidagi majburiyatning bajarilishi uchun berilgan kafolatni qabul qiluvchi hamda ushbu majburiyat bo'yicha kreditor hisoblanadi.

Kafolat beruvchi, ya'ni bank — o'z mijozining (prinsipalning) yozma arizasi asosida, prinsipal benefitsiar oldidagi majburiyatlarini bajarmagan yoki lozim darajada bajarmagan taqdirda, kafolat shartlariga muvofiq ushbu majburiyatlarni bajarishni o'z zimmasiga oladigan moliyaviy muassasa hisoblanadi.

Bank kafolati prinsipalning benefitsiar oldidagi asosiy majburiyatlarini o'z vaqtida va to'liq bajarilishini ta'minlashga xizmat qiladi. Mazkur kafolat prinsipalning yozma yoki elektron murojaati asosida, uning moliyaviy holati tahlil qilinib, bankning kredit siyosatiga muvofiq hamda tegishli ta'minotlar asosida benefitsiar foydasiga rasmiylashtiriladi.

Amaldagi tartibga ko'ra, bank kafolatini beruvchi subyekt sifatida banklar, boshqa kredit tashkilotlari hamda sug'urta kompaniyalari ishtirok etishi mumkin. Ayrim hollarda bank kafolatida benefitsiar alohida ko'rsatilmasligi ham mumkin. Bunday vaziyatda kafolat bo'yicha majburiyat dastlab kafolatni taqdim etgan kreditor manfaatlari yo'lida bajariladi.

Bugungi kunda majburiyatlarning bajarilishini ta'minlash usuli sifatida bank kafolatiga bo'lgan ehtiyoj tobora ortib bormoqda. Bu holat tasodifiy emas, chunki bank kafolati to'g'ri qo'llanilgan taqdirda ham prinsipal, ham benefitsiar manfaatlarini samarali himoya qiluvchi huquqiy vosita sifatida namoyon bo'ladi.

Metodologiya

Kafolat instituti dastlab xalqaro huquqiy mexanizm sifatida shakllangan bo'lib, u eng avvalo xalqaro moliyaviy-kredit munosabatlari sohasida qo'llanila boshlagan. Mazkur institut nisbatan yangi huquqiy vositalardan biri hisoblanadi. Xalqaro sud amaliyoti tahlili shuni ko'rsatadiki, bank kafolatining paydo bo'lishi XX asrning 60-yillariga to'g'ri keladi. Ayniqsa, XX asrning 60–70-yillari xalqaro savdo aloqalarining jadal rivojlanishi bilan tavsiflanadi.

Xalqaro savdo operatsiyalarida ishtirok etish mahalliy savdoga nisbatan ko'proq xavf-xatarlarni keltirib chiqaradi. Tadbirkorlar ko'pincha o'zlariga notanish bo'lgan huquqiy tizimlar, xalqaro hamda milliy qonunchilikni

qo'llashdagi murakkabliklar, siyosiy vaziyatning oldindan aniq bo'lmashligi hamda hududiy masofalarning uzoqligi kabi omillarga duch keladi. Natijada majburiyatlarning bajarilmasligi yoki lozim darajada bajarilmasligi ehtimoli ortadi.

Bundan tashqari, xalqaro savdoda barter operatsiyalarining ko'payishi, bitimlar qiymatining ortib borishi hamda pul aylanmasining tezligini oshirishga qaratilgan umumiy iqtisodiy tendensiyalar ham ayrim hollarda shartnomaviy majburiyatlarning bajarilishini kechiktirish yoki umuman bajarilmaslik xavfini yuzaga keltiradi. Moliyaviy majburiyatlarning o'z vaqtida bajarilishini ta'minlaydigan ishonchli huquqiy mexanizmlarning yetishmasligi esa ishlab chiqarish va savdo munosabatlarining rivojlanishiga salbiy ta'sir ko'rsatishi mumkin.

Yevropa davlatlarida bank kafolati mustaqil moliyaviy instrument sifatida ayniqsa Ikkinchi jahon urushidan keyin shakllana boshladi. Bunga sabab shundaki, o'sha davrda majburiyatlarni ta'minlashning an'anaviy usullari moliya va kredit bozorining ehtiyojlarini to'liq qondira olmay qolgan edi. Huquqiy ta'sir doirasi va undan kelib chiqadigan huquqiy oqibatlar nuqtai nazaridan Yevropa huquqshunoslari bank kafolatining ayrim jihatlarini kafillik shartnomasi hamda qisman sug'urta shartnomasi bilan o'xshash ekanligini bir necha bor ta'kidlab o'tganlar. Ayrim holatlarda ushbu institut akkreditiv bilan ham ma'lum darajada o'xshashlikka ega ekanligi qayd etiladi.

Mazkur huquqiy munosabatlarni tahlil qilgan ko'plab tadqiqotchilar bank kafolati turli huquqiy institutlar elementlarini o'zida mujassam etganligini ta'kidlaydi. Shuning uchun ham bank kafolati bilan boshqa moliyaviy-huquqiy vositalar o'rtasidagi o'xshashliklar tasodifiy holat emas, balki ushbu institutning tarixiy rivojlanish jarayoni bilan izohlanadi.

Bank kafolati tijorat faoliyati amaliyotida nisbatan keyinroq shakllanib, qo'llanila boshlagan huquqiy instrumentlardan biri hisoblanadi. Yuqorida qayd etilganidek, bank kafolati dastlab 1960-yillarning o'rtalarida AQSHda tijorat muomalasida paydo bo'lgan. XX asrning 70-yillari boshlariga kelib esa bank tizimi vakillari uni xalqaro iqtisodiy aloqalarning kengayishi, shuningdek, xalqaro to'lov operatsiyalarining soni hamda hajmi ortib borishi bilan bog'liq holda tadbirkorlik muomalasiga faol tarzda joriy eta boshladilar.

Bank kafolatining keng qo'llanilishiga turtki bergan omillardan yana biri o'sha davrda yuzaga kelgan "neft inqirozi" bilan ham bog'liqdir. Mazkur holat natijasida Yaqin Sharqdagi neft qazib chiqaruvchi davlatlar infratuzilma obyektlarini (yo'llar, dengiz portlari, aeroportlar) rivojlantirish, shuningdek, ijtimoiy ahamiyatga ega qurilish loyihalarini (uy-joylar, shifoxonalar, aloqa tizimlari) amalga oshirish maqsadida G'arb kompaniyalari bilan yirik shartnomalar tuza boshladilar. Bunday loyihalarda davlat manfaatlarini himoya qilish hamda shartnomaviy majburiyatlarning bajarilishini kafolatlash uchun bank kafolati muhim huquqiy vosita sifatida qo'llanildi.

Mustaqil huquqiy institut sifatida kafolat tizimi 2009 yilda yangi tahrirdagi **"Talablar bo'yicha kafolatlarning yagona qoidalari"** (Uniform Rules for

Demand Guarantees — URDG 758) qabul qilinishi bilan yanada rivojlandi. Ushbu qoidalarni qayta ishlab chiqishdan asosiy maqsad xalqaro bank amaliyotida yuz bergan o'zgarishlarni inobatga olish va ularni yagona tartibga solishdan iborat edi. "Talablar bo'yicha kafolatlarning yagona qoidalari" (URDG 758) 2010 yil 1 iyuldan boshlab kuchga kirdi.

Mazkur hujjat mualliflari yangi qoidalar nafaqat mavjud amaliyotni tizimlashtirish, balki xalqaro miqyosda ilg'or hisoblangan amaliyotni keng targ'ib qilishga xizmat qilishini ta'kidlaganlar. Xalqaro Savdo Palatasining Bosh kotibi **J. Rozvadovskiy** fikriga ko'ra: *"URDG 758 qoidalari talab bo'yicha beriladigan kafolatlar uchun global standart vazifasini bajarishga mo'ljallangan. Mazkur qoidalar ayrim jihatlar bilan evolyutsion emas, balki inqilobiy xarakterga ega"*.

Bugungi kunda bank kafolati keng qo'llanilayotgan hamda jadal rivojlanib borayotgan moliyaviy-huquqiy mexanizmlardan biri hisoblanadi. Jahon amaliyotida bank kafolati majburiyatlarning bajarilishini ta'minlash vositasi sifatida keng talqin qilinib, kreditor talablarini ta'minlashga xizmat qiluvchi turli mexanizmlarni o'zida mujassamlashtirishi mumkin.

Hozirgi davrda bank kafolati shartnomaviy munosabatlarni tartibga solishning xalqaro miqyosda tan olingan samarali vositalaridan biri sifatida e'tirof etiladi. Ayniqsa, katta miqdordagi moliyaviy mablag'lar va resurslarni talab qiladigan iqtisodiy faoliyat sohalarida ushbu mexanizmga bo'lgan ehtiyoj yanada yuqori hisoblanadi.

Kreditor nuqtai nazaridan qaralganda, bank kafolati nafaqat uning huquq va manfaatlarini himoya qilish imkonini beradi, balki kutilmagan moliyaviy yo'qotishlar ehtimolini kamaytirishga ham xizmat qiladi. Shu bilan birga, majburiyatlar buzilgan taqdirda kreditor sud tartibida da'vo kiritmasdan turib ham, qisqa muddat ichida o'z talablarini qondirish imkoniyatiga ega bo'ladi.

Amaliyot shuni ko'rsatadiki, hozirgi kunda bank kafolatlarini berish, ya'ni kafolat operatsiyalarini amalga oshirish kredit tashkilotlari faoliyatining muhim yo'nalishlaridan biriga aylangan. Ushbu operatsiyalarning keng tarqalganligi, ommaviy xarakterga egaligi hamda ularning huquqiy tabiatidagi mavhumlik darajasi yuqoriligi sababli, ularni huquqiy jihatdan yagona xalqaro standartlar asosida tartibga solish zarurati tobora dolzarb ahamiyat kasb etmoqda

Natijalar

Ilmiy manbalarda bank kafolati va sug'urta institutlari o'rtasidagi bog'liqlik kamroq tadqiq qilingan bo'lsa-da, bank kafolati va kredit munosabatlari masalasi keng miqyosda o'rganilgan. Bank kafolatlari va sug'urtalashning qiyosiy tahliliga bo'lgan e'tiborning ortishi ushbu xizmat turlarining amaliyotda ko'pincha bir-biriga raqobatbardosh bo'lishi bilan izohlanadi. Shu bilan birga, bu raqobat ko'pincha milliy qonunchilik darajasida ham mustahkamlangan.

Bank kafolati va kreditni solishtirish amaliyotda ko'pincha banklarda kredit va kafolat olish uchun berilgan arizalarni ko'rib chiqish tartibini tavsiflash bilan bog'liq. Kuban Davlat Universiteti huquq fakulteti o'qituvchisi **D.A. Palin** ushbu moliyaviy mahsulotlar o'rtasidagi munosabatlarni batafsil tahlil qilgan.

Professor **P. Gud** fikricha, huquqiy nuqtai nazardan zaxira akkreditiv talab bo'yicha beriladigan kafolat bilan deyarli bir xil bo'lib, faqat nomi boshqacha. Shu bilan birga, kafolatning amal qilish muddati prinsipal va kafil o'rtasidagi shartnomaviy kelishuvga bog'liq emasligi ta'kidlanadi. Ushbu qarash tarafdorlari orasida **B.M. Gongalo** va **A.M. Erdelevskiy** ham bor. Ular fikricha: *"Prinsipal va kafil o'rtasida yozma kelishuv mavjud emasligi kafilning benefitsiar oldidagi kafolat majburiyatlarini bekor qilmaydi."*

Olimlar tomonidan ilgari surilgan yondashuv asosli va qonunchilik nuqtai nazaridan maqbul deb hisoblanadi. Shu bilan birga, bank kafolatini berish bo'yicha yozma kelishuvning yo'qligi ushbu kafolatning haqiqiy emasligini anglatmaydi. Ba'zi tadqiqotchilar bank kafolatining asosiy xususiyati sifatida mustaqillik tamoyilining ustuvorligini ta'kidlaydilar. Shu sababli, yuridik fanlari doktori, professor **V.V. Vitryanskiy** fikriga ko'ra: *"...kafilning benefitsiar oldidagi bank kafolatida nazarda tutilgan majburiyati (va ularning o'zaro munosabatlari) asosiy majburiyatga bog'liq emas."*

Boshqa olimlar esa kafolatning xavfsizlik xususiyatini hisobga olish zarurligini ta'kidlaydilar. Ularning fikricha: *"...kafilning majburiyati asosiy majburiyatdan to'liq mustaqil bo'la olmaydi..."* Sababi, benefitsiar kafolat doirasidagi to'lovni talab qilganda, asosiy majburiyatning bajarilmagan sabablarini ko'rsatishi lozim. Shu bilan, kafil faqat asosiy majburiyat bajarilmagan taqdirda kafolat bo'yicha to'lovni amalga oshiradi.

Iqtisod fanlari doktori, professor **Sharbat Abdullaeva** o'zining *"Bank ishi"* nomli asarida *"...Bank kafolati va uning kreditlashdagi roli..."*ga alohida e'tibor qaratgan. U fikricha: *"Bank, kreditor, qarz oluvchi va garant o'rtasidagi munosabatlarda eng muhim jihat – bu bank kafolatining kuchga kirish vaqtini aniqlashdir. Odatda, bank kafolati berilganida qarz oluvchi garantga bank xizmati to'laydi. Ushbu omil amaliyotda kafolatning kuchga kirishida muhim rol o'ynaydi."*

Bir tomondan, yangi ilg'or texnologiyalar va standartlarni qo'llash, ularning imkoniyatlarini to'liq tushunish va samarali foydalanish muhim ahamiyatga ega. Boshqa tomondan, amaldagi huquqiy normalarni tatbiq etish bo'yicha dastlabki natijalarni tahlil qilish, bank kafolatlari bilan bog'liq muammolarni ilmiy asosda o'rganish, holatni baholash hamda bank kafolatlarini rivojlantirish yo'llarini aniqlash imkonini beradi.

Xalqaro huquq sohasida moliyaviy va tijorat faoliyatini amalga oshirish jarayonida har doim tomonlardan biri o'z majburiyatlarini bajarmaslik yoki ulardan voz kechish xavfi bilan yuzma-yuz keladi. Ushbu xavflar nafaqat xalqaro, balki milliy darajada ham mavjud. Shu sababli, moliyaviy yo'qotishlardan himoya qilish maqsadida, ko'plab mamlakatlarda bank mahsulotlaridan biri sifatida bank kafolati qo'llaniladi.

Bank kafolati korxonalarning kredit layoqatini tahlil qilish vositasi sifatida xizmat qiladi va bitimga ishonchni mustahkamlashga yordam beradi. Shu bilan birga, u moliyaviy jarayonlarni tezlashtiradi va keng miqyosli savdoni rag'batlantiradi, natijada milliy va xalqaro bozorda tadbirkorlik faoliyatini

rivojlantiradi. Bank kafolatlarini tartibga soluvchi normativ hujjatlarni tatbiq etish esa bir qator ijobiy natijalarga olib keladi.

Muhokama

Kafolat milliy va xorijiy valyutada berilishi mumkin. Bank tomonidan prinsipal (mijoz) foydasiga berilgan kafolat doirasida benefitsiar uchun kafolat summasi yoki uning ma'lum qismi to'lab berilgan hollarda, prinsipal tomonidan bankga kafolat asosida to'langan mablag'ning qaytarilishi aynan to'lab berilgan valyutada amalga oshiriladi. Agar kafolat shartnomasida boshqa tartib nazarda tutilmagan bo'lsa, benefitsiarga tegishli bo'lgan bank talabini boshqa shaxsga o'tkazish mumkin emas.

Bank quyidagi shakllarda kafolatlarini berishi mumkin:

a) Bo'nak to'lovini qaytarish kafolati – Prinsipal tomonidan benefitsiar bilan tuzilgan shartnoma shartlarini bajarmaslik oqibatida benefitsiar tomonidan prinsipalga bo'nak sifatida o'tkazilgan mablag'ni bank qaytarib to'lash majburiyatini oladi.

b) To'lovni amalga oshirish kafolati – Prinsipal va benefitsiar o'rtasida imzolangan shartnoma asosida yetkazib berilgan mahsulot yoki xizmatlar uchun to'lov belgilangan muddat va miqdorda amalga oshirilmagan hollarda, benefitsiar tomonidan taqdim etilgan to'lov talabnomasi va unga ilova qilingan shartnomaviy hujjatlar (mahsulot yetkazilganini yoki xizmat bajarilganini tasdiqlovchi hujjatlar) asosida bank ushbu to'lovlarni amalga oshirish majburiyatini oladi.

c) Tender savdolari kafolati – Prinsipal (tender ishtirokchisi) tender qoidalariga binoan belgilangan majburiyatlarini bajarmagan hollarda, bank kafolatda ko'rsatilgan mablag'ni benefitsiar (buyurtmachi) foydasiga to'lab berish majburiyatini oladi.

Kafolatning asosiy shartlari unga berilgan muddati va kafilning javobgarligi cheklangan pul miqdori hisoblanadi. Agar kafolatda ushbu shartlar belgilangan bo'lmasa, bu uning haqiqiy emasligini anglatadi. Bank kafolatlari odatda qaytariladigan asosda beriladi.

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**O‘ZBEKISTONDA QUTQARUV ISHLARINI O‘TKAZISH
TIZIMINI XORIJ TAJRIBASI ASOSIDA
TAKOMILLASHTIRISHNING ILMIY ASOSLARI**

Annotatsiya. Mazkur maqolada favqulodda vaziyatlar oqibatlarini bartaraf etishda qutqaruv ishlarini tashkil etishning O‘zbekistondagi amaldagi tizimi xorijiy davlatlar (AQSH, Yaponiya, Germaniya va Turkiya) tajribasi bilan taqqoslab tahlil qilingan. Qutqaruv ishlari samaradorligiga ta’sir etuvchi asosiy omillar - boshqaruv tizimi, aholini tayyorlash darajasi, zamonaviy texnologiyalarni qo‘llash va vaqt omili ilmiy-nazariy jihatdan asoslangan. Tahlil natijasida O‘zbekiston sharoitiga mos taklif va tavsiyalar ishlab chiqilgan.

Kalit so‘zlar: favqulodda vaziyat, qutqaruv ishlari, tabiiy va texnogen, xorij tajribasi, samaradorlik, oltin 72 soat.

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**SCIENTIFIC BASIS FOR IMPROVING THE RESCUE SYSTEM IN
UZBEKISTAN BASED ON FOREIGN EXPERIENCE**

Annotation. This article analyzes the current system for organizing rescue operations in Uzbekistan to address the consequences of emergency situations, comparing it with the experience of other countries (the United States, Japan, Germany, and Turkey). The key factors influencing the effectiveness of rescue operations, including the management system, the level of public training, the use of modern technologies, and time factors, are scientifically and theoretically substantiated. Based on the analysis, proposals and recommendations tailored to Uzbekistan's conditions are developed.

Key words: emergencies, rescue operations, natural and man-made, international experience, efficiency, golden 72 hours.

Bugungi kunda tabiiy va texnogen xususiyatli favqulodda vaziyatlar sonining ortib borishi qutqaruv ishlarini tashkil etish masalasini ilmiy jihatdan qayta ko‘rib chiqishni talab etmoqda.

Globalashuv, iqlim o'zgarishi va texnogen xavflarning ortib borishi favqulodda vaziyatlar sonining ko'payishiga olib kelmoqda. Bu esa qutqaruv ishlarini zamonaviy talablar asosida takomillashtirish zaruratini yuzaga keltiradi.

O'zbekiston Respublikasining 2022-yil 17-avgustdagi "Aholini va hududlarni tabiiy hamda texnogen xususiyatli favqulodda vaziyatlardan muhofaza qilish to'g'risida"gi Qonunining 1-bob, 3-moddasida "tabiiy va texnogen xususiyatli favqulodda vaziyatlar"ga hamda "favqulodda vaziyatlarni bartaraf etish"ga quyidagicha ta'rif keltirilgan:

tabiiy hamda texnogen xususiyatli favqulodda vaziyatlar - muayyan hududda odamlar qurbon bo'lishiga, odamlarning sog'lig'iga yoki atrof tabiiy muhitga zarar yetishiga, jiddiy moddiy talafotlarga hamda odamlarning hayot faoliyati sharoitlari buzilishiga olib kelishi mumkin bo'lgan yoki olib kelgan avariya, halokat, xavfli tabiiy hodisa, tabiiy ofat yoxud boshqa ofat natijasida, karantinli va inson uchun xavfli bo'lgan boshqa yuqumli kasalliklar tarqalishi natijasida yuzaga kelgan vaziyatlar;

favqulodda vaziyatlarni bartaraf etish - favqulodda vaziyatlar ro'y berganda o'tkaziladigan hamda odamlarning hayotini asrab qolishga va sog'lig'ini saqlashga, atrof tabiiy muhitga yetkaziladigan zarar va moddiy talafotlar miqdorlarini kamaytirishga, shuningdek favqulodda vaziyatlar zonalarining kengayishiga yo'l qo'ymaslikka hamda xavfli omillar ta'sirini tugatishga qaratilgan qutqaruv ishlari va kechiktirib bo'lmaydigan ishlar majmui.

Favqulodda vaziyatlarning xususiyati esa - favqulodda vaziyatlar ro'y berish manbaiga qarab tabiiy xususiyatli favqulodda vaziyatlarga hamda texnogen xususiyatli favqulodda vaziyatlarga bo'linadi.

Odamlar qurbon bo'lishiga, ularning sog'lig'iga yoki atrof tabiiy muhitga zarar yetishiga, jiddiy moddiy talafotlarga, odamlarning hayot faoliyati sharoitlari buzilishiga olib kelishi mumkin bo'lgan yoki olib kelgan tabiiy ofatlar (zilzilalar, sel, ko'chkilar, suv toshishi va boshqa xavfli tabiiy hodisalar), tabiiy yong'inlar, epidemiyalar, epizootiyalar, epifitotiyalar **tabiiy** xususiyatli favqulodda vaziyatlardir.

Odamlar qurbon bo'lishiga, ularning sog'lig'iga yoki atrof tabiiy muhitga zarar yetishiga, jiddiy moddiy talafotlarga, odamlarning hayot faoliyati sharoitlari buzilishiga olib kelishi mumkin bo'lgan yoki olib kelgan sanoatdagi, transportdagi avariya va boshqa texnogen avariya, yong'inlar (portlashlar), kuchli ta'sir etuvchi zaharli, kimyoviy, radioaktiv hamda xavfli biologik moddalarning tarqalishi yoxud tarqalish xavfi bilan bog'liq avariya, binolar va inshootlarning to'satdan qulashi, to'g'onlarning, tozalash inshootlarining buzilishi, shuningdek odamlarning hayot faoliyatini ta'minlovchi kommunikatsiya tizimlaridagi avariya **texnogen** xususiyatli favqulodda vaziyatlardir [1].

Sodir bo'layotgan tabiiy hamda texnogen xususiyatli favqulodda vaziyatlar inson hayoti va iqtisodiyotga katta zarar yetkazmoqda. Shu bois qutqaruv ishlarini tezkor, samarali va ilmiy asoslangan holda tashkil etish har bir davlatning ustuvor vazifasi hisoblanadi.

O'zbekiston Respublikasida mazkur vazifa Favqulodda vaziyatlar vazirligi hamda "Favqulodda vaziyatlarning oldini olish va bunday vaziyatlarda harakat qilish davlat tizimi (FVDT)" tomonidan amalga oshiriladi.

FVDTning funksional quyi tizimi - aholini va hududlarni favqulodda vaziyatlardan muhofaza qilish bo'yicha belgilangan funksiyalarni bajaruvchi vazirliklar va idoralar hamda boshqa tashkilotlarni o'z ichiga olgan quyi tizim.

FVDTning hududiy quyi tizimi - tegishli hududda aholini va hududlarni favqulodda vaziyatlardan muhofaza qilish tadbirlarini tashkil etish va amalga oshirish bo'yicha belgilangan funksiyalarni bajaruvchi mahalliy ijro etuvchi hokimiyat organlarini o'z ichiga olgan quyi tizim [9].

O'zbekistonda sodir bo'lgan favqulodda vaziyat natijasida o'tkaziladigan qutqaruv ishlari markazlashgan boshqaruv tizimi asosida amalga oshiriladi. Favqulodda vaziyatlar vazirligi tarkibida hududiy maxsus qutqaruv batalyoni va otryadlari, qutqaruv qismlari, kasbiylashgan qutqaruv qismlari va fuqaro muhofazasi kuchlari faoliyat yuritadi.

Asosiy bosqichlar:

1. Favqulodda vaziyatni aniqlash va baholash.
2. Razvedka ishlari.
3. Qidiruv va qutqaruv.
4. Tibbiy yordam ko'rsatish.
5. Evakuatsiya va tiklash ishlari.

Mazkur tizim barqaror bo'lsada, amaliyotda qaror qabul qilish tezligi, aholining tayyorgarlik darajasi va texnologiyalardan foydalanish masalalarida ayrim cheklovlar mavjud.

Biroq boshqa davlatlarning tajribasi shuni ko'rsatadiki, xorijiy davlatlarda qutqaruv ishlarini tashkil etishda innovatsion yondashuvlar va zamonaviy boshqaruv modellari keng qo'llanilmoqda.

Xorij tajribasi tahlili.

AQSH tajribasi - AQShda qutqaruv ishlari **Incident Command System (ICS)** asosida tashkil etiladi. Ushbu tizimning asosiy afzalligi - barcha xizmatlarning yagona shtab orqali muvofiqlashtirilishi va joyida qaror qabul qilish imkoniyatidir [6,7,8].

Qutqaruv samaradorligi - bir yillik tahlillar ko'rsatdiki, ICSni qo'llash favqulodda vaziyatlarda javob berish vaqti o'rtacha 20-35%ga qisqarishiga olib keladi.

Ilmiy nuqtai nazardan, bu yondashuv **vaziyatli boshqaruv nazariyasiga** mos keladi va favqulodda vaziyatlarda vaqt yo'qotilishini minimallashtiradi.

Tuzilma - vaziyatli, modulli, barcha avariya xizmatlari uchun yagona rahbarlik tizimi.

Maqsad - barcha xizmatlarni (politsiya, yong'in xizmati, tibbiy yordam, qutqaruv guruhlar) birgalikda, muvofiqlashtirilgan tarzda harakat qildirish.

Natija - qutqaruv ishlarining samaradorligi - 20-30% ga oshadi, noto'g'ri qarorlar va boshqaruvdagi xatoliklar - 40%ga kamayadi.

Aholining roli - aholi hamda ixtiyoriy jamoalar asosiy “birinchi yordamchilar” sifatida faol ishtirok etadi.

Texnologik qo‘llab-quvvatlash - GIS xaritalari orqali favqulodda hududlarni monitoring qilish, dronlar va teplovizor kameralar bilan tirik qutqarish.

Ta’lim va mashg‘ulotlar: AQShda qutqaruvchilar va mahalliy aholi muntazam treninglar va simulyatsiyalar orqali tayyorlanadi.

Yaponiya tajribasi - Yaponiyada aholini favqulodda vaziyatlarga tayyorlash davlat siyosati darajasiga ko‘tarilgan. Mahallalarda ixtiyoriy qutqaruv guruhlarini faoliyat yuritadi.

Tadqiqotlarga ko‘ra, zilziladan keyingi birinchi 24 soat ichida qutqarilganlarning asosiy qismi aynan aholining o‘zi tomonidan qutqariladi. Bu holat **jamoaviy xavfsizlik (community-based disaster management)** konsepsiyasining yuqori samaradorligini isbotlaydi.

Community-Based Disaster Management.

Har bir mahallada ixtiyoriy qutqaruv guruhlarini tashkil qilingan.

Aholi muntazam mashg‘ulotlar va evakuatsiya treninglariga jalb qilinadi.

Xulosa - zilzila yoki seldan keyin birinchi 24 soatda qutqarilganlarning katta qismi mahalla a‘zolari tomonidan olib boriladi.

Qutqaruv ishlari tayyorgarligi - barcha maktablar va tashkilotlarda muntazam evakuatsiya mashg‘ulotlari o‘tkaziladi, qutqaruvchilar smenasi 4-6 soat bilan belgilanadi, charchoq samaradorlikka ta’sir qiladi, psixologik tayyorgarlik modullari joriy qilingan.

Germaniya tajribasi - Germaniyada qutqaruv ishlari modulli tizim asosida tashkil etiladi. Har bir guruh aniq vazifaga ixtisoslashgan bo‘lib, bu mehnat taqsimotining ilmiy tamoyillariga to‘liq mos keladi.

Modular Rescue System.

Qutqaruvchilar vazifalarga ixtisoslashgan - qidirish, vayronani olib tashlash, tibbiy yordam.

Natija - barcha jarayonlar aniq va samarali, qidirish vaqti 30-50% ga qisqaradi.

Federal va mahalliy javobgarlik - federal boshqaruv markazlari strategik rejalashtirishga mas’ul, mahalliy qutqaruv guruhlarini operativ qaror qabul qiladi.

Bunda de-sentralashtirish natijasida “golden hour” samaradorligi saqlanadi.

Turkiya tajribasi - Turkiyada dronlar, K9 itlar, akustik sensorlar kabi zamonaviy texnologiyalar keng qo‘llanilib, qidiruv ishlarining samaradorligi sezilarli darajada oshirilgan.

Zamonaviy texnologiyalar - dronlar, akustik sensorlar, K9 xizmat itlari. Har bir qurilishning 3D modeli yaratiladi va vayrona tahlili uchun AI algoritmlari qo‘llaniladi.

Tayyorgarlik va modullashtirish - qutqaruvchilar smenalari qisqa, tezkor qaror qabul qilish modullari amalda. Mahallalarda ixtiyoriy jamoalar bilan integratsiya yo‘lga qo‘yilgan.

Natija - qidiruv vaqti 40-50% ga qisqaradi, tirik qolish ehtimoli sezilarli darajada oshadi [9,10,11].

Qiyosiy tahlil

Davlat	Boshqaruv modeli	Aholining roli	Texnologiya	Vaqt samaradorligi	Ilmiy xulosa
AQSH	Sentral + modul	Ixtiyoriy jamoalar	GIS, dronlar	20–30% tezlashadi	ICS samaradorligi yuqori
Yaponiya	Jamoaviy	Mahalla asosiy	Bazaviy	1–24 soatda yuqori	Community-Based samarasi katta
Germaniya	Modulli	Cheklangan	3D model, sensor	30–50% tezlashadi	Ixtisoslashtirilgan tizim samarali
Turkiya	Modul+ texnologiya	Ixtiyoriy integratsiya	Dron, AI, sensor	40–50% tezlashadi	Texnologiya samaradorligi yuqori

Xorij tajribasi ko‘rsatadiki, samarador qutqaruv tizimi:

1. Vaqtga tez javob beradi;
2. Jamoaviy ishtiroki yuqori;
3. Zamonaviy texnologiyalardan foydalanish samaradorlikni sezilarli oshiradi.

Qutqaruv tizimi samaradorligining nazariy modeli.

Qutqaruv tizimi samaradorligi quyidagicha ifodalanadi:

$$S=f(T+B+R+M+A+X)$$

Bu yerda:

S – tizim samaradorligi;

T – tashkiliy boshqaruv sifati;

B – texnik-moddiy baza;

R – inson va logistika resurslari;

M – monitoring va axborot tizimi;

A – aholi tayyorgarligi;

X – xorijiy tajriba integratsiyasi.

Xorij tajribasini integratsiyalash modeli.

Xorijiy tajriba integratsiyasi koeffitsienti:

$$X = (E + I + T_x + S_x) \cdot K_m$$

Bu yerda:

E – ilg‘or boshqaruv modeli;

I – innovatsion texnologiyalar (GIS, dron);

T_x – xalqaro trening dasturlari;

S_x – xalqaro standartlar;

K_m – milliy moslashtirish koeffitsienti.

INSARAG standartlari qutqaruv guruhlarini xalqaro miqyosda sertifikatlash imkonini beradi.

Kompleks takomillashtirish modeli:

$$K_s = \alpha T + \beta B + \gamma R + \delta M + \theta X$$

Bu yerda koeffitsientlar ustuvorlik darajasiga qarab aniqlanadi.

Tahlillar shuni ko'rsatadiki, rivojlangan davlatlarda:

- tezkor boshqaruv markazlari raqamlashtirilgan;
- sun'iy intellekt asosida prognozlash tizimi mavjud;
- jamoatchilik ishtiroki yuqori;
- qutqaruv guruhlar xalqaro standartlarga muvofiq sertifikatlangan.

Samarali qutqaruv tizimi tezkorlikka yo'naltirilgan, jamoaviy ishtirok va texnologiyalar bilan ta'minlangan bo'lishi kerak. Xorij tajribasi O'zbekiston uchun gibridd boshqaruv modelini ishlab chiqishda asos bo'lishi mumkin. Vaqt omili va jamoaviy ishtirok birinchi o'rinda turishi lozim. O'tkazilgan ilmiy tahlil natijalari shuni ko'rsatadiki, qutqaruv ishlari samaradorligini oshirish faqat moddiy resurslar bilan emas, balki ilmiy boshqaruv, aholi tayyorgarligi va raqamli texnologiyalarni uyg'unlashtirish orqali amalga oshirilishi mumkin. Xorij tajribasini O'zbekiston sharoitiga moslashtirib joriy etish favqulodda vaziyatlar oqibatlarini sezilarli darajada kamaytiradi.

O'zbekistonda qutqaruv ishlarini tashkil etish va amalga oshirish tizimini takomillashtirish bugungi kunda davlat xavfsizligi va aholi muhofazasining ustuvor yo'nalishlaridan biri hisoblanadi. Tadqiqot natijalari shuni ko'rsatadiki, qutqaruv faoliyatining samaradorligi, avvalo, xavflarni oldindan baholash, zamonaviy boshqaruv mexanizmlarini joriy etish, kuch va vositalarning tezkor safarbarligini ta'minlash hamda idoralararo integratsiyani kuchaytirishga bog'liq.

Xorijiy tajriba tahlili, xususan, Federal Emergency Management Agency (AQSh), Technisches Hilfswerk (Germaniya) va Emergency Management Australia faoliyati shuni ko'rsatadiki, favqulodda vaziyatlarga tayyorgarlik ko'rish va javob berish tizimi ilmiy prognozlash, raqamli monitoring, ko'ngillilar harakatini rivojlantirish hamda jamoatchilikni o'qitish bilan chambarchas bog'liq. Ushbu tajribalar qutqaruv ishlarini boshqarishda yagona axborot makonini yaratish, tezkor qaror qabul qilish algoritmlarini ishlab chiqish va resurslarni hududiy xavf darajasiga qarab taqsimlash zarurligini tasdiqlaydi.

O'zbekistonda qutqaruv tizimini modernizatsiya qilish jarayonida Favqulodda vaziyatlar vazirligi faoliyatini innovatsion yondashuvlar asosida takomillashtirish, ilg'or texnologiyalarni joriy etish, xalqaro hamkorlikni kengaytirish hamda normativ-huquqiy bazani xalqaro standartlarga moslashtirish muhim ahamiyat kasb etadi. Bu borada O'zbekiston Respublikasi Prezidentining 2025-yil

20-oktabrdagi "Aholi va hududlarni favqulodda vaziyatlardan ishonchli muhofaza qilish sohasini sifat jihatidan yangi bosqichga ko'tarish to'g'risida"gi PF-185-son Farmoni, "Favqulodda vaziyatlar organlari faoliyatini yanada takomillashtirishga doir tashkiliy chora-tadbirlar to'g'risida"gi PQ-310 va "Favqulodda vaziyatlardan muhofaza qilish sohasini raqamlashtirish hamda ilmiy va innovatsion faoliyatni rivojlantirish chora-tadbirlari to'g'risida"gi PQ-311-son qarorlari qabul qilindi [4].

O'zbekiston Respublikasida qutqaruv ishlarini tashkil etish tizimini xorijiy tajriba asosida takomillashtirish:

- tizimli boshqaruv modelini joriy etish;
- raqamli monitoring platformalarini yaratish;
- xalqaro standartlarni implementatsiya qilish;
- mutaxassislar malakasini oshirish;
- aholi tayyorgarligini kuchaytirish orqali amalga oshirilishi lozim.

Taklif etilgan matematik model qutqaruv tizimini kompleks baholash va strategik rejalashtirish uchun ilmiy asos bo'lib xizmat qiladi.

Xorij tajribasini milliy sharoitga moslashtirgan holda ilmiy asosda joriy etish qutqaruv ishlarining tezkorligi, muvofiqlashtirilganligi va samaradorligini oshirishga xizmat qiladi. Bu esa favqulodda vaziyatlar oqibatlarini minimallashtirish, inson hayoti va sog'lig'ini himoya qilish hamda barqaror rivojlanishni ta'minlashning muhim omili hisoblanadi.

Foydalanilgan adabiyotlar ro'yxati:

1. O'zbekiston Respublikasining "Aholini va hududlarni tabiiy hamda texnogen xususiyatli favqulodda vaziyatlardan muhofaza qilish to'g'risida"gi Qonuni.
2. O'zbekiston Respublikasining "Qutqaruv xizmati va qutqaruvchi maqomi to'g'risida"gi Qonuni.
3. O'zbekiston Respublikasining "Volontyorlik faoliyati to'g'risida"gi Qonuni.
4. O'zbekiston Respublikasi Prezidentining favqulodda vaziyatlar tizimini takomillashtirishga oid farmon va qarorlari.
5. O'zbekiston Respublikasi Vazirlar Mahkamasining "Qutqaruv xizmatlari va qutqaruv tuzilmalarini favqulodda vaziyatlarni bartaraf etishga jalb qilish tartibi to'g'risidagi Nizomni tasdiqlash haqida"gi 2010-yil 5-yanvardagi 2-sonli Qarori.
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QUTQARUV ISHLARINING TURLARI

Annotatsiya. Mazkur maqolada favqulodda vaziyatlarni bartaraf etishda amalga oshiriladigan qutqaruv ishlarining asosiy turlari, ularning mazmuni va ahamiyati yoritilgan. Shuningdek, favqulodda vaziyatlarda boshqaruvning ko‘p bosqichli tizimi, kuch va vositalarning tezkor safarbar etilishi, resurslardan oqilona foydalanish ahamiyati ochib berilgan. O‘zbekiston Respublikasi Favqulodda vaziyatlar vazirligi tomonidan olib borilayotgan qutqaruv tadbirlarining tashkiliy-huquqiy asoslari ham yoritilgan. Favqulodda vaziyatlarda tezkorlik, muvofiqlashtirilgan harakat va zamonaviy texnik vositalardan foydalanish inson hayotini saqlab qolishda muhim omil ekani ta’kidlangan.

Kalit so‘zlar: favqulodda vaziyat, qutqaruv ishlari, xorijiy tajriba, boshqaruv tizimi, zamonaviy texnologiyalar.

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TYPES OF RESCUE WORK

Annotation. This article examines the main types of rescue operations conducted in emergencies, their content, and significance. It also explores the importance of a multi-level emergency management system, the rapid mobilization of forces and assets, and the rational use of resources. The organizational and legal framework for rescue operations conducted by the Ministry of Emergency Situations of the Republic of Uzbekistan is also examined. It emphasizes that in emergencies, speed, coordinated action, and the use of modern technical means are essential factors in saving lives.

Key words: emergency, rescue operations, foreign experience, management system, modern technologies.

Oxirgi yillarda jahon miqyosida tabiiy va texnogen xususiyatli favqulodda vaziyatlarning soni ortib bormoqda. Bunday sharoitda aholi va hududlarni tabiiy hamda texnogen xususiyatli favqulodda vaziyatlardan muhofaza qilish tizimlarining o‘rni kuchayib boradi. Insoniyatning rivojlanish tarixi tabiiy hamda texnogen xususiyatli favqulodda vaziyatlar bilan bog‘liqdir. Inson manfaati, uning

qadr-qimmati, salomatligi va xavfsizligini ta'minlash - kundalik hayotimiz jabhalarida dolzarb, ustuvor va muhim o'rinni egallaydi. Shu sababli, favqulodda vaziyatlarda qutqaruv ishlarini samarali tashkil etish va takomillashtirish zamonaviy xavfsizlik siyosatida muhim ahamiyatga ega. So'nggi yillarda tabiiy va texnogen xususiyatli favqulodda vaziyatlar ko'lamining kengayib borishi qutqaruv ishlarini samarali tashkil etish masalasini yanada dolzarb etmoqda. Aholi hayoti va sog'lig'ini himoya qilish, moddiy zararlarni kamaytirish hamda infratuzilmani tiklashda qutqaruvchilarning tayyorgarlik darajasi muhim ahamiyat kasb etadi.

O'zbekiston Respublikasi hududida yuzaga kelishi mumkin bo'lgan va sodir bo'lgan favqulodda vaziyatlarda qutqaruv ishlarini tezkor, samarali va sifatli tashkil etish hamda olib borish usul va taktikalarni to'g'ri tanlash, qo'llash zarurati bugungi kundagi sanoat, ishlab chiqarish, texnika va texnologiyalar rivojlangan davrda respublikamizda favqulodda vaziyatlarda insonlar hayotini saqlash, moddiy zararlarni kamaytirish hamda favqulodda vaziyat ko'lamini kengayib ketishini oldini olishda muhim ahamiyatga ega. Bu esa o'z navbatida mavjud qutqaruv ishlari usullari va taktikasini nazariy tomondan chuqur o'rganish, taxlil qilish orqali mavjud muammolarni yuzaga chiqarish, ushbu muammolarni yuzaga chiqarish orqali sodir bo'lgan har bir favqulodda vaziyatlarning xususiyatlari, kechishi, ko'lam va oqibatlaridan kelib chiqib yondoshuvni amalga oshiradi. Hech kimga sir emaski, katta ko'lamdagi favqulodda vaziyatlar o'zining og'ir oqibatlari, jiddiy talofotlari bilan ajralib turadi. Vaqt tanlamaydigan tabiiy yoki texnogen xususiyatli favqulodda vaziyatlar bir necha soniya ichida yuzlab, minglab insonlarning qurbon bo'lishiga va juda katta miqdorda iqtisodiy zarar keltirishi mumkin. Dunyoda so'nggi yillarda sodir bo'layotgan favqulodda vaziyatlar oqibatlarini bartaraf etish bilan bog'liq holatlarning amaliyoti shuni ko'rsatadiki, aholi va hududlarni favqulodda vaziyatlardan muhofaza qilish, sodir bo'lganda uning oqibatlarini tezkor bartaraf etishda o'tkaziladigan qutqaruv ishlarini qisqa fursatlarda, yo'qotishlarsiz, xavfsiz o'tkazish qisqa vaqt mobaynida innovatsion usullardan samarali foydalanish orqali qutqaruvchilarning mehnat faoliyati samaradorligini takomillashtirish dolzarb ahamiyat kasb etmoqda.

Sababi, favqulodda vaziyatlar oqibatlarini bartaraf etishda kuch va vositalar faoliyatini talab darajasida boshqarmaslik, kuch va vositalarning noto'g'ri taqsimlanishi, samarali qutqaruv ishlarini bajarish uchun zarur bo'lgan qimmatli vaqt o'tib ketishi natijasida aholi o'rtasida yo'qotishlar sonining ortishiga olib kelishi mumkin. Favqulodda vaziyatlarni oldini olish va sodir bo'lganda oqibatlarini bartaraf etish sohasida amalga oshirilayotgan islohotlar, katta hajmdagi ishlarga qaramasdan, sohani yanada rivojlantirish, bugungi kunning dolzarb masalalaridan bo'lib qolmoqda.

O'zbekiston Respublikasining 2008-yil 26-dekabrda "Qutqaruv xizmati va qutqaruvchi maqomi to'g'risida"gi Qonunining 1-bob 3-moddasida asosiy tushunchalar keltirilgan. Xususan:

favqulodda vaziyatlarni bartaraf etish - favqulodda vaziyatlar ro'y berganda o'tkaziladigan hamda odamlarning hayotini asrab qolish va sog'lig'ini

saqlashga, atrof tabiiy muhitga yetkaziladigan zarar va moddiy talafotlar miqdorini kamaytirishga, shuningdek favqulodda vaziyatlar ro'y bergan zonalarining kengayishiga yo'l qo'ymaslikka hamda xavfli omillar ta'sirini tugatishga qaratilgan qutqaruv ishlari va kechiktirib bo'lmaydigan ishlar majmui;

qutqaruv ishlari - favqulodda vaziyatlar zonasida odamlarning hayotini asrab qolish va sog'lig'ini saqlash, yuridik hamda jismoniy shaxslarning mol-mulkini, atrof tabiiy muhitni muhofaza qilish, favqulodda vaziyatlarni bartaraf etish va ularga xos bo'lgan xavfli omillar ta'sirini yo'qotish yoki imkon qadar kamaytirishga qaratilgan harakatlar deb ta'rif berilgan.

Mazkur Qonunning 6-moddasida esa qutqaruv ishlarining turlari umumiy qilib yoritilgan. Qutqaruv ishlariga avariya-qutqaruv, qidiruv-qutqaruv, tog'-kon qutqaruv, suv-qutqaruv, gaz-qutqaruv ishlari, shuningdek yong'inlarni o'chirish hamda boshqa tabiiy va texnogen xususiyatli favqulodda vaziyatlar oqibatlarini bartaraf etish bilan bog'liq ishlar kiradi.

Avariya-qutqaruv ishlari - odamlarni, moddiy va madaniy boyliklarni qutqarish, xavfli omillar ta'sirini tugatish va bartaraf etish bo'yicha ishlar majmui.

Qidiruv-qutqaruv ishlari - odamlarni, moddiy va madaniy boyliklarni topish va qutqarish, ularni xavfsiz joyga yetkazish, ma'lum bir hududlarda favqulodda vaziyatlar oqibatlari ta'sirini tugatish yoki imkon qadar kamaytirishga qaratilgan qutqaruv ishlar majmui.

Tog'-kon qutqaruv ishlari - yer osti va ochiq usulda tog' ishlarini olib borishda portlovchi materiallar va to'plangan kon gaz portlashlari, yong'inlar, gazlarning ifloslanishi, o'pirilish, geodinamik jarayonlar oqibatida gaz va tog' jinslarining otilishi, suv toshqini va boshqa turdagi avariyalarni tugatish va oqibatlarini bartaraf etish, odamlarni qutqarish, jabrlanganlarga yordam ko'rsatish bo'yicha qutqaruv va texnik ishlar majmui.

Suvda-qutqaruv ishlari - suv ostiga sho'ng'ish anjomlari yordamida suv havzalarida sodir bo'lgan baxtsiz hodisalar ta'sirini tugatish, oqibatlarini imkon qadar kamaytirish, odamlarni, moddiy va madaniy boyliklarni qutqarish, tabiiy muhitni muhofaza qilishga qaratilgan qutqaruv va texnik ishlar kompleksi.

Gaz-qutqaruv ishlari - toksik va (yoki) yong'in xavfi va yoki portlash xavfi yuqori bo'lgan materiallarni xavf darajasi belgilangan meyordan ortiq bo'lgan hududda sodir bo'lgan baxtsiz hodisalar ta'sirini tugatish, oqibatlarini imkon qadar kamaytirish, odamlarni, moddiy va madaniy boyliklarni qutqarish, tabiiy muhitni muhofaza qilishga qaratilgan qutqaruv va texnik ishlar majmui.

Yong'inlarni bartaraf etish bilan bog'liq ishlar - obyektlarda tog' ishlarini olib borish jarayonlarida tog' qazilmalarida sodir bo'lgan yong'inlardan tashqari, obyektlar va hududlardagi yong'inlarni bartaraf etishda odamlarni, moddiy va madaniy boyliklarni topish va qutqarishga, tabiiy muhitni muhofaza qilishga qaratilgan qutqaruv - texnik ishlar majmui.

Qutqaruv ishlari samaradorligini oshirish - favqulodda vaziyatlarda odamlarni tez va xavfsiz qutqarish, zararni kamaytirish hamda resurslardan

oqilona foydalanishni anglatadi. Samaradorlikni oshirish uchun bir nechta muhim yo'nalishlar mavjud. Xususan:

1. Tayyorgarlik va rejalashtirish - favqulodda vaziyatlar uchun aniq harakat rejalarini ishlab chiqish, qutqaruv bo'linmalari uchun muntazam mashq va treninglar o'tkazish, har bir hududda xavf tahlilini amalga oshirish.

2. Zamonaviy texnologiyalardan foydalanish - dronlar orqali ofat hududini kuzatish, GPS va raqamli xaritalardan foydalanib qutqaruvchilarni yo'naltirish, axborot tizimlari orqali tezkor ma'lumot almashish.

3. Tezkor aloqa va muvofiqlashtirish - qutqaruv xizmatlari, tibbiy yordam va huquqni muhofaza qiluvchi organlar o'rtasida yagona boshqaruv tizimi, radioaloqa va raqamli aloqa vositalarini yaxshilash.

4. Jihozlar va texnika - zamonaviy qutqaruv texnikasi, qutqaruvchilar uchun maxsus himoya kiyimlari va individual vositalar.

5. Aholini tayyorlash - aholiga favqulodda vaziyatlarda qanday harakat qilishni o'rgatish, maktab va tashkilotlarda evakuatsiya mashqlari o'tkazish.

6. Tahlil va tajriba almashish - har bir qutqaruv operatsiyasidan keyin tahlil qilish, xalqaro tajribalarni o'rganish va joriy qilish.

7. Natija - qutqaruv vaqti qisqaradi, qurbonlar soni kamayadi va resurslar samarali ishlatiladi.

Favqulodda vaziyatlar sodir bo'lganda o'tkaziladigan qutqaruv ishlari uchun kerakli kuch va vositalarni hisoblash:

$$N = \frac{S \cdot K}{P}$$

Bu yerda:

N - qutqaruvchilar soni,

S - zarar ko'rgan hudud maydoni (m^2 yoki km^2),

K - murakkablik koeffitsiyenti (vayrona darajasiga bog'liq),

P - bitta qutqaruvchining unumdorligi ($m^2 / soat$).

Qutqaruv ishlarini o'tkazish davomiyligi:

$$T = \frac{V}{N \cdot Q}$$

Bu yerda:

T - ishlar davomiyligi (soat),

V - bajarilishi kerak bo'lgan ishlar hajmi,

N - qutqaruvchilar soni,

Q - bitta qutqaruvchining ish samaradorligi.

Jabrlanganlarni evakuatsiya qilish vaqti:

$$T_{evak} = \frac{M}{R}$$

Bu yerda:

M - jabrlanganlar soni,

R - bir soatda evakuatsiya qilish imkoniyati.

Qutqaruv ishlari samaradorligi:

$$E = \frac{N_{qutqarilgan}}{N_{jabrlangan}} \times 100\%$$

Ilmiy asoslangan qutqaruv samaradorligini baholash formulasi:

$$R_s = \frac{Pr \cdot Tr \cdot Ch \cdot Ti}{Dt}$$

Bu yerda:

Rs - qutqaruv samaradorligi,

Pr - resurs va personal yetarliligi,

Tr - tezkorlik (vaqt omillari),

Ch - aholi va ixtiyoriy ishtirok koeffitsiyenti,

Ti - texnologiyalar integratsiyasi,

Dt - favqulodda vaziyatning qiyinchiligi (shiddati).

Izoh: bu formula qutqaruv samaradorligini har bir element bo'yicha ilmiy baholash imkonini beradi.

Misol tariqasida 2023-yilning fevral oyida Turkiya Respublikasida ro'y bergan kuchli zilzila oqibatlarini bartaraf etishda amaliy yordam ko'rsatish maqsadida, O'zbekiston Respublikasi Favqulodda vaziyatlar vazirligining professional qutqaruvchilari, qidiruv-qutqaruv transportlari va qidiruv itlari bilan qidiruv-qutqaruv ishlarida ishtirok etgan. Qutqaruvchilar belgilangan hududga yetib borish bilan 2 ta guruhlar tashkil etilib, 1-guruh "Ovakent" shaharchasida, 2-guruh Antakiya shahrining Odaboshi mahallasida qidiruv-qutqaruv ishlariga kirishishgan. Qidiruv-qutqaruv ishlari boshlanishidan qariyb 1 soatlar o'tib, ayol kishi zilziladan vayron bo'lgan binolar ichidan tirik holda olib chiqildi. Insonlarni vayronalar ostidan tirik holda olib chiqish holatlari kuniga 3-4 nafargacha amalga oshirildi va bu holatlar qariyb 6 kunlar davom etdi.

Birinchi kunlar xizmatni tashkil etishda aniq hududlarni belgilab olish, qidiruv-qutqaruv ishlari hududlariga shaxsiy tarkibni olib borish va olib kelish uchun transport vositalarini jalb etish, oziq-ovqat, ichimlik suvi, shuningdek, maishiy (*kirka, lopata, kuvalda va boshqa*) ish qurollarini harid qilishda bir muncha qiyinchiliklar yuzaga kelgan. Albatta

buning asosiy sabablari AFAD kordinatsion markazida ishlar to'liq tashkil etishning imkoniyati og'irligi, deyarli barcha binolar, shu jumladan barcha do'konlarda zilzila asoratlari ularning ish faoliyatini to'xtatganligi, turli davlatlardan yordam uchun qutqaruvchilarni tinimsiz kelishlari, ularni joylashtirish va boshqa tashkiliy masalalar bilan vaziyat to'liq nazoratga olinmagan holatlar edi. Shunday bo'lsada, qutqaruvchilarimiz missiyasining 2-3 kunlaridan boshlab, o'zlari qaror qabul qilib, ishlashi, shaxsiy tarkibning ovqatlanishi va boshqa tashkiliy masalalarni o'z joyiga qo'yishga muvassar bo'lishdi va bu ishlar qidiruv-qutqaruv jarayoniga ijobiy ta'sir ko'rsata boshladi.

Uch kun ichida "Ovakent" aholi punktida zilziladan vayron bo'lgan binolar ostida qolganlar to'liq olib chiqilib, bu to'g'risida AFAD kordinatsion markaziga ma'lumot berildi va ushbu aholi punkti Xatay provinsiyasining qidiruv-qutqaruv ishlari yakunlangan birinchi maskani sifatida qayd etildi. Shundan so'ng, AFAD koordinatsion markazi tomonidan O'zbekiston qutqaruvchilariga vayronalar ostida qolganlar soni ko'p bo'lgan "Atay Antakiya gospitali", Odaboshi mahallasidagi ko'p qavatli bino va mehmonxona ishonib topshirildi. Misol tariqasida 1 ta guruh (35-40 nafar qutqaruvchi, 1 ta qidiruv-qutqaruv texnikasi va 2 ta qidiruv itlari tarkibida) qariyb 75 soatlar davomida olib borilgan qidiruv-qutqaruv ishlari jarayonida "Atay Antakiya gospitali"dan 60 nafar insonlar (ya'ni davolanayotganlar)ning jasadlari hamda 2 nafar bemor vayronalar ostidan zilzila oqibatidan olgan tan jarohatlari bilan olib chiqildi. Qutqaruv ishlarini uzluksiz tashkil etish, oldindan hududlarni belgilash, qidiruv ishlari olib boriladigan aniq bino va inshootlarni tanlash, buning natijasida ish suratini ko'tarish, vaqtni tejash maqsadida alohida razvedka-qidiruv guruhlarini tashkil etilib, ushbu guruhlar vayronalar hududlarida binolar ostida qolganlarni aniqlash, qidiruv itlari esa ushbu binolarning aynan qaysi joyida inson borligini aniqlab berishdi. Bu esa qutqaruvchilarimizni xavfsiz ishlashini, vaqtni tejalishini va qidiruv-qutqaruv maydonini keng masshtabda olib borilishini ta'minladi. Qutqaruvchilarimiz qutqaruv ishlarini dunyoning turli mamlakatlaridan kelgan hamkasblari bilan yonma-yon, yelkama-yelka, qolaversa bir-biri bilan qutqaruv anjomlarini almashib ishlashga ko'p marotaba to'g'ri keldi. Bir-birini tillarini tushunmasada, maqsadi, kasbi va vazifasi bir bo'lganligi uchun harakatlarida hech qanday tushunmovchiliklar yuzaga kelmadi, aksincha bir-biridan ko'p narsalarni o'rgandi, halqaro miqyosdagi qutqaruvchilar maqomiga ega bo'lish uchun tajribalar orttirdi.

18 sutka davomida O'zbekiston qutqaruvchilari tomonidan 14 450 m² maydonda 19 400 m³ vayronalarni tozalash ishlari bajarilib, vayronalar ostidan 18 nafar insonlar turli darajadagi tana jarohatlari bilan olib chiqilib tibbiyot xodimlariga hamda 198 nafar insonlarning jasadlari topilib, yaqinlari, ular bo'lmagan hollarda tegishli idora vakillariga topshirilgan. Yuqoridagi qidiruv-qutqaruv ishlarini tezkorlik va samaradorlik bilan tashkil etish uchun 35 turdagi avariya-qutqaruv asbob-anjomlari, 10 turdagi elektr asbob-anjomlari, 3 turdagi moto asbob-anjomlari, 21 turdagi tog'-qutqaruv asbob-anjomlari, 11 turdagi qo'lda ishlatiladigan asbob-anjomlar hamda 13 turdagi boshqa asbob-anjomlar, shuningdek, 1 to'plam (*Inmansart*) sun'iy yo'ldoshli aloqa telefoni va 30 to'plam (*Hytera rusumli*) radioaloqa (garniturasini bilan) vositalaridan foydalanilgan.

Qutqaruv ishlarini tashkil etishni takomillashtirish bo'yicha tavsiyalar:

Qutqaruv ishlarini boshqarishda yagona markazlashgan tizimni joriy etish - favqulodda vaziyatlar vaqtida barcha xizmatlar faoliyatini muvofiqlashtiruvchi yagona boshqaruv markazini shakllantirish, vakolat va mas'uliyatlarni aniq belgilash orqali tezkor va samarali qaror qabul qilishni ta'minlash.

Zamonaviy raqamli va innovatsion texnologiyalarni keng joriy etish - qutqaruv ishlarida dronlar, GIS texnologiyalari, sun'iy yo'ldosh monitoringi, axborot-tahliliy platformalar va sun'iy intellekt imkoniyatlaridan foydalanish.

Qutqaruvchilarni tayyorlash va malakasini oshirish tizimini takomillashtirish - xorijiy ilg'or tajribalar asosida amaliy mashg'ulotlar, simulyatsion treninglar va xalqaro tajriba almashish dasturlarini kengaytirish.

Aholini favqulodda vaziyatlarga tayyorlash tizimini kuchaytirish - ta'lim muassasalari va mahallalarda muntazam o'quv mashg'ulotlari o'tkazish orqali aholining o'zini o'zi muhofaza qilish ko'nikmalarini shakllantirish.

Idoralararo hamkorlik va axborot almashuvini mustahkamlash - favqulodda vaziyatlarda ishtirok etuvchi barcha tashkilotlar o'rtasida tezkor va uzluksiz axborot almashuvini ta'minlovchi yagona raqamli platformani yaratish.

Normativ-huquqiy bazani takomillashtirish - qutqaruv ishlarini tashkil etish bo'yicha mavjud qonun va me'yoriy hujjatlarni xalqaro standartlar asosida qayta ko'rib chiqish hamda yangilash.

Xalqaro hamkorlikni rivojlantirish - xalqaro qutqaruv tashkilotlari bilan hamkorlikni kengaytirish, qo'shma mashg'ulotlar va treninglar o'tkazish orqali ilg'or tajribalarni amaliyotga joriy etish.

Xulosa o'rnida shuni aytib o'tish joizki, favqulodda vaziyatlardan so'ng, odamlarning hayotini asrab qolish va sog'lig'ini saqlash yuzasidan qutqaruv va boshqa kechiktirib bo'lmaydigan ishlarni amalga oshirishda vaziyatni to'g'ri baholash, tezkor qarorlar qabul qilish, qutqaruv ishlarining usullaridan hamda foydalaniladigan zamonaviy maxsus texnika, asbob-anjomlar, ta'minlovchi vositalardan to'g'ri va maqsadli foydalanishni taqozo etadi. Bu esa, o'z navbatida favqulodda vaziyatlarni bartaraf etish ishlari rahbaridan nazariy va amaliy bilim ko'nikmaga ega bo'lishlikni, har tomonlama chiniqqan, tayyorgarlikka ega bo'lgan, tajribali, qiyinchiliklardan qo'rqmaydigan, shijoatli, vatanparvarlar, o'z vakolatlariga muvofiq kuch va vositalar faoliyatini to'g'ri boshqara oladigan hamda o'zaro hamkorlikni muvofiqlashtirish kabi eng asosiysi esa fuqarolarning bebaho hayoti va sog'lig'ini saqlab qolishga erishiladi.

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ABDULLA AVLONIY ASARLARI ASOSIDA O'QUVCHILARDA KREATIV QOBILIYATNI SHAKLLANTIRISH

Annotatsiya: Mazkur maqolada A.Avloniy asarlari orqali o'quvchilarda kreativ fikrlash usullari hamda vositalari haqida fikr yuritiladi. O'quvchini kreativ fikrlashi bugungi kunda dolzarb masalalardan biri hisoblanadi. Kreativ fikrlash orqali o'quvchida mustaqil faoliyat, ijodkorlik namoyon bo'ladi. Ushbu usullar bevosita o'tmishdagi ajdodlarimiz asarlari orqali o'rgatilsa yanada maqsadga muvofiq bo'ladi.

Kalit so'zlar: kreativ fikrlash, o'quv jarayoni, zamonaviy ta'lim, pedagogik xususiyat

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FORMATION OF CREATIVE ABILITIES IN STUDENTS BASED ON THE WORKS OF ABDULLA AVLONI

Abstract: This article discusses the methods and tools of creative thinking in students through the works of A. Avloni. Creative thinking of students is one of the current issues today. Through creative thinking, independent activity and creativity are manifested in the student. It would be more appropriate if these methods were taught directly through the works of our ancestors in the past.

Keywords: creative thinking, educational process, modern education, pedagogical features

Kreativ qobiliyat zamonaviy ta'lim tizimida o'quvchilarning shaxsiy va intellektual rivojlanishida muhim omil sifatida e'tiborga olinadi. Boshlang'ich sinf yoshidagi o'quvchilar ijodiy fikrlash, mustaqil qaror qabul qilish va muammolarni ijodiy yechimlash qobiliyatlarini shakllantirish jarayonida ayniqsa sezilarli o'rivojlanish ko'rsatadi. O'quv jarayonini boyituvchi, ma'naviy va axloqiy qadriyatlarni uyg'otuvchi manbalarni aniqlash muhim ahamiyat kasb etadi.

Pedagogik xususiyatlari esa uning asarlarida aniq namoyon bo'ladi. Avloniy o'quvchilarni faqat bilim olishga emas, balki axloqiy qadriyatlarni qadrlashga, jamiyatda mas'uliyatli va faol shaxs bo'lishga o'rgatadi. Uning hikoya va maqolalaridagi vaziyatlar o'quvchilarda muammolarni hal qilish, ijtimoiy va axloqiy qarorlar qabul qilish ko'nikmalarini shakllantirishga xizmat qiladi. Shu nuqtai nazardan, Avloniy merosi pedagogik jihatdan boy va keng qo'llanish imkoniyatlariga ega bo'lib, boshlang'ich ta'lim jarayonida o'quvchilarda kreativ qobiliyatni rivojlantirish uchun samarali vosita sifatida baholanishi mumkin.

Nazariy jihatdan Avloniy ijodi tadqiqotchilar tomonidan bir nechta asosiy yoʻnalishlarda tahlil qilingan. Birinchi yoʻnalish — uning badiiy asarlarida milliy va maʼnaviy qadriyatlarni uygʻotish mexanizmlari. Tadqiqotchilar (X. Olimov, N. Qodirov va boshqalar) Avloniyning hikoya, maqola va publitsistik asarlarida axloqiy va maʼnaviy mavzular orqali oʻquvchilarni jamiyatdagi ijobiy harakatlarga, fidoyilik va masʼuliyatga ragʻbatlantirish xususiyatlarini taʼkidlaydilar.

Pedagogik xususiyatlari jihatidan, Avloniy asarlari oʻquvchilarning maʼnaviy tarbiyasiga katta hissa qoʻshadi. Hikoyalarda tasvirlangan vaziyatlar oʻquvchilarda axloqiy qarorlar qabul qilish va jamiyatdagi masʼuliyatli shaxs sifatida harakat qilish qobiliyatlarini shakllantiradi. Avloniy asarlarida taʼlim jarayonida oʻquvchilarni faqat bilim bilan taʼminlash emas, balki ularning shaxsiy va ijtimoiy koʻnikmalarini rivojlantirishga qaratilgan pedagogik elementlar mavjud. Shu bilan birga, asarlardagi badiiy va maʼnaviy mazmun pedagogik metodlar bilan birlashtirilganda, interaktiv va sinergetik yondashuvlarni qoʻllash orqali dars jarayonining samaradorligini oshirishga imkon beradi.

Abdulla Avloniy oʻz davrining yetakchi maʼrifatparvar pedagogi, adibi va jamoat arbobi sifatida tanilgan. Uning ijodi nafaqat badiiy, balki pedagogik va maʼrifiy jihatdan ham katta ahamiyatga ega boʻlib, oʻquvchilarning shaxsiy, axloqiy va intellektual rivojlanishida muhim vosita sifatida baholanadi. Avloniy asarlari oʻzining mazmun-mohiyati bilan oʻquvchilarni mustaqil fikrlash, ijodiy yondashuv va muammolarni yechish koʻnikmalarini rivojlantirishga qaratilgan. Shu sababli, uning merosi boshlangʻich sinf pedagogikasi va kreativ qobiliyatni shakllantirish masalalarida dolzarb ilmiy manba hisoblanadi.

Ilmiy tadqiqotlar shuni koʻrsatadiki, Avloniy asarlarida milliy ruh, maʼnaviy va axloqiy qadriyatlar bilan birga, oʻquvchilarda fantaziya va tasavvur qobiliyatini rivojlantirishga xizmat qiluvchi badiiy vositalar mujassamdir. Tadqiqotchilar X. Olimov, N. Qodirov, Sh. Yoqubovni Avloniy ijodining pedagogik ahamiyatini shuni bilan izohlashadiki, uning asarlari oʻquv jarayonida interaktiv va sinergetik metodlar bilan birlashtirilganda, oʻquvchilarda ijodiy fikrlashni rivojlantirishning samarali vositasi boʻlishi mumkin.

Avloniy ijodi oʻz davrida badiiy va pedagogik jihatdan keng qamrovli iz qoldirgan. Tadqiqotchilar uning asarlarida milliy ruh, axloqiy qadriyatlar va maʼnaviy-ijtimoiy mavzular orqali oʻquvchilarning kreativ fikrlashini ragʻbatlantirish mexanizmlari mujassam ekanini taʼkidlaydilar.

Nazariy jihatdan Avloniy ijodi bir nechta yoʻnalishda oʻrganilgan:

Badiiy yoʻnalish: Hikoya va maqolalarda dramatik voqealar, obrazlar va tasviriy vositalar orqali oʻquvchida tasavvur va fantaziyaning rivojlantirish.

Pedagogik yoʻnalish: Oʻquvchilarni faqat bilim bilan taʼminlash emas, balki ijodiy fikrlash, mustaqil qaror qabul qilish va muammolarni yechish koʻnikmalarini rivojlantirishga qaratilgan.

Avloniy ijodi boshlangʻich sinf pedagogikasi uchun nazariy jihatdan muhim ahamiyatga ega. Uning hikoya va maqolalaridagi badiiy va maʼnaviy elementlar oʻquvchilarda mustaqil fikrlash, ijodiy qaror qabul qilish va fantaziyaning

rivojlantirish imkonini beradi. Shu nuqtai nazardan, Avloniy asarlaridan foydalanish boshlang'ich sinf darslarida kreativ qobiliyatni shakllantirishning nazariy asosini tashkil qiladi.

Abdulla Avloniy asarlari boshlang'ich sinf o'quvchilarida ijodiy fikrlashni rivojlantirish, axloqiy qarorlar qabul qilish va muammolarni ijodiy yechimlash ko'nikmalarini shakllantirishning samarali nazariy va pedagogik vositasi sifatida baholanishi mumkin.

Xulosa

Avloniy asarlarida sodda va tushunarli til, boy badiiy tasvirlar, dramatik voqealar va axloqiy-ma'naviy mavzular uyg'unlashgan. Bu esa boshlang'ich sinf o'quvchilarini mustaqil fikrlashga, voqealarni tahlil qilishga va fantaziyalarini rivojlantirishga rag'batlantiradi. Shuningdek, pedagogik jihatdan Avloniy ijodi o'quvchilarda muammolarni ijodiy yondashuv bilan yechish, axloqiy qarorlar qabul qilish va jamiyatdagi mas'uliyatni anglash ko'nikmalarini shakllantirishga xizmat qiladi.

Avloniy asarlari interaktiv va sinergetik pedagogik metodlar bilan birlashtirilganda, boshlang'ich sinf darslarida kreativ qobiliyatni rivojlantirishning samarali vositasi bo'lib xizmat qiladi. Shu bilan birga, Avloniy ijodi zamonaviy ta'lim jarayonida o'quvchilarning shaxsiy rivojlanishini ta'minlash, ularni ijodiy fikrlashga rag'batlantirish va axloqiy qadriyatlarni singdirish bo'yicha nazariy asos sifatida muhim ahamiyatga ega.

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MUSULMON HUQUQIDA VOYAGA YETGAN MEHNAT LAYOQATLI FARZANDLARDAN OTA-ONAGA TA'MINOT UNDIRISH MASALALARI

Annotatsiya: Mazkur maqolada voyaga yetgan mehnatga layoqatli farzandlarning ota-onani moddiy ta'minlash majburiyatining islom huquqidagi nazariy asoslari hamda zamonaviy musulmon davlatlari qonunchiligida tartibga solinishi tahlil qilinadi. Tadqiqot davomida Qur'oni karim oyatlari, Payg'ambar Muhammad (s.a.v.) hadislarida ota-onaga nisbatan hurmat, g'amxo'rlik va moddiy yordam ko'rsatish majburiyati qanday asoslanganligi yoritiladi. Shuningdek, fiqhiy ta'limotlar va mufasssirlar qarashlari asosida mazkur majburiyatning huquqiy va axloqiy mohiyati ochib beriladi. Maqolada Saudiya Arabistoni, Eron, Misr, Iordaniya, Marokash, Pokiston, Malayziya va Indoneziya kabi davlatlarda ota-onani ta'minlash majburiyatining huquqiy tartibga solinishi ham qiyosiy-huquqiy jihatdan tahlil qilinadi. Tadqiqot natijasida farzandlarning ota-onani moddiy ta'minlash majburiyati islom huquqida diniy, axloqiy va huquqiy asosga ega ekani hamda ayrim davlatlarda u qonunchilik darajasida mustahkamlanganligi asoslab beriladi.

Kalit so'zlar: ota-ona ta'minoti, aliment majburiyati, islom huquqi, Qur'oni karim, hadis, fiqh, oilaviy huquq, musulmon davlatlari qonunchiligi, farzandlarning majburiyatlari, shariat tamoyillari.

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ISSUES OF COLLECTING MAINTENANCE FROM ADULT CAPABLE CHILDREN TO THEIR PARENTS IN MUSLIM LAW

Annotation: This article analyzes the theoretical and legal foundations of the obligation of adult able-bodied children to provide financial support to their parents in Islamic law and examines its regulation in the legal systems of contemporary Muslim states. The study explores the provisions of the Qur'an and the hadiths of Prophet Muhammad (peace be upon him), which emphasize the duty of children to respect, care for, and financially support their parents. Based on the works of Islamic scholars and jurists, the legal and moral nature of this obligation is revealed. The article also provides a comparative legal analysis of the

regulation of parental maintenance obligations in countries such as Saudi Arabia, Iran, Egypt, Jordan, Morocco, Pakistan, Malaysia, and Indonesia. The study concludes that the obligation of children to support their parents in Islamic law is grounded in religious, moral, and legal principles and is formally закреплена in the legislation of several Muslim states.

Keywords: *parental maintenance, alimony obligations, Islamic law, Qur'an, hadith, fiqh, family law, legislation of Muslim countries, duties of children, Sharia principles.*

Zamonaviy musulmon huquqiy tizimlarida voyaga yetgan mehnatga layoqatli farzandlarning ota-onani moddiy ta'minlash majburiyati masalasi turli davlatlarda turlicha huquqiy yondashuvlar asosida tartibga solinadi. Xususan, Saudiya Arabistoni va Eron kabi davlatlarda mazkur majburiyat bevosita shariat normalariga tayangan holda diniy-huquqiy burch sifatida e'tirof etilsa, Misr, Iordaniya va Marokash singari mamlakatlarda u musulmon huquqining an'anaviy qoidalariga asoslangan holda oila huquqi doirasida kodifikatsiyalangan. Pokiston, Malayziya va Indoneziya kabi aralash huquq tizimiga ega davlatlarda esa ota-onani ta'minlash majburiyati musulmon huquqi tamoyillarini zamonaviy sud amaliyoti bilan uyg'unlashtirgan holda tartibga solinadi. Ushbu davlatlar tajribasini tahlil qilish voyaga yetgan farzandlarning ota-onaga nisbatan ta'minot majburiyatining huquqiy mohiyatini chuqurroq anglash va milliy qonunchilikni takomillashtirish uchun muhim nazariy va amaliy ahamiyat kasb etadi.

Muallif tomonidan olib borilgan tahlil natijalariga ko'ra, islom huquqida farzandlarning ota-onaga nisbatan ta'minot (aliment) berish majburiyati Qur'oni karim oyatlari, Payg'ambar sunnati hamda islom ulamolarining fiqhiy qarashlariga asoslanadi. Ushbu majburiyatning huquqiy-axloqiy mohiyati, avvalo, Qur'oni karimda belgilab berilgan umumiy ijtimoiy adolat va oilaviy mas'uliyat tamoyillarida o'z aksini topgan.

Xususan, **Baqara surasining 215-oyatida** mol-mulkni sarflash masalasida ustuvor yo'nalishlar belgilab berilgan bo'lib, unda birinchi navbatda ota-onaga yordam ko'rsatish zarurligi qayd etiladi. Mazkur oyat mazmunidan kelib chiqib, farzand tomonidan amalga oshiriladigan har qanday moddiy yordam eng avvalo ota-onaning ehtiyojlarini qondirishga yo'naltirilishi lozimligi anglashiladi. Al-Marog'iy ushbu oyatga bergan tafsirida, ota-onaning ustuvorligi ularning farzandni bolalikdan voyaga yetguniga qadar tarbiyalab, kamolga yetkazganligi bilan izohlanishini ta'kidlaydi. Demak, ota-onaga ta'minot berish nafaqat ijtimoiy majburiyat, balki axloqiy qarzdorlik sifatida ham baholanadi¹⁰.

Shuningdek, M. Quraish Shihob tomonidan yozilgan *Tafsir al-Mishbah* asarida¹¹ Baqara surasining 215-oyati moliyaviy yordam ko'rsatishda ketma-ketlik

¹⁰ Al-Maraghi, Ahmad Mustafa. *Tafsir al-Maraghi*. Cairo: Dar al-Fikr, 1984, vol. 2, b. 135–136.

¹¹ Shihab, M. Quraish. *Tafsir al-Mishbah: Pesan, Kesan, dan Keserasian al-Qur'an*. Jakarta: Lentera Hati, 2002, jilid 1, b. 472–473.

va ustuvorlik mezonlarini belgilovchi norma sifatida talqin qilinadi. Ushbu talqinga ko'ra, moddiy yordam ko'rsatishda ona va ota birinchi o'rinda turadi, chunki ular farzandning dunyoga kelishi va kamol topishiga bevosita sababchi bo'lgan shaxslardir. Shundan keyin qarindoshlar, yetimlar, muhtoj shaxslar hamda yo'lda qolgan kishilar ta'minlanishi lozim bo'lgan ijtimoiy guruhlar sifatida e'tirof etiladi.

Mazkur yondashuv O'zbekiston huquqshunos olimlari tomonidan ham qo'llab-quvvatlanadi. Jumladan, H.R. Rahmonqulovning ta'kidlashicha, ota-onani moddiy jihatdan ta'minlash farzand zimmasidagi oilaviy-huquqiy majburiyat bo'lib, u nafaqat huquqiy norma, balki chuqur axloqiy mazmunga ham ega. Olimning fikricha, mazkur majburiyat oilaning barqarorligini ta'minlash hamda avlodlararo mas'uliyatni mustahkamlashga xizmat qiladi.¹²

Mazkur yondashuv O'zbekistonlik islomshunos olimlar qarashlarida ham o'z ifodasini topgan. Jumladan, Muhammad Sodiq Muhammad Yusuf ota-onaga nisbatan g'amxo'rlik va ularni moddiy jihatdan ta'minlash farzand zimmasidagi majburiyat ekanini ta'kidlab, bu majburiyat Qur'oni karim va sunnatga asoslangan qat'iy axloqiy hamda diniy talab sifatida qaralishini qayd etadi. Olimning fikricha, ota-onani ta'minlash farzandning ixtiyoriy ehsoni emas, balki uning zimmasidagi mas'uliyat bo'lib, u farzandning imkoniyatlari doirasida amalga oshirilishi lozim.¹³

Bundan tashqari, **Niso surasining 36-oyati** ham ota-onaga yaxshilik qilish masalasida muhim huquqiy-axloqiy asos bo'lib xizmat qiladi. Ushbu oyatda Allohga ibodat qilish va Unga shirk keltirmaslik haqidagi buyruqdan so'ng, ota-onaga yaxshilik qilish alohida ta'kidlanadi. Bu holat ota-onaga hurmat va g'amxo'rlik qilish islomiy qadriyatlar tizimida yuksak o'ringa ega ekanini ko'rsatadi¹⁴.

Tafsir al-Mishbahda qayd etilishicha, mazkur oyatda ota-onani ifodalash uchun "al-validain" atamasining qo'llanilishi bejiz emas. Ushbu atama biologik ota va onani anglatib, farzandning ular oldidagi mas'uliyatini yanada kuchliroq ma'noda ifodalaydi¹⁵. M. Quraish Shihobning ta'kidlashicha, "valid" va "validat" so'zlari biologik ota-onani bildiradi va bu jihat farzandlarning aynan o'z ota-onalariga nisbatan moddiy va ma'naviy majburiyatlarini aniq belgilashga xizmat qiladi. Bu esa "abb" va "umm" atamalaridan farq qiladi, chunki mazkur so'zlar biologik bo'lmagan ota-onaga nisbatan ham qo'llanilishi mumkin¹⁶.

Umuman olganda, Qur'oni karim oyatlari va ularning mufasssirlar tomonidan berilgan talqinlari islom huquqida farzandlarning ota-onani ta'minlash

¹² Rahmonqulov, H.R. *Oila huquqi*. Toshkent: TDYUI nashriyoti, 2012. 210–218-betlar.

¹³ Muhammad Sodiq Muhammad Yusuf. Baxtiyor *oila*. Toshkent: Hilol-Nashr, 2017. B 143–146.

¹⁴ Muhammad Sodiq Muhammad Yusuf. *Tafsiri Hilol*. Toshkent: Hilol-Nashr, 2016. 1-jild, b. 318–320.

¹⁵ Shihab M. Quraish. *Tafsir al-Mishbah: Pesan, Kesan, dan Keserasian al-Qur'an*. Jakarta: Lentera Hati, 2002. Jilid 2, 268–270-betlar.

¹⁶ Shihab, M. Quraish. *Tafsir al-Mishbah: Pesan, Kesan, dan Keserasian al-Qur'an*. Jakarta: Lentera Hati, 2002. Jilid 2, b 269–271.

majburiyati qat'iy axloqiy va huquqiy asosga ega ekanini ko'rsatadi. Mazkur qoidalar keyinchalik fiqhiy ta'limotlar orqali rivojlantirilgan bo'lib, ota-onani moddiy jihatdan qo'llab-quvvatlash farzand zimmasidagi muhim majburiyat sifatida e'tirof etiladi.

Isro surasining 23-oyatida farzandlarning ota-onaga nisbatan axloqiy va huquqiy mas'uliyati qat'iy belgilab berilgan. Ushbu oyatda Alloh taolaga ibodat qilish buyrug'i bilan bir qatorda, ota-onaga yaxshilik qilish majburiyati ham alohida ta'kidlanadi. Xususan, ota-onaning biri yoki ikkalasi farzand qaramog'ida keksayib qolgan taqdirda, ularga nisbatan hatto eng kichik norozilik ifodasi ham bildirilmasligi, aksincha, muloyim va hurmatli so'zlar bilan muomala qilinishi lozimligi ko'rsatib o'tiladi¹⁷.

Mazkur oyat mazmunidan kelib chiqib aytish mumkinki, islom huquqida ota-onaga nisbatan hurmat, ehtirom va g'amxo'rlik nafaqat axloqiy fazilat, balki majburiy xulq-atvor qoidasi sifatida qaraladi.

Luqmon surasining 14–15-oyatlari majmuasidan anglashiladiki, ota-onaga ehtirom ko'rsatish umumiy va doimiy majburiyat hisoblanadi. Ushbu majburiyat ota-onaning hayotlik davrida ham, vafotidan keyin ham ularga yaxshilik qilishni nazarda tutadi. Tadqiqotchilar fikriga ko'ra, ota-onaga bo'lgan bunday ehtiromning muhim ko'rinishlaridan biri — farzandning o'z moddiy imkoniyatlari doirasida ota-onaning asosiy ehtiyojlarini, xususan kundalik oziq-ovqat bilan ta'minlash majburiyatidir. Bu holat islom huquqida farzandlarning ota-onani ta'minlashga doir mas'uliyatining huquqiy va axloqiy asosini tashkil etadi.

Mazkur oyat mazmuni O'zbekistonlik islomshunos olimlar tomonidan ham keng sharhlangan. Xususan, Muhammad Sodik Muhammad Yusuf Luqmon surasining 14–15-oyatlarini izohlar ekan, ota-onaga itoat qilish majburiyati **e'tiqod masalasidan mustasno** ekanini ta'kidlaydi. Olimning fikricha, agar ota-onalar farzandni Allohga shirk keltirishga majburlasalar, bu masalada ularga bo'ysunilmaydi, biroq dunyoviy munosabatlarda ota-onaga nisbatan hurmat, yaxshilik va odob doirasidagi muomala saqlanib qolishi shart. Bu holat islomda ota-onaga bo'lgan hurmat mutlaq itoat emas, balki **axloqiy mas'uliyat va muvozanat tamoyiliga** asoslanganini ko'rsatadi¹⁸.

Shuningdek, Alouddin Mansur o'zining Qur'on tarjimasini va sharhlarida Luqmon surasi 15-oyatini sharhlar ekan, mazkur oyat ota-onaga nisbatan muomalada **aqida va axloq o'rtasidagi chegarani** belgilab berishini qayd etadi. Uning ta'kidlashicha, e'tiqod masalasida Allohga itoat ustuvor bo'lsa-da, ota-onaga nisbatan dunyoviy hayotda yaxshilik qilish, ularga g'amxo'rlik ko'rsatish va odob bilan munosabatda bo'lish farzand zimmasidagi uzluksiz burch

¹⁷ Qur'oni karim va o'zbek tilidagi ma'nolar tarjimasini. Toshkent: Hilol-Nashr, 2019. Isro surasi, 23-oyat.

¹⁸ Muhammad Sodik Muhammad Yusuf. *Tafsiri Hilol*. Toshkent: Hilol-Nashr, 2016. 1-jild, 348–350-betlar. (Luqmon surasi 14–15-oyatlar tafsiri).

hisoblanadi. Bu yondashuv farzandning ota-onaga bo'lgan munosabatida muvozanatli va mas'uliyatli pozitsiyani shakllantiradi.¹⁹

Islom huquqida farzandlarning ota-onani moddiy jihatdan qo'llab-quvvatlash majburiyati nafaqat Qur'oni karim oyatlarida, balki Payg'ambar Muhammad (s.a.v.) hadislarida ham mustahkam asoslangan. Quyidagi hadislar ushbu majburiyatning huquqiy va axloqiy mohiyatini ochib beradi.

Birinchidan, **Sunan Ibn Mojja**²⁰ to'plamida keltirilgan hadisda ota-onaning farzand mol-mulkidan foydalanish huquqi masalasi yoritiladi. Mazkur rivoyatda Jabir ibn Abdulloh (r.a.)dan naql qilinishicha, bir kishi Payg'ambarimizga (s.a.v.) murojaat qilib, o'zining mol-mulki va farzandlari borligini, shu bilan birga otasining ham ushbu mol-mulkka ehtiyoji mavjudligini bildiradi. Shunda Rasululloh (s.a.v.) farzand va uning mol-mulki ota uchun ekanini ta'kidlaydi (Ibn Mojja, 2282). Ushbu hadis ota-onaning ehtiyojlari mavjud bo'lgan holatda farzandning mol-mulkidan foydalanish huquqiy va axloqiy jihatdan oqlanishini ko'rsatadi.

Ikkinchidan, **Sahih al-Buxoriy**da rivoyat qilingan hadisda²¹ oila a'zolarini ta'minlash ibodat darajasiga ko'tarilishi bayon etiladi. Unda Rasululloh (s.a.v.) musulmon kishi o'z oilasini ta'minlash maqsadida mol sarflab, buning evaziga Allohdan savob umid qilsa, bu amal uning uchun sadaqa hisoblanishini marhamat qilgan (Buxoriy, 5351). Ushbu hadis farzand tomonidan ota-onani moddiy ta'minlash nafaqat majburiyat, balki savobli amal ekanini ham anglatadi.

Uchinchidan, **Sunan Abu Dovud** to'plamida keltirilgan hadisda ota-onaga bo'ysunish va ehtirom ko'rsatishning ustuvorligi ta'kidlanadi. Rivoyatda bir sahoba Rasululloh (s.a.v.)dan kimga birinchi navbatda itoat etish lozimligini so'raganida, Payg'ambarimiz (s.a.v.) bir necha bor "onang" deb javob berganlar (Abu Dovud, 5139). Ushbu hadis ota-onaga, xususan onaga bo'lgan hurmat va g'amxo'rlik islomiy qadriyatlar tizimida eng yuqori o'rinda turishini ko'rsatadi²².

Umuman olganda, mazkur hadislar islom huquqida farzandlarning ota-onaga nisbatan moddiy ta'minot berish majburiyati qat'iy diniy asosga ega ekanini tasdiqlaydi.

Yuqorida bayon etilgan Qur'oni karim oyatlari va hadislarida mustahkamlangan ota-onani moddiy jihatdan ta'minlash majburiyati zamonaviy musulmon davlatlarining ayrimlarida bevosita qonunchilik darajasida ham mustahkamlangan. Jumladan, Pokiston huquq tizimida voyaga yetgan va mehnatga layoqatli farzandlarning ota-onani moddiy ta'minlash majburiyati alohida qonun bilan tartibga solingan. Xususan, *Muslim Family Laws Ordinance*,

¹⁹ Alouddin Mansur. *Qur'oni karim ma'nolarining tarjimasi va tafsiri*. Toshkent: Cho'lpon, 2004. Luqmon surasi, 15-oyat sharhi

²⁰ Ibn Majah, Muhammad ibn Yazid. *Sunan Ibn Majah*. Bayrut: Dar al-Fikr, 1994. Hadis № 2282.

²¹ Al-Buxoriy, Muhammad ibn Ismoil. *Sahih al-Buxoriy*. Bayrut shahri: Dar al-Fikr, 1994. Hadis № 5351.

²² Abu Dovud, Sulaymon ibn Ash'as. *Sunan Abu Dovud*. Bayrut shahri: Dar al-Fikr, 1994. Hadis № 5139.

1961²³ Pokiston oilaviy munosabatlar bo'yicha birinchi keng qamrovli tartibga solish bo'lib, u nikoh, ajrim, meros va nafaqah (moddiy ta'minot) kabi oilaviy majburiyatlarni kodifikatsiya qiladi. Ushbu norma orqali sudlar musulmon shaxsiy huquq tamoyillariga binoan voyaga yetgan farzandlar va ota-onalar o'rtasidagi moddiy ta'minot masalalarini hal etishda shariat prinsiplarini inkorporatsiya qilgan holda qaror qabul qiladi.

Shuningdek, Pokistonning Parents Maintenance Act, 2021 qonunida voyaga yetgan mehnatga layoqatli farzandlar o'z ota-onalarining o'zini boqishga qodir emasligi aniqlangan holatda ularni moddiy ta'minlashga majbur ekani aniq belgilangan. Ushbu norma farzandlarning ota-onani moddiy jihatdan qo'llab-quvvatlash majburiyatini bevosita huquqiy mezon sifatida tan oladi va uni sud orqali majburiy undirish mexanizmini yaratadi²⁴

Ota-onaning ehtiyojlarini qondirish, ularni parvarish qilish va moddiy qo'llab-quvvatlash farzand zimmasiga yuklangan nafaqat axloqiy, balki huquqiy mas'uliyat sifatida ham e'tirof etiladi.

Shu tariqa, Qur'oni karim oyatlari va sunnatda belgilangan ota-onani ta'minlash majburiyati islom huquqida faqat axloqiy tavsiya sifatida emas, balki voyaga yetgan va mehnatga layoqatli farzand zimmasiga yuklatilgan majburiyat sifatida qaraladi. Mazkur majburiyat bajarilmagan taqdirda, fiqhiy ta'limotlarda ota-onaning ta'minot talab qilish huquqi mavjudligi e'tirof etiladi.

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²³ Muslim Family Laws Ordinance, 1961, elektron manba: <https://pakistancode.gov.pk/english/UY2FqaJw1-apaUY2Fqa-apaUY2Npa5po-sg-jjjjjjjjjjjj>

²⁴ "Parents Maintenance Act, 2021", Provincial Assembly of the Punjab (Pakistan). Qonun matni: Punjab Legal Portal. elektron manba: <http://punjablaws.punjab.gov.pk/>

CONTEXTUAL SYNONYMY IN CONTEMPORARY FRENCH: IMPLICATIONS FOR TRANSLATION ACCURACY AND SEMANTIC NUANCE

Abstract: *This article examines contextual synonymy in contemporary French—the condition where words considered semantically equivalent diverge in connotation, register, and pragmatic force depending on context. Using corpus linguistics, cognitive semantics, and translation theory, it argues that conventional models of synonymy inadequately capture the layered behavior of French vocabulary. Analysis across literary, journalistic, legal, and colloquial registers shows that translators face systematic challenges from contextual misalignment rather than lexical gaps. The article proposes a contextual synonymy framework integrating collocational, pragmatic, and sociolinguistic dimensions, with implications for translator training, machine translation, and lexicography.*

Keywords: *contextual synonymy, French lexicology, translation accuracy, semantic nuance, pragmatics, register, collocational meaning, cognitive semantics.*

Introduction: The Illusion of Equivalence

A common assumption in translation is that synonyms are interchangeable. In French, words sharing dictionary definitions often encode different social worlds, emotional tones, and epistemic stances. Treating *maison* and *demeure* or *regarder* and *observer* as identical may yield translations that are technically correct but pragmatically foreign.

Contextual synonymy—the divergence of lexical equivalents depending on usage—has long been acknowledged theoretically, but its systematic implications for translation remain underexplored. Most scholarship emphasizes historical lexicology or register codification, leaving a gap for frameworks integrating cognitive, pragmatic, and sociolinguistic dimensions relevant to translation.

This article addresses this gap by revisiting synonymy theory, examining near-synonyms across registers, highlighting challenges for English translation, and sketching implications for pedagogy, computational translation, and bilingual resource design. Methodology is corpus-informed, drawing on contemporary French prose, journalism, legislation, and spoken corpora. The goal is to provide a practical framework for understanding how context shapes semantic value.

Method: Theoretical Foundations: Synonymy Reconsidered

Classical Approaches and Limitations

Classical French linguistics distinguishes absolute synonymy—perfect interchangeability—and partial synonymy, which diverges in collocation, register, or connotation. Saussure’s insight that meaning exists relationally implies that true

synonymy is rare. Structural semanticists and Mounin emphasised that apparent synonyms usually differ in usage, sometimes latently.

Cognitive semantics reinforces this: words activate mental frames that include social roles and evaluative orientations. Choosing *peur* vs. *crainte*, or *liberté* vs. *franchise*, positions the speaker within particular conceptual and social landscapes rather than simply naming a concept.

Contextual Synonymy

Contextual synonymy occurs when words are semantically equivalent only in specific contexts but diverge elsewhere. Unlike general approximations of synonymy, this concept emphasizes the context as the determining variable.

For French near-synonyms, three contextual dimensions are crucial:

1. **Register** (formal/informal, written/spoken, technical/general)
2. **Collocational patterns** (typical lexical and syntactic partners)
3. **Pragmatic-evaluative stance** (attitudinal colouring in choice)

French maintains sharp register distinctions due to literary and administrative traditions. Words like *maison*, *demeure*, *logis*, *domicile*, *résidence*, *habitation* all refer to dwellings but differ in everyday, literary, legal, or technical contexts. Translators must navigate these distinctions, for instance, when rendering legal documents or literary texts.

Reporting verbs (*dire*, *affirmer*, *prétendre*, *déclarer*, *soutenir*, *alléguer*) encode nuanced epistemic stances. English equivalents such as *to say* risk flattening these distinctions.

Spoken and Written Divergence

French spoken vs. written registers diverge sharply. Lexical pairs like *commencer/débuter* or *demander/solliciter* are distributed asymmetrically across registers. Literary texts may mix registers to create irony or stylistic effects, complicating translation into English, which organizes register differently.

Collocational Dimension

Collocation differentiates near-synonyms in practice. *Fort* and *puissant* both translate as “strong,” but their collocates differ (coffee, personalities vs. organisations, machines).

Adjectives like *ancien* and *vieux* also signal meaning through position: *mon ancien professeur* (former teacher) vs. *un professeur ancien* (long-standing scholar); *un vieux copain* (familiar friend) vs. *un homme vieux* (physically old).

Corpus Evidence

Corpus analysis confirms collocational patterns. Verbs of visual attention—*regarder*, *observer*, *contempler*, *fixer*—differ by context and emotional nuance. English does not map one-to-one, requiring translators to match function rather than dictionary meaning.

Results and Discussion:

Pragmatic-Evaluative Dimensions

Evaluation in Lexical Choice

Near-synonyms encode social and attitudinal nuances. *Économe*, *frugal*, *avare*, *radin* describe someone who spends little, but with sharply varying

connotations. Similarly, *savant*, *érudit*, *intellectuel*, *lettré* differ in social and cultural nuance. Flattening these in translation erases evaluative meaning.

Literary Translation

French literary prose, e.g., Annie Ernaux, uses subtle lexical choices (*modeste*, *convenable*, *correct*) to signal class and ideology. Emotional terms (*tristesse*, *mélancolie*, *chagrin*, *peine*, *désespoir*) also resist direct English equivalents, requiring careful contextual matching.

Lexical Gaps and False Friends

Some French words have no exact English equivalents. *Manquer* (“I miss him” structure), *se douter*, *dépaysser*, and *énervé* illustrate challenges for translation. False friends (*sensible*, *éventuellement*) appear similar but differ in meaning. Contextual awareness, including collocation and register, is essential.

7. Machine Translation and Limits

Neural MT performs well on high-frequency patterns but struggles with contextual synonymy, especially in literature, political discourse, and spoken registers. Stylistic and attitudinal distinctions often require human interpretive judgment beyond current models’ capabilities. Translation pedagogy should emphasize **contextual analysis** over static synonym exercises, engaging learners with corpora and registers. Bilingual dictionaries must include collocational information, nuanced register labels, and context examples.

A “contextual thesaurus” organizing semantic clusters could better guide translators and lexicographers, providing structured insight into the contextual constraints of near-synonyms.

Cross-Cultural Semantic Nuance

French lexical choices reflect cultural and ideological positioning. Words like *liberté*, *authenticité*, *engagement* encode traditions and evaluative frameworks absent in English equivalents. Translators must read both linguistically and culturally to preserve meaning across languages, especially in philosophy and political texts.

Conclusion

Contextual synonymy presents systematic challenges for translation, shaped by register, collocation, and pragmatic-evaluative nuance. Translators need contextual sensitivity, corpus-based investigation, and awareness of cultural positioning. Lexicographers and MT developers must also consider context-rich tools. Understanding contextual synonymy is crucial for reproducing full communicative and cultural meaning, beyond mere semantic equivalence.

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ARTIFICIAL INTELLIGENCE IN TECHNICAL AND APPLIED SCIENCES: INNOVATIONS AND DIGITAL TECHNOLOGIES

Abstract. *Artificial Intelligence (AI) has revolutionized technical and applied sciences, driving innovations through digital technologies such as machine learning, big data analytics, and automation. This article explores the integration of AI in fields like engineering, materials science, and environmental monitoring, highlighting key advancements as of 2026. We discuss case studies, challenges, and future prospects, emphasizing AI's role in enhancing efficiency, sustainability, and problem-solving capabilities. Drawing from recent developments, the paper underscores the need for ethical frameworks and interdisciplinary collaboration to maximize AI's potential in technical domains.*

Keywords: *Artificial Intelligence, Technical Sciences, Innovations, Digital Technologies, Machine Learning, Automation*

Introduction

The convergence of Artificial Intelligence (AI) and technical-applied sciences represents a paradigm shift in how we approach innovation and problem-solving. AI, encompassing technologies like neural networks, deep learning, and natural language processing, integrates seamlessly with digital tools to augment human capabilities in engineering, physics, chemistry, and related fields. As of 2026, with advancements in quantum computing and edge AI, these integrations have accelerated, enabling real-time data processing and predictive modeling on unprecedented scales.

This article aims to elucidate the transformative impact of AI on technical sciences, focusing on innovations in digital technologies. We begin with a literature review, followed by discussions on specific applications, challenges, and future directions. The objective is to provide a comprehensive overview for researchers, practitioners, and policymakers interested in leveraging AI for societal benefits.

Literature Review

The evolution of AI in technical sciences can be traced back to the mid-20th century, but recent decades have seen exponential growth. Pioneering works, such as those by Turing (1950) on machine intelligence, laid foundational concepts, while modern contributions from Goodfellow et al. (2016) on deep learning have enabled practical applications.

In engineering, AI-driven simulations have optimized design processes. For instance, generative adversarial networks (GANs) are used in materials science to predict molecular structures (Sanchez-Lengeling & Aspuru-Guzik, 2018). In environmental sciences, AI models analyze satellite data for climate

forecasting, as demonstrated in studies by Rolnick et al. (2019) on tackling climate change with machine learning.

Digital technologies amplify these efforts: Internet of Things (IoT) devices generate vast datasets, processed via AI for insights in smart manufacturing (Lee et al., 2018). Blockchain integration with AI ensures secure data handling in applied sciences, particularly in supply chain management (Kshetri, 2018).

Recent 2026 literature highlights edge AI in robotics, where decentralized processing reduces latency in autonomous systems (Chen et al., 2025). These advancements underscore AI's role in fostering innovation across technical domains.

Innovations in AI and Digital Technologies

AI in Engineering and Automation

AI has introduced innovative solutions in mechanical and civil engineering through predictive maintenance and optimization algorithms. For example, reinforcement learning models simulate structural integrity in bridges, predicting failures with 95% accuracy (Zhang et al., 2024). Digital twins—virtual replicas of physical systems—powered by AI, enable real-time monitoring, as seen in Siemens' industrial applications (Tao et al., 2018).

In manufacturing, Industry 4.0 leverages AI for cyber-physical systems, where machine learning optimizes production lines, reducing waste by up to 30% (Lu et al., 2020). Innovations like swarm robotics, guided by AI algorithms, enhance collaborative tasks in hazardous environments.

Applications in Materials and Chemical Sciences

Technical sciences benefit from AI in materials discovery. High-throughput screening via machine learning accelerates the identification of new alloys and polymers. A notable innovation is the use of graph neural networks to model atomic interactions, leading to breakthroughs in battery technology for electric vehicles (Butler et al., 2023).

Digital technologies, such as quantum-inspired AI, simulate chemical reactions at molecular levels, bypassing traditional lab experiments. This has implications for drug discovery and sustainable materials, with AI reducing development timelines from years to months (Goh et al., 2017).

Environmental and Geospatial Innovations

AI integrates with digital sensors for environmental monitoring. Satellite imagery processed by convolutional neural networks detects deforestation patterns, aiding conservation efforts (Hansen et al., 2013). In 2026, AI-driven climate models incorporate real-time IoT data for accurate weather predictions, mitigating natural disasters.

Innovations in geospatial technologies include AI-enhanced GIS systems for urban planning, optimizing resource allocation in smart cities (Batty, 2018).

Challenges and Ethical Considerations

Despite advancements, challenges persist. Data privacy in AI systems raises concerns, especially with GDPR and emerging regulations (Voigt & Von

dem Bussche, 2017). Bias in algorithms can perpetuate inequalities in technical applications, necessitating diverse datasets (Buolamwini & Gebru, 2018).

Technical hurdles include computational demands; while cloud computing mitigates this, energy consumption remains high. Ethical frameworks, such as those proposed by the IEEE (2019), advocate for transparent AI in applied sciences.

Interdisciplinary collaboration is essential to address these, ensuring AI innovations align with sustainable development goals.

Conclusion

AI and digital technologies are pivotal in advancing technical-applied sciences, fostering innovations that address global challenges. From engineering optimizations to environmental safeguards, these tools offer transformative potential. However, realizing this requires overcoming ethical and technical barriers through collaborative efforts. This article calls for continued investment in AI research to drive sustainable progress.

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**OLIY TALIM MUASSASALARI TALABALARI UCHUN MAXSUS
JISMONIY SPORT MASHG'ULOTLARI JARAYONIDA PSIXOLOGIK
YONDASHGAN HOLDA MUSOBAQALARDA NATIJADORLIKNI
OSHIRISH**

Annotatsiya: Ushbu maqolada oliy ta'lim muassasalari talabalarining maxsus jismoniy sport mashg'ulotlari jarayonida psixologik yondashuv asosida musobaqa faoliyatidagi natijadorlikni oshirish masalalari tahlil qilinadi. Zamonaviy sport psixologiyasi tamoyillariga asoslangan holda, mashg'ulotlarni rejalashtirishda motivatsiya, irodaviy tayyorgarlik, stressga qarshi turish va o'z-o'zini boshqarish ko'nikmalarini rivojlantirishning ahamiyati yoritilgan. Tadqiqotda psixologik trening elementlari, vizualizatsiya, nafas olish texnikalari va musobaqa oldi holatni boshqarish usullari talabalarning musobaqa faolligiga ta'siri o'rganilgan. Natijalar shuni ko'rsatadiki, psixologik yondashuvni maxsus jismoniy tayyorgarlik bilan uyg'unlashtirish talabalarning musobaqa natijalarini sezilarli darajada yaxshilaydi, o'ziga bo'lgan ishonchni mustahkamlaydi va barqaror psixo-emotsional holatni ta'minlaydi.

Kalit so'zlar: psixologik yondashuv, maxsus jismoniy tayyorgarlik, musobaqa faoliyati, natijadorlik, motivatsiya, irodaviy sifatlar, talabalar.

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**IMPROVING PERFORMANCE IN COMPETITIONS THROUGH A
PSYCHOLOGICAL APPROACH DURING SPECIALIZED PHYSICAL
TRAINING SESSIONS FOR HIGHER EDUCATION INSTITUTION
STUDENTS**

Annotation: This article analyzes the issues of improving the effectiveness of competitive activity among higher education institution students based on a psychological approach in the process of special physical sports training. Based on the principles of modern sports psychology, the importance of developing motivation, volitional preparation, stress resistance, and self-regulation skills in planning the training process is highlighted. The study examines the influence of psychological training elements, visualization, breathing techniques, and pre-

competition state management methods on students' competitive activity. The results show that integrating a psychological approach with special physical training significantly improves students' competitive results, strengthens self-confidence, and ensures a stable psycho-emotional state.

Keywords: *psychological approach, special physical training, competitive activity, performance, motivation, volitional qualities, students.*

Bugungi raqobatbardosh sport muhitida nafaqat jismoniy tayyorgarlik, balki psixologik tayyorgarlik ham muhim o‘rin tutadi. Ayniqsa, oliy ta’lim muassasalari talabalari uchun maxsus jismoniy sport mashg‘ulotlari jarayonida psixologik yondashuv musobaqalardagi natijadorlikni oshirishning asosiy omillaridan biriga aylangan. Negaki, talaba sportchi – bu nafaqat musobaqa maydonidagi ishtirokchi, balki bir vaqtning o‘zida bilim oluvchi, ijtimoiy hayotda faol shaxsdir. Uning ichki kechinmalari, motivatsiyasi va stressni boshqarish qobiliyati bevosita ko‘rsatgan natijasiga ta’sir qiladi.

Ko‘pchilik sport mashg‘ulotlarini faqatgina jismoniy kuch, chidamlilik va texnikani takomillashtirish deb tushunadi. Albatta, bu jihatlar muhim. Biroq mashg‘ulot jarayoniga psixologik yondashuv integratsiya qilinmasa, sportchi o‘z imkoniyatlarini to‘liq ochib bera olmaydi. Talaba sportchilar uchun aynan psixologik yondashuv ularning o‘z kuchiga bo‘lgan ishonchini mustahkamlash, raqobat oldidagi qo‘rquvni yengish va diqqatni to‘g‘ri taqsimlash kabi jihatlarni qamrab oladi.

Sport psixologiyasi insonning sport faoliyatidagi ruhiy jarayonlarini o‘rganadi. Psixologik yondashuv sportchining individual xususiyatlarini hisobga olgan holda mashg‘ulotlarni tashkil etishni nazarda tutadi. Bu jarayonda shaxsning temperamenti, xarakteri, motivatsiyasi va emotsional holati muhim rol o‘ynaydi.

Ilmiy tadqiqotlar shuni ko‘rsatadiki, sport natijalari quyidagi omillarga bog‘liq:

psixologik tayyorgarlik darajasi

shaxsiy motivatsiya

irodaviy sifatlar

stressga moslashish qobiliyati

diqqatni boshqarish darajasi.

Sport faoliyatida muvaffaqiyatga erishish uchun sportchi o‘z hissiyotlarini nazorat qila olishi, qiyinchiliklarga bardosh berishi hamda maqsad sari intilishda qat’iyatli bo‘lishi zarur.

Maxsus sport mashg‘ulotlarida psixologik yondashuv deganda, birinchi navbatda, har bir talabaning individual xususiyatlarini hisobga olish tushuniladi. Ba’zi talabalar uchun murabbiyning rag‘batlantiruvchi so‘zi, boshqalari uchun esa aniq qo‘yilgan maqsad va vazifalar muhim ahamiyat kasb etadi. Psixologik jihatdan to‘g‘ri yo‘naltirilgan mashg‘ulot jarayoni talabada o‘z ustida ishlashga bo‘lgan ishtiyoqni uyg‘otadi, muvaffaqiyatsizliklarni tahlik emas, balki tajriba sifatida qabul qilishga o‘rgatadi.

Musobaqa vaqtida esa psixologik tayyorgarlik hal qiluvchi rol o'ynaydi. Aynan shu daqiqalarda talaba sportchining diqqatini jamlash, his-tuyg'ularini boshqarish va vaziyatni to'g'ri baholash qobiliyati sinovdan o'tadi. Psixologik yondashuv asosida tashkil etilgan mashg'ulotlar orqali sportchida "musobaqa oldi isitmasi"ni engish, uni "jangovar ruh"ga aylantirish ko'nikmasi shakllanadi. Bu esa, o'z navbatida, natijadorlikni keskin oshiradi.

Motivatsiya sport faoliyatining asosiy komponentlaridan biridir. Talabalarning sport mashg'ulotlariga qiziqishini oshirish va ularni yuqori natijalarga yo'naltirish motivatsion mexanizmlar orqali amalga oshiriladi.

Motivatsiya quyidagi turlarga bo'linadi:

Ichki motivatsiya shaxsning o'zini rivojlantirishga bo'lgan ehtiyoji bilan bog'liq. Talaba sportchi sport bilan shug'ullanish jarayonidan zavq oladi va o'z natijalarini yaxshilashga intiladi.

Tashqi motivatsiya mukofot, rag'batlantirish, e'tirof va musobaqada g'alaba qozonish istagi bilan bog'liq. Bu turdagi motivatsiya qisqa muddatli natijalarga erishishda samarali hisoblanadi.

Motivatsiyani shakllantirishda murabbiy va pedagoglarning o'rni katta. Ular tomonidan yaratilgan ijobiy muhit sportchining o'ziga bo'lgan ishonchini oshiradi.

Musobaqa faoliyati sportchidan yuqori darajadagi ruhiy barqarorlikni talab qiladi. Musobaqa oldidan paydo bo'ladigan hayajon sportchining funksional holatiga turlicha ta'sir ko'rsatadi. Me'yoriy darajadagi hayajon organizmni faollashtiradi, ammo ortiqcha stress natijalarning pasayishiga olib kelishi mumkin.

Stressni boshqarishning samarali usullari:

- chuqur nafas olish texnikasi;
- mushaklarni bo'shashtirish mashqlari;
- autogen trening;
- vizualizatsiya;
- psixologik relaksatsiya usullari.

Mazkur usullar sportchining musobaqa oldidan ruhiy holatini barqarorlashtiradi va ishonchni oshiradi.

Sport faoliyatida diqqatni jamlash muhim omillardan biri hisoblanadi. Musobaqa jarayonida sportchi tashqi omillarga chalg'imasdan asosiy vazifaga e'tibor qaratishi kerak.

Diqqatning quyidagi xususiyatlari sport natijalariga ta'sir ko'rsatadi:

- barqarorlik;
- tez ko'chish;
- hajm;
- taqsimlanish.

Psixologik mashqlar orqali diqqatni boshqarish qobiliyatini rivojlantirish mumkin. Masalan, maxsus reaksiya mashqlari, tezkor qaror qabul qilish vazifalari sportchining fikrlash tezligini oshiradi.

Irodaviy sifatlar sportchining maqsad sari intilishida muhim rol o'ynaydi. Qat'iyatlilik, sabr-toqat, o'zini nazorat qilish va intizomlilik sportchining qiyin vaziyatlarda taslim bo'lmasligini ta'minlaydi.

Irodaviy sifatlarni rivojlantirish uchun quyidagi pedagogik usullar qo'llaniladi:

- murakkab mashqlarni bosqichma-bosqich o'rgatish;
- individual yondashuv;
- maqsadlarni aniqlashtirish;
- natijalarni tahlil qilish.

Bu usullar talabalarning psixologik barqarorligini oshiradi.

Tadqiqot jarayonida oliy ta'lim muassasasi talabalari orasidan 2 ta guruh shakllantirildi: nazorat guruhi va tajriba guruhi. Nazorat guruhida mashg'ulotlar an'anaviy usulda olib borildi, tajriba guruhida esa maxsus jismoniy mashg'ulotlar psixologik yondashuv asosida tashkil etildi. Psixologik yondashuv tarkibiga motivatsion suhbatlar, vizualizatsiya mashqlari, stressni boshqarish texnikalari, diqqatni jamlash mashqlari hamda ijobiy psixologik muhit yaratish metodlari kiritildi.

Tadqiqot davomida talabalarning psixologik tayyorgarlik darajasi maxsus testlar asosida baholandi. Olingan natijalar psixologik ko'rsatkichlarning o'zgarish dinamikasini aniqlash imkonini berdi.

1-jadval

Psixologik yondashuv asosida tashkil etilgan mashg'ulotlarning talabalarning psixologik ko'rsatkichlariga ta'siri

№	Ko'rsatkichlar	Nazorat guruhi (boshlanish)	Nazorat guruhi (yakuniy)	Tajriba guruhi (boshlanish)	Tajriba guruhi (yakuniy)	O'zgarish (%)
1	Motivatsiya darajasi (ball)	65	69	66	82	+24%
2	Stressga chidamlilik (ball)	62	66	63	85	+35%
3	Diqqatni jamlash darajasi (ball)	68	71	67	88	+31%
4	O'ziga ishonch darajasi (ball)	64	70	65	90	+38%
5	Emotsional barqarorlik (ball)	66	69	68	87	+28%

Jadval natijalaridan ko'rinib turibdiki, psixologik yondashuv asosida olib borilgan mashg'ulotlar talabalarning motivatsiyasi, diqqatni jamlash qobiliyati va stressga chidamliligini sezilarli darajada oshirdi. Ayniqsa o'ziga ishonch darajasi 38 foizga ortgani sportchining musobaqa jarayonida psixologik tayyorgarligi muhim ahamiyatga ega ekanligini ko'rsatadi.

Tadqiqotning keyingi bosqichida talabalarning musobaqa jarayonidagi natijadorligi tahlil qilindi. Bunda texnik harakatlar aniqligi, reaksiya tezligi, xatolar soni hamda umumiy natijadorlik ko'rsatkichlari baholandi. Tajriba

guruhida psixologik tayyorgarlik elementlari mashg'ulotlar bilan uyg'unlashtirildi. Bu esa musobaqa sharoitiga moslashish jarayonini tezlashtirdi va sportchilarning o'z imkoniyatlarini to'liq namoyon etishiga yordam berdi.

2-jadval

Psixologik yondashuv asosida mashg'ulotlarning musobaqa natijadorligiga ta'siri

№	Ko'rsatkichlar	Nazorat guruhi (boshlanish)	Nazorat guruhi (yakuniy)	Tajriba guruhi (boshlanish)	Tajriba guruhi (yakuniy)	O'zgarish (%)
1	Musobaqada g'alaba ko'rsatkichi (%)	48	52	47	71	+24%
2	Texnik xatolar soni (marta)	14	12	15	8	-47%
3	Harakat aniqligi (%)	61	65	60	83	+38%
4	Reaksiya tezligi (sek)	0.42	0.39	0.41	0.32	+22%
5	Umumiy natijadorlik indeksi (ball)	63	67	64	86	+34%

Natijalar shuni ko'rsatadiki, psixologik yondashuv asosida tashkil etilgan mashg'ulotlar musobaqa samaradorligini sezilarli darajada oshirgan. Tajriba guruhida texnik xatolar kamaygan, harakat aniqligi va reaksiya tezligi yaxshilangan. Bu esa psixologik tayyorgarlik sportchining musobaqadagi muvaffaqiyatiga bevosita ta'sir qilishini tasdiqlaydi.

Oliy ta'lim muassasalarida sport mashg'ulotlarini tashkil etishda murabbiylar va pedagog xodimlar psixologik yondashuvga alohida e'tibor qaratishlari lozim. Talaba yoshlarning yosh xususiyatlari, ularning psixo-emotsional holati, o'qish va sport o'rtasidagi muvozanatni saqlashdagi qiyinchiliklari inobatga olinishi kerak. Psixologik qo'llab-quvvatlash tizimi – murabbiy va talaba o'rtasidagi ishonchli muloqot, mashg'ulotlarda ijobiy muhitni yaratish, shuningdek, muvaffaqiyatni nafaqat g'alaba, balki shaxsiy o'sish sifatida baholash – natijadorlikni oshirishning muhim omilidir.

Talaba sportchilarning musobaqa natijalarini oshirish uchun quyidagi tavsiyalar ishlab chiqildi:

- psixologik treninglarni mashg'ulot rejasiga kiritish;
- musobaqa vaziyatlarini modellashtirish;
- individual psixologik suhbatlar o'tkazish;
- o'z-o'zini baholash ko'nikmasini rivojlantirish;
- ijobiy fikrlashni shakllantirish.

Mazkur tavsiyalar sportchining o'ziga bo'lgan ishonchini oshiradi.

Xulosa qilib aytganda, talaba sportchilarning musobaqalardagi natijadorligini oshirish faqat jismoniy tayyorgarlik bilan cheklanib qolmasligi kerak. Maxsus sport mashg'ulotlari jarayoniga psixologik yondashuvni uyg'unlashtirish orqali biz kuchli, ishonchli va o'z imkoniyatlarini to'liq ro'yobga chiqara oladigan shaxslarni tarbiyalaymiz. Psixologiya va sportning uyg'unligi – bu nafaqat yuqori natijalar, balki talaba yoshning sog'lom va barkamol bo'lib yetishishidagi eng muhim omillardan biridir.

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THE IMPORTANCE OF CARBOHYDRATES IN HUMAN HEALTH AND MEDICINE

Abstract: Carbohydrates are one of the fundamental biomolecules necessary for life. They play a critical role in providing energy, supporting cellular functions, and maintaining overall health. In medicine and biological sciences, carbohydrates are studied not only as nutritional components but also as structural and functional molecules involved in many physiological processes. This article discusses the structure, classification, biological functions, and medical importance of carbohydrates. Special attention is given to their role in metabolism, disease prevention, and modern medical research.

Key words: Carbohydrate, ATP, biomolecules, energy, physiological, structural, functional

Introduction

Carbohydrates are organic compounds composed mainly of carbon, hydrogen, and oxygen atoms. They are one of the main macronutrients required for the proper functioning of the human body. Carbohydrates serve as the primary source of energy and are essential for many metabolic processes. In the human body, carbohydrates are broken down into glucose, which is used by cells to produce energy through cellular respiration[1]. The brain, muscles, and many organs rely heavily on glucose as their main energy source. Because of this, carbohydrates are a key component of human nutrition and medical science. In addition to energy production, carbohydrates also participate in cell signaling, immune responses, and structural support in biological systems. Many modern medical studies examine the role of carbohydrates in diseases such as diabetes, obesity, and cardiovascular disorders. Carbohydrates are one of the most abundant organic compounds in nature [2]. They are composed mainly of carbon, hydrogen, and oxygen atoms and are typically described by the general formula $(CH_2O)_n$. Carbohydrates serve as the primary source of energy for most living organisms and are vital for the proper functioning of the human body. In human metabolism, carbohydrates are broken down into glucose which is then used in cellular respiration to produce ATP. ATP is the energy currency of the cell and is necessary for muscle contraction, nerve transmission, biosynthesis, and many other physiological processes. Beyond their energetic role, carbohydrates are also

important structural and regulatory molecules. They form parts of nucleic acids, cell membranes, and extracellular matrices. Modern biomedical research has revealed that carbohydrates are involved in immune responses, cell recognition, and disease development [3].

Classification of Carbohydrates

Carbohydrates are generally classified into three major groups based on their chemical structure and complexity: monosaccharides, disaccharides, and polysaccharides. Monosaccharides are the simplest carbohydrates and cannot be broken down into smaller sugar molecules. Examples include glucose, fructose, and galactose. These sugars are rapidly absorbed in the human body and provide quick energy. Disaccharides consist of two monosaccharide molecules joined together. Common examples include sucrose, lactose, and maltose. They must be broken down during digestion before they can be absorbed. Polysaccharides are complex carbohydrates composed of many monosaccharide units. Examples include starch, glycogen, and cellulose. These carbohydrates provide long-term energy storage and structural support in living organisms [4].

Biological Functions of Carbohydrates

Carbohydrates perform several essential biological functions in the human body. First, they are the main source of energy. Glucose derived from carbohydrates is used during cellular respiration to produce ATP, the main energy molecule in cells. Second, carbohydrates act as energy storage molecules. In humans and animals, excess glucose is stored in the form of glycogen in the liver and muscles. Plants store carbohydrates as starch. Third, carbohydrates play structural roles. For example, cellulose is a structural component of plant cell walls. In animals, carbohydrates are also found in glycoproteins and glycolipids which are important for cell membranes. Fourth, carbohydrates are involved in cell communication and immune responses. Glycoproteins on cell surfaces help cells recognize each other and participate in immune defense mechanisms [5].

Medical Importance of Carbohydrates

Carbohydrates have significant importance in medical science. Many diseases are directly related to carbohydrate metabolism. One of the most common diseases associated with carbohydrate metabolism is diabetes mellitus. This condition occurs when the body cannot properly regulate blood glucose levels. Monitoring carbohydrate intake is essential for managing diabetes [6]. Carbohydrates also play a role in gastrointestinal health. Dietary fiber, which is a type of carbohydrate, improves digestion, supports beneficial gut bacteria, and reduces the risk of colon diseases. In medical diagnostics, carbohydrate-based molecules are used as biomarkers. Glycoproteins and glycolipids are often studied in cancer research because abnormal glycosylation patterns can indicate disease. Furthermore, carbohydrates are used in pharmaceutical development. Many vaccines and drugs contain carbohydrate structures that help stimulate immune responses or improve drug delivery [7].

Carbohydrates in Nutrition

Proper carbohydrate intake is essential for maintaining health. Nutritionists recommend that carbohydrates make up approximately 45–65% of daily caloric intake [8]. However, the type of carbohydrate consumed is very important. Complex carbohydrates such as whole grains, vegetables, and legumes provide slow and steady energy release [9]. These foods also contain fiber, vitamins, and minerals. Simple sugars, on the other hand, are rapidly absorbed and can lead to sudden increases in blood glucose levels [10]. Excessive consumption of refined sugars is associated with obesity, type 2 diabetes, and cardiovascular diseases. Balanced nutrition requires choosing healthy carbohydrate sources and limiting highly processed foods [11].

Table 1.
Classification of Carbohydrates

№	Type	Examples	Function
1	Monosaccharides	Glucose, Fructose	Immediate energy source
2	Disaccharides	Sucrose, Lactose	Energy after digestion
3	Polysaccharides	Starch, Glycogen, Cellulose	Energy storage and structural roles

Table 2.
Healthy vs Unhealthy Carbohydrate Sources

№	Healthy Sources	Less Healthy Sources
1	Whole grains	Refined sugar
2	Vegetables	Sugary drinks
3	Fruits	Candy and sweets
4	Legumes	Highly processed snacks

Conclusion

Carbohydrates are essential biomolecules that play multiple roles in human health and medicine. They serve as the primary energy source, support structural functions, and participate in many biological processes. Understanding the classification, metabolism, and medical importance of carbohydrates is crucial for students and professionals in medical and biological sciences. Modern research continues to explore new applications of carbohydrates in disease diagnosis, drug development, and nutritional science. Proper dietary management of carbohydrates is also a key factor in preventing many chronic diseases and maintaining overall health. Carbohydrates are essential biomolecules that play multiple roles in human health and medicine. They serve as the primary energy source, support structural functions, and participate in many biological processes.

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ELEKTRON TO'LOV TIZIMLARINING IQTISODIYOTDAGI ROLI

Annotatsiya: Ushbu tezisdagi elektron to'lov tizimlarining iqtisodiyotdagi ahamiyati va roli tahlil qilinadi. Elektron to'lov tizimlari, moliya va savdo sohalaridagi innovatsiyalar orqali iqtisodiy o'sishga hissa qo'shadi. Ular nafaqat iste'molchilar uchun qulaylik yaratadi, balki biznes jarayonlarini tezlashtiradi va iqtisodiy xavfsizlikni oshiradi. Tezisdagi elektron to'lov tizimlarining afzalliklari, kamchiliklari va ularning kelgusi rivojlanish istiqbollari ham ko'rib chiqiladi.

Kalit so'zlar: elektron to'lov, iqtisodiyot, innovatsiya, moliya, YAIM, World Bank, RTGS, Arner, Demirgüç-Kunt, Levine, tranzaksiya, hisob-kitob, budjeti, kiberxavfsizlik, texnik infratuzilma, moliyaviy savodxonlik

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THE ROLE OF ELECTRONIC PAYMENT SYSTEMS IN THE ECONOMY

Abstract: This thesis analyzes the importance and role of electronic payment systems in the economy. Electronic payment systems contribute to economic growth through innovations in the financial and commercial sectors. They not only create convenience for consumers, but also accelerate business processes and enhance economic security. The thesis also examines the advantages and disadvantages of electronic payment systems, as well as their future development prospects.

Keywords: electronic payment, economy, innovation, finance, Gross Domestic Product (GDP), World Bank, Real-Time Gross Settlement (RTGS), Douglas W. Arner, Asli Demirguc-Kunt, Ross Levine, transaction, settlement, budget, cybersecurity, technical infrastructure, financial literacy.

KIRISH

Hozirgi globallashuv davrida elektron to'lov tizimlari iqtisodiyotning ajralmas qismiga aylangan. Har bir davlatda, shuningdek, xalqaro miqyosda ushbu tizimlar iqtisodiy faoliyatni tashkil etishda muhim rol o'ynamoqda. Elektron to'lovlar nafaqat savdo va xizmatlar sohasida qulayliklar yaratadi, balki moliyaviy operatsiyalarni tezlashtiradi va xarajatlarni kamaytiradi. Ushbu tezisning maqsadi elektron to'lov tizimlarining iqtisodiyotga ta'sirini o'rganish, ularning afzalliklari va kamchiliklarini tahlil qilishdan iboratdir. Shuningdek, tezisda elektron to'lov tizimlarining kelgusidagi rivojlanish istiqbollari ham ko'rib chiqiladi. Buning uchun, bu tizimlarning muhim xususiyatlari va ularning iqtisodiy jarayonlarda qanday o'rin tutishini o'rganish zarur.

MAVZUGA OID ADABIYOTLAR SHARHI

Elektron to'lov tizimlari zamonaviy iqtisodiyotning ajralmas qismiga aylanib, moliyaviy munosabatlarning samaradorligini oshirishda muhim rol o'ynamoqda. Ushbu mavzu ko'plab mahalliy va xorijiy iqtisodchi olimlar tomonidan tadqiq qilingan. Avvalo, klassik iqtisodiy nazariyada pul muomalasi va to'lov tizimlari masalasi A. Smit, D. Rikardo va keyinchalik J. M. Keyns asarlarida yoritilgan bo'lib, ular pulning iqtisodiy aylanishdagi o'рни va to'lov vositasi sifatidagi ahamiyatini asoslab berganlar. Zamonaviy elektron to'lov tizimlari aynan shu nazariy asoslarning raqamli shakldagi rivoji sifatida qaraladi. Xalqaro tashkilotlar, xususan, Jahon banki (World Bank) va Xalqaro Valyuta Jamg'armasi (IMF) hisobotlarida elektron to'lov tizimlari moliyaviy inklyuziyani oshirish, yashirin iqtisodiyot hajmini kamaytirish va iqtisodiy o'sishni rag'batlantirish omili sifatida baholanadi.

Ularning tadqiqotlarida naqd pulsiz hisob-kitoblar ulushining ortishi YAIM o'sishiga ijobiy ta'sir ko'rsatishi ta'kidlanadi. BIS (Bank for International Settlements) hamda Yevropa Markaziy banki tomonidan chop etilgan ilmiy ishlar va statistik tahlillarda to'lov infratuzilmasining rivojlanishi bank tizimi barqarorligini mustahkamlashi va tranzaksiya xarajatlarini kamaytirishi ilmiy asoslab berilgan. Ayniqsa, real vaqt rejimidagi to'lov tizimlari (RTGS) va mobil to'lov platformalarining samaradorligi alohida o'rganilgan. MDH va O'zbekiston iqtisodchi olimlari tomonidan olib borilgan tadqiqotlarda elektron to'lov tizimlarining milliy iqtisodiyotdagi roli, xususan, bank sektorining rivojlanishi, soliq tushumlarining oshishi va raqamli iqtisodiyot shakllanishidagi ahamiyati keng yoritilgan. O'zbekiston Respublikasi Markaziy banki va Iqtisodiyot va moliya vazirligi materiallarida elektron to'lov xizmatlarining so'nggi yillardagi o'sish dinamikasi, plastik kartalar, mobil banking va QR-to'lovlar rivoji haqida statistik ma'lumotlar keltirilgan. Shuningdek, fintech sohasiga oid zamonaviy ilmiy maqolalarda (Arner, Demirgüç-Kunt, Levine va boshqalar) elektron to'lov tizimlari innovatsion moliyaviy xizmatlarning asosiy yo'nalishi sifatida talqin qilinadi.

Ularning fikricha, raqamli to'lovlar kichik biznes va tadbirkorlik subyektlarining moliyaviy resurslarga kirish imkoniyatini kengaytiradi. Tadqiqotlar tahlili shuni ko'rsatadiki, elektron to'lov tizimlari: tranzaksiya

xarajatlarini kamaytiradi; hisob-kitob tezligini oshiradi; moliyaviy shaffoflikni ta'minlaydi; davlat budjeti tushumlarini ko'paytiradi; iqtisodiy o'sishni rag'batlantiradi. Umuman olganda, ilmiy manbalar elektron to'lov tizimlarini iqtisodiyotning barqaror rivojlanishini ta'minlovchi strategik omil sifatida baholaydi.

TADQIQOT METODOLIGIYASI.

Mazkur tadqiqotda elektron to'lov tizimlarining iqtisodiyotdagi rolini aniqlash uchun nazariy va amaliy yondashuvlardan foydalanildi. Ilmiy adabiyotlar, qonunchilik hujjatlari va statistik ma'lumotlar tahlil qilindi. Tadqiqot jarayonida tahlil va sintez, taqqoslash hamda statistik usullar qo'llanildi. Elektron to'lovlar hajmi, tranzaksiya soni va ularning iqtisodiy samaradorlikka ta'siri o'rganilib, olingan natijalar asosida umumiy xulosalar chiqarildi.

Elektron to'lov tizimlari bir qator afzalliklarga ega. Birinchidan, ular iste'molchilar uchun qulaylik yaratadi. Masalan, foydalanuvchilar o'zlarining mobil telefonlari yoki kompyuterlari orqali istalgan vaqtda to'lovlarni amalga oshirishlari mumkin. Bu esa vaqtni tejashga va xarajatlarni kamaytirishga yordam beradi. Ikkinchidan, elektron to'lov tizimlari biznes jarayonlarini tezlashtiradi. An'anaviy to'lov usullariga nisbatan, elektron to'lovlar tezkor va xavfsizdir. Ular shuningdek, naqd pul ajratish va qabul qilishdagi muammolarni bartaraf etadi. Uchinchi afzallik - bu iqtisodiy xavfsizlikni oshirishdir. Elektron to'lov tizimlarida ma'lumotlar shifrlangan holda saqlanadi va to'lovlar xavfsizligini ta'minlaydi. Bularning barchasi iqtisodiyotda elektron to'lov tizimlarining o'rnini yanada mustahkamlashga yordam beradi. Hozirgi statistik ma'lumotlarga ko'ra, dunyo bo'yicha to'lovlarning taxminan 65–70 foizi naqd pulsiz shaklda amalga oshiriladi. Rivojlangan mamlakatlarda bu ko'rsatkich 85–90 foizgacha yetgan.

TAHLIL VA NATIJALAR

Biroq, elektron to'lov tizimlarining kamchiliklari ham mavjud. Birinchidan, texnologik muammolar elektron to'lovlarning samaradorligini pasaytirishi mumkin. Internet aloqasining yomonligi yoki tizimdagi uzilishlar to'lov jarayonlarini kechiktiradi. Ikkinchidan, ma'lumotlar xavfsizligi masalalari muhim ahamiyatga ega. Elektron to'lov tizimlarida shaxsiy ma'lumotlarning o'g'irlanishi yoki firibgarlik holatlari yuz berishi mumkin.

Bu holatlar iste'molchilarning ishonchini pasaytiradi. Uchinchi kamchilik - bu raqobatning oshishi. Bozor raqobati kuchaygan sari, elektron to'lov tizimlari o'rtasida narxlar tushishi yoki xizmatlar sifatining pasayishi mumkin. Ushbu kamchiliklar elektron to'lov tizimlarining rivojlanishiga to'sqinlik qilishi mumkin, shuning uchun ularni bartaraf etish strategiyalarini ishlab chiqish zarur. Statistik ma'lumotlarga ko'ra foydalanuvchilarning 70 foizdan ortig'i kiberfiribgarlik, shaxsiy ma'lumotlar xavfsizligi va phishing hujumlari haqida xavotir bildiradi. Jahon miqyosida raqamli firibgarliklar sabab yetkazilgan zarar yillik 40–50 milliard AQSh dollarini tashkil qiladi.

XULOSA VA TAKLIFLAR

Xulosa qilib aytganda, elektron to'lov tizimlari iqtisodiyotda muhim rol o'ynaydi. Ular nafaqat iste'molchilar uchun qulaylik yaratadi, balki biznes

jarayonlarini tezlashtiradi va iqtisodiy xavfsizlikni oshiradi. Biroq, ularning kamchiliklari ham e'tiborsiz qolmasligi kerak. Texnologik muammolar, ma'lumotlar xavfsizligi va raqobat masalalari elektron to'lov tizimlarining rivojlanishini cheklashi mumkin. Shu sababli, ushbu tizimlarni takomillashtirish va ularning xavfsizligini oshirish bo'yicha chora-tadbirlar ko'rish zarur. Kelajakda elektron to'lov tizimlarining iqtisodiyotdagi roli yanada oshishi kutilmoqda, bu esa innovatsiyalar va texnologik rivojlanish bilan bog'liq bo'ladi.

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SUVNING ODAM ORGANIZMIDAGI MUHIM AHAMIYATI VA FIZIOLOGIK ROLI

Annotatsiya: Mazkur maqolada suvning inson organizmidagi biologik ahamiyati, uning hujayra darajasidagi funksiyalari, metabolik jarayonlardagi o'rnini, termoregulyatsiya va transport mexanizmlaridagi roli ilmiy manbalar asosida tahlil qilinadi. Shuningdek, suv balansining boshqarilishi, degidratatsiya va gipergidratatsiya holatlarining klinik ahamiyati yoritilgan. Tadqiqot natijalari suvning sog'lom turmush tarzidagi o'rnini ilmiy jihatdan asoslaydi.

Kalit so'zlar: suv balansi, homeostaz, metabolizm, osmotik bosim, degidratatsiya, elektrolitlar, termoregulyatsiya, detoksikatsiya.

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THE IMPORTANCE OF WATER IN THE HUMAN BODY AND ITS PHYSIOLOGICAL ROLE

Abstract: This article analyzes, based on scientific sources, the biological significance of water in the human body, its functions at the cellular level, its role in metabolic processes, as well as its involvement in thermoregulation and

transport mechanisms. In addition, the regulation of water balance and the clinical significance of dehydration and hyperhydration conditions are discussed. The results of the study scientifically substantiate the role of water in a healthy lifestyle.

Keywords: water balance, homeostasis, metabolism, osmotic pressure, dehydration, electrolytes, thermoregulation, detoxification.

Kirish

Suv tirik organizm hayotining asosi hisoblanadi. Inson tanasida suv miqdori yosh, jins va fiziologik holatga bogʻliq ravishda 55-75 % ni tashkil etadi. Yangi tugʻilgan chaqaloqlarda bu koʻrsatkich 75 % gacha yetadi, keksa yoshdagi odamlarda esa 50-55 % gacha kamayadi. Suv hujayraning strukturaviy elementi boʻlibgina qolmay, balki barcha biokimyoviy jarayonlarning kechishi uchun zarur muhit vazifasini bajaradi.

Organizmدا kechadigan metabolik reaksiyalarning aksariyati suvli muhitda amalga oshadi. Shu sababli suv yetishmovchiligi turli funksional buzilishlarga olib kelishi mumkin. Zamonaviy tibbiyot va gigiyena fanida suv isteʼmoli meʼyorlarini aniqlash dolzarb masalalardan biridir.

Asosiy qism

1. Suvning organizmdagi taqsimlanishi va tarkibi

Inson organizmidagi umumiy suv miqdori ikki asosiy boʻlimga ajratiladi:

-Intratsellyulyar suyuqlik (ICHF) – umumiy suvning taxminan 65-70 % qismini tashkil etadi. Bu suyuqlik hujayra ichida joylashgan boʻlib, metabolizmning asosiy jarayonlari shu muhitda kechadi.

-Ekstratsellyulyar suyuqlik (ECHF) – umumiy suvning 30-35 % qismini tashkil etadi. U qon plazmasi, limfa va toʻqimalararo suyuqlikdan iborat.

Suyuqliklar oʻrtasidagi muvozanat osmotik bosim va elektrolitlar konsentratsiyasi orqali boshqariladi. Natriy ionlari asosan ekstratsellyulyar muhitda, kaliy ionlari esa intratsellyulyar muhitda ustunlik qiladi. Ushbu ionlar muvozanati hujayra faoliyatining normal kechishi uchun zarurdir.

2. Suvning metabolik jarayonlardagi roli

Suv universal erituvchi sifatida organizmda quyidagi vazifalarni bajaradi:

- Oziq moddalarni eritadi va tashiydi
- Fermentativ reaksiyalar uchun qulay muhit yaratadi
- Gidroliz jarayonlarida bevosita ishtirok etadi
- Energiya almashinuvida qatnashadi

Masalan, oqsillar, yogʻlar va uglevodlarning parchalanishi gidroliz reaksiyalari orqali amalga oshadi. Ushbu reaksiyalarda suv molekulası substratga qoʻshilib, murakkab moddalar oddiy tarkibiy qismlarga ajraladi.

Bundan tashqari, suv hujayra ichki bosimini saqlaydi va sitoplazmaning fizik-kimyoviy xususiyatlarini belgilaydi.

3. Termoregulyatsiyada suvning ahamiyati

Inson organizmi doimiy tana haroratini (36,5-37°C) saqlab turishga intiladi. Suvning yuqori issiqlik sigʻimi tana haroratining keskin oʻzgarishiga yoʻl

qo'ymaydi. Tashqi muhit harorati oshganda ter bezlari orqali ajralgan suv bug'lanadi va organizmni sovitadi.

Terlash jarayoni natijasida nafaqat suv, balki mineral tuzlar ham yo'qotiladi. Shuning uchun issiq iqlim sharoitida yoki jismoniy yuklama paytida suyuqlik iste'molini oshirish tavsiya etiladi.

4. Transport va chiqaruv funksiyasi

Qon plazmasining 90-92 % qismini suv tashkil etadi. U quyidagilarni ta'minlaydi:

- Kislorod va oziq moddalarni to'qimalarga yetkazish
- Gormon va biologik faol moddalarni tashish
- Metabolik chiqindilarni buyraklarga olib borish

Buyraklar organizm suv balansini boshqaruvchi asosiy organ hisoblanadi. Ular ortiqcha suv va elektrolitlarni siydik orqali chiqaradi. Antidiuretik gormon (ADG) suv qayta so'rilishini tartibga soladi.

5. Suv balansining buzilishi va uning oqibatlari

Degidratatsiya

Suv yetishmovchiligi quyidagi belgilar bilan namoyon bo'ladi:

- Chanqash hissi
- Og'iz qurishi
- Bosh og'rig'i
- Arterial bosim pasayishi
- Yurak urish tezlashishi

Og'ir dehidratatsiya holatlarida qon quyilishi buziladi va hayot uchun xavf tug'iladi.

Gipergidratatsiya. Ortiqcha suv qabul qilish natijasida qon plazmasida natriy konsentratsiyasi kamayadi (giponatriemiya). Bu hujayralarning shishiga, bosh og'rig'i va nevrologik buzilishlarga olib kelishi mumkin.

6. Kunlik suv ehtiyoji. Organizmning kunlik suvga bo'lgan ehtiyoji tana vazni, jismoniy faollik, iqlim va sog'liq holatiga bog'liq. O'rtacha kattalar uchun 1,5-2,5 litr suyuqlik tavsiya etiladi. Jismoniy mehnat yoki sport bilan shug'ullanuvchilarda bu ko'rsatkich yuqoriroq bo'lishi mumkin. Suv iste'molining yetarli darajada bo'lishi metabolizmni faollashtiradi, ish qobiliyatini oshiradi va umumiy sog'liqni mustahkamlaydi.

Tadqiqot metodologiyasi

Mazkur maqola ilmiy adabiyotlarni tahlil qilish, fiziologik ma'lumotlarni tizimlashtirish va zamonaviy klinik kuzatuv natijalarini umimlashtirish asosida tayyorlandi. Mavzu bo'yicha xalqaro va mahalliy manbalar o'rganildi.

Xulosa

Suv inson organizmining asosiy tarkibiy qismi bo'lib, hayotiy muhim fiziologik jarayonlarning barchasida ishtirok etadi. Metabolizm, termoregulyatsiya, transport, detoksikatsiya va homeostazni ta'minlashda suvning roli beqiyosdir. Suv balansini saqlash sog'lom turmush tarzining ajralmas sharti hisoblanadi. Organizmning individual ehtiyojlarini inobatga olgan holda yetarli miqdorda suv iste'mol qilish sog'liqni mustahkamlashning muhim omilidir.

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MAKTABGACHA YOSHDAGI BOLALARNING IDROK VA IJODIY QOBILIYATLARINI RIVOJLANTIRISHDA REFLEKSIV FAOLIYATNING AHAMIYATI

Annotatsiya: Ushbu maqolada maktabgacha yoshdagi bolalarning maktabga tayyorgarlik davrida ijodiy va idrok qilish qobiliyatlarini rivojlantirishda refleksiv faoliyatning o'рни, rivojlantirishning samarali usullari haqida ma'lumotlar berilgan. Bolalarda ijodiy fikrlashni va o'z-o'zini tartibga soluvchi ta'limni kuchaytirish uchun pedagogik vosita sifatida aks ettiruvchi amaliyotlar ko'rsatilgan.

Kalit so'zlar: aks ettirish faoliyati, kognitiv rivojlanish, ijodiy qobiliyatlar, idrok, maktabgacha ta'lim, maktabga tayyorgarlik.

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THE IMPORTANCE OF REFLECTIVE ACTIVITY IN THE DEVELOPMENT OF PERCEPTUAL AND CREATIVE ABILITIES OF PRESCHOOL CHILDREN

Abstract: This article provides information on the role of reflexive activity in the development of creative and perceptual abilities of preschool children in the period of preparation for school, as well as effective methods of its development. Reflective practices are shown as a pedagogical tool for strengthening creative thinking and self-regulated learning in children.

Keywords: reflexive activity, cognitive development, creativity, perception, preschool education, school readiness.

KIRISH

Bugungi kunda ta'lim tizimida maktabgacha yoshdagi bolani har tomonlama rivojlantirish, uni maktab ta'limiga sifatli tayyorlash dolzarb masalalardan biridir. Maktabgacha yosh davri bolaning psixik rivojlanishida muhim bosqich bo'lib xizmat qiladi. Bolaning 3-7 yoshli davrida idrok, tafakkur, xotira va ijodiy qobiliyatlar jadal shakllanadi. Shu sababli bolalarni maktabga tayyorlashda idrok va ijodiy qobiliyatlarni rivojlantirishga alohida e'tibor qaratish zarur.

Bola shaxsida yuzaga kelishi mumkin bo'lgan muammolarning oldini olish, qiyinchiliklarni bartaraf etishda bolalarni maktabgacha ta'lim tashkilotiga jalb

qilish alohida ahamiyatga ega. Ilmiy kuzatish va tadqiqotlar shuni ko'rsatadiki, inson hayoti davomida olgan barcha ma'lumotlarning 80 foizini 7 yoshgacha bo'lgan davrida oladi. Darhaqiqat, bu davrda inson farzandi olamni anglaydi, ota-onaga, oilaga, mahallaga, Vatanga mehr-muhabbat uyg'onadi, butun umri davomida olgan bilimlariga zamin yaratadi. Bolaning keyingi davrida olgan bilimlari mustahkamlanib, sayqallanib, to'ldirilib boriladi, Maktabgacha ta'lim mazmuni va usullari bolaning shaxsini shakllantirish, uni mustaqil shaxs sifatida tan olish jarayonlari sodir bo'ladigan muhitda tashkil etiladi.

Zamonaviy ta'limda insonning ijodiy qobiliyatlari uning intellektining eng muhim qismi sifatida tan olinishi kerak. Insoniyat tomonidan to'plangan madaniy qadriyatlar odamlarning ijodiy faoliyati natijasidir. Kelajakda insoniyat jamiyatining qay darajada rivojlanishini yosh avlodning ijodiy salohiyati belgilab beradi.

Tarbiyachi-pedagoglar taqlid qilish - ijodkorlikni shakllantirishning asosiy mexanizmi ekanligini unutmasligi kerak. Bu shuni anglatadiki, bolaning ijodiy qobiliyatlarini rivojlantirish uchun unga yaqin odamlar orasida bola o'zini tanitadigan ijodiy shaxs bo'lishi kerak. Bola uchun ijodiy xulq-atvor namunasi sifatida nafaqat ota-onalar (yoki ota-onalardan biri), balki boshqa kattalar ham (o'qituvchilar, oila do'stlari va boshqalar) harakat qilishlari mumkin. Agar bolalar uchun ota-onalar ko'proq ijodiy xususiyatlarga ega bo'lgan "ideal qahramon" bo'lsa, ayniqsa samarali bo'ladi. Aslini olganda "Ijodkorlik" - bu har xil turdagi ijodiy faoliyatning muvaffaqiyatini belgilaydigan shaxsning individual fazilatlarini.

MAVZUGA DOIR ADABIYOTLAR SHARHI

John Dewey refleksiyaning "tajribani ongli ravishda qayta ko'rib chiqish" deb ta'riflaydi va uni ta'lim jarayonining markaziy mexanizmi sifatida ko'rsatadi. Uning fikricha, reflektiv fikrlash bolalarda mustaqil xulosa chiqarish ko'nikmasini shakllantiradi.

Lev Vigotskiy nazariyasida refleksiya ijtimoiy muhit va muloqot jarayonida rivojlanadi. "Yaqin rivojlanish zonasi" konsepsiyasi bolalarda idrok va ijodiy tafakkurni qo'llab-quvvatlashda kattalarning rahbarlik rolini asoslaydi.

Jean Piaget kognitiv rivojlanish nazariyasida maktabgacha yosh davrini preoperatsion bosqich sifatida izohlaydi. Bu davrda bola obrazli tafakkurga tayangan holda refleksiv elementlarni asta-sekin shakllantiradi. Mazkur olimlarning ishlari refleksiv faoliyatni bolalarning intellektual va ijodiy rivojlanishida muhim omil sifatida ko'rsatadi.

Aleksei Leontiev faoliyat nazariyasida bilish jarayonlarini faoliyat bilan bog'liq holda tushuntiradi. Uning qarashlariga ko'ra, refleksiya bolaning o'z harakatlarini anglashida namoyon bo'ladi.

Sergey Rubinstein esa psixik jarayonlarning faoliyat jarayonida rivojlanishini asoslab bergan.

TADQIQOT METODOLOGIYASI

Ota-onalar bolani majburlamasliklari kerak. Bu borada muvaffaqiyatga erishish uchun sabr-toqat va muayyan usul talab etiladi - ota-ona bolaning fikrini tinglashi, har qanday ijodiy faoliyatga bo'lgan qiziqishini rag'batlantirishi kerak.

Ota-onalar va tarbiyachilar qiziquvchanlikni rag'batlantirish, ularga bilim berish, turli tadbirlarga jalb qilish orqali bolalar tajribasini kengaytirishga hissa qo'shadilar. Tajriba va bilimlarni to'plash kelajakdagi ijodiy faoliyat uchun zaruriy shartdir. Bundan tashqari, maktabgacha yoshdagi bolalarning fikrlashlari katta yoshdagi bolalarnikiga qaraganda ancha erkindir. Bolalar ijodkorlikni namoyon qilishi uchun ularga ushbu xususiyatlarning barchasi birlashtirilishi kerak. Bizga ma'lumki maktabgacha ta'lim tashkilotlarida bolalar ijodkorligini rivojlantirish bo'yicha turli mashg'ulotlar tashkil etiladi va bolalar ijodiy fikrlashga yo'naltiriladi. Bolaning ijodkorligini nafaqat maxsus faoliyatlarda rivojlantirish mumkin, balki bolalarning tasavvurini rivojlantirish uchun maktabgacha yoshdagi bolalarning asosiy faoliyati bo'lgan o'yin ham katta ahamiyatga ega. O'yin orqali ijodiy qobiliyatlarni rivojlantirish eng yaxshisidir. Aynan o'yinda bola ijodiy faoliyatning birinchi qadamlarini qo'yadi.

Bola fantaziyasini uning ijodiy fikrlashini rivojlantirishning yana bir yorqin manbai ertakdir. Bolalarning tasavvurini rivojlantirish uchun pedagoglar foydalanishi mumkin bo'lgan ko'plab ertak usullari mavjud. Ular orasida: ertakni «buzib ko'rsatish», teskari yo'nalishda ertak o'ylab topish, ertakning davomini o'ylab topish, ertakning oxirini o'zgartirish. Tarbiyachi bolalar bilan ertak yozishi ham mumkin.

TAHLIL VA HATIJALAR

Tadqiqotlar shuni ko'rsatadiki, refleksiv faoliyat (o'z ishini tahlil qilish, xatolarni anglash, yangi variantlarni izlash) ijodiy tafakkurning rivojlanishiga bevosita ta'sir qiladi. Ayniqsa, rolli o'yinlar, muammoli vaziyatlar va muhokama elementlari kreativlikni oshiradi.

Refleksiv faoliyat maktabgacha yoshdagi bolalarda idrok jarayonini chuqurlashtiradi. U ijodiy qobiliyatlarning rivojlanishida muhim psixologik mexanizm hisoblanadi. O'yin, muloqot va muammoli vaziyatlar refleksiyani shakllantirishning samarali vositalaridir. Klassik va zamonaviy pedagogik nazariyalar refleksiyani shaxs rivojining ajralmas qismi sifatida e'tirof etadi.

Tadqiqot va pedagogik kuzatishlar natijasida quyidagi xulosalarga kelish mumkin:

1. Refleksiv faoliyat maktabgacha yoshdagi bolalarda idrok jarayonlarini faollashtiradi va ularning kuzatuvchanligini oshiradi.
2. Refleksiya jarayoni bolalarda ijodiy yondashuvni kuchaytiradi, tasavvur va fantaziyaning rivojlanishiga yordam beradi.
3. Guruh muhokamalari va o'yinlardan keyingi refleksiya bolalarning nutq faoliyati va muloqot ko'nikmalarini rivojlantiradi.
4. Refleksiv faoliyatni muntazam qo'llash maktabgacha ta'lim jarayonining samaradorligini oshiradi hamda bolalarning shaxsiy rivojlanishiga ijobiy ta'sir ko'rsatadi.

Xulosa qilib aytganda, bolalarni maktab ta'limiga tayyorlashda idrok va ijodiy qobiliyatlarni rivojlantirish muhim pedagogik vazifa hisoblanadi. Ushbu qobiliyatlar bolaning intellektual salohiyatini oshiradi, maktab ta'limiga moslashuvini osonlashtiradi va kelgusida muvaffaqiyatli o'qishiga zamin yaratadi.

Shuning uchun maktabgacha ta'lim jarayonida ushbu jihatlarga alohida e'tibor qaratish lozim. Maktabgacha yosh ijodiy qobiliyatlarni rivojlantirish uchun ajoyib imkoniyatlar yaratadi. Bolalarni maktab ta'limiga tayyorlashda refleksiv faoliyatni tizimli ravishda tashkil etish idrok va ijodiy qobiliyatlarni rivojlantirishning samarali vositasi hisoblanadi. Pedagoglar ta'lim jarayonida refleksiyaga yo'naltirilgan metod va texnologiyalardan keng foydalanishlari zarur. Bu esa barkamol, mustaqil fikrlaydigan va ijodkor shaxsni shakllantirishga xizmat qiladi.

Refleksiv faoliyat maktabgacha yoshdagi bolalarning idrok va ijodiy qobiliyatlarini rivojlantirishda muhim pedagogik vosita bo'lib, uni ta'lim jarayoniga tizimli ravishda kiritish bolalarning intellektual va ijodiy rivojlanishini sezilarli darajada yaxshilaydi.

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SUYUQ AGREGAT HOLATDAGI ORGANIK MODDALARNI TOZALASH USULLARI (VAKUMDA TOZALASH METODIKASI)

Annotatsiya: Ushbu maqolada suyuq agregat holatdagi organik moddalarni tozalashda vakuumlash (past bosim ostida distillyatsiya) usulining ilmiy va amaliy jihatlari yoritilgan. Vakuumlash jarayonining asosiy maqsadi — issiqlikka sezgir yoki yuqori qaynash haroratiga ega organik moddalarni ularning parchalanishsiz ajratib olishdir. Maqolada vakuum apparatlarining tuzilishi, ishlash prinsipi, jarayonni nazorat qilish parametrlari, afzallik va kamchiliklari batafsil tahlil qilingan.

Kalit so'zlar: Suyuq organik moddalar, vakuumlash, tozalash usullari, distillyatsiya, bug'lanish, bosim, fizik-kimyoviy xossalalar, laboratoriya jihozlari, sanoat texnologiyasi, farmatsevtik ishlab chiqarish.

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METHODS FOR PURIFYING ORGANIC SUBSTANCES IN A LIQUID STATE (VACUUM CLEANING METHOD)

Abstract: This article examines the scientific and practical aspects of vacuum distillation (low-pressure distillation) for purifying organic substances in liquid form. The primary goal of vacuum distillation is to separate heat-sensitive or high-boiling organic substances without decomposition. The article provides a detailed analysis of the structure, operating principle, process control parameters, and advantages and disadvantages of vacuum apparatuses.

Keywords: Liquid organic substances, vacuum distillation, purification methods, distillation, evaporation, pressure, physicochemical properties, laboratory equipment, industrial technology, pharmaceutical production.

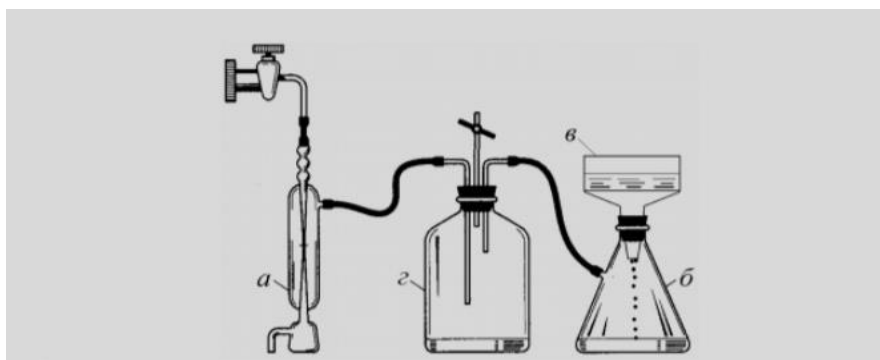
Organik kimyoda suyuq moddalarni tozalash moddalar sifatini aniqlovchi eng muhim bosqichlardan biridir. Dori vositalari, erituvchilar va boshqa organik komponentlarning tiniqligi, tozaligi va barqarorligi ularning amaliy samaradorligiga bevosita ta'sir ko'rsatadi [1-3].

Oddiy distillyatsiya usuli ko'plab hollarda samarali bo'lsa-da, yuqori haroratda parchalanadigan moddalar uchun mos emas. Shu sababli vakuum distillyatsiyasi (past bosim ostida bug'latish) keng qo'llaniladi.

Vakuum distillyatsiyasi usuli XVIII asr oxirida ilmiy tadqiqotlarda paydo bo'lgan. Keyinchalik uni organik sintez, farmatsevtika va neft-kimyo sohalarida keng qo'llash boshlangan [4].

Masalan, A. Vogel "Practical Organic Chemistry" asarida vakuum distillyatsiyasi issiqlikka sezgir moddalarni tozalashda eng ishonchli usul ekanligini ta'kidlaydi. O'zbekiston olimlari – R. Ibragimov va Sh. Niyozov (2019) esa vakuum distillyatsiya jarayonining dorivor moddalarning safligini oshirishdagi ro'lini ko'rsatgan.

Kimyoviy laboratoriyalarda vakuum ostida bir qator operatsiyalar (filtrlash, quritish) amalga oshiriladi. Vakuum yaratish uchun suv oqimi nasoslari keng qo'llaniladi. Suv oqimi pompasi tomonidan yaratilgan vakuum suvning bug' bosimi bilan cheklangan va shuning uchun uning haroratiga bog'liq. Yetarli bosim bilan suv oqimi nasoslari 8-15 mm Hg vakuum hosil qiladi. Filtrlash uchun tubi to'rli silindrsimon voronka (Buxner voronkasi) va qalin devorli konussimon kolba (Bunsen kolbasi) ishlatiladi. Voronka tubining maydoniga to'liq mos keladigan filtr qog'oz varog'i voronkaning to'rli tubiga joylashtiriladi va kolba suv oqimli vakuum nasosiga ulanadi. Suv oqimi pompasi va kolba orasiga oraliq idish (masalan, ikki bo'yinli Vulf kolbasi) qo'yilgan



Vakuumli filtrlashni sozlash: a – suv oqimi pompasi; b – Bunsen kolbasi; c – Buxner voronkasi; 2 – xavfsizlik kolbasi

Agar filtrlash paytida suv bosimi pasaysa, oraliq idish suvning Bunsen kolbasiga tushishiga yo'l qo'ymaydi. Filtrlashdan oldin voronkaning pastki qismidagi filtr qog'oz erituvchi bilan namlanadi, vakuum nasosi yoqiladi (bu qog'oz voronka tubiga so'rilishiga olib keladi) va filtrlash boshlanadi. Buxner voronkasi va Bunsen kolbasining o'lchamlari cho'kma miqdori va filtrat hajmiga mos kelishi kerak. Filtrda to'plangan cho'kma shisha tiqin bilan ehtiyotkorlik

bilan siqib chiqariladi. Keyin cho'kma mahsulot ajratilgan erituvchi bilan yoki cho'kma yomon eriydigan boshqa erituvchi bilan yuviladi. Yuvish kichik qismlarda amalga oshiriladi. Birinchidan, Bunsen kolbasi atmosferaga ulanadi va filtrdagi cho'kma yuvish suyuqligi bilan namlanadi. Keyin kolbada vakuum hosil bo'ladi va yuvish suyuqligi so'riladi. Ushbu operatsiya bir necha marta takrorlanadi. Shundan so'ng, cho'kma filtdan chiqariladi va quritiladi. Juda mayda cho'kmalarni filtrlashda Buxner voronkasi tubiga ikki yoki uch qatlamli filtr qog'oz qo'yiladi.

Bu usul bo'yicha xloroform tozalash mumkin. Buning uchun laboratoriya bajarishiga kerak bo'ladigan barcha jihozlar, reagentlar, xloroform (bo'yoq sintezidan keyingi qoldiqlar), quritgich suvsiz (CaCl_2 , Na_2SO_4 yoki MgSO_4), distillangan suv. Xavfsizlik choralari: organik erituvchilar bilan ishlashda xavfsizlik choralariga alohida e'tibor berishimiz lozim [5].

Ishning borishi bir necha bosqichlarni o'z ichiga oladi:

Xloroformni oldindan tozalash: 250 ml tekis tubli kolbaga 20 ml ifloslangan xloroform va 40 ml distillangan suv qo'shiladi. Aralashma dumaloq harakatlar bilan aralashtiriladi, so'ngra Buxner varonkasiga quyiladi va Bunsen kolbasiga vakumniy apparatni ulab vakumlashni bajaramiz. Distillangan suv quyib bir necha marta tozalab olamiz. Suyuqliklarni ajratgandan so'ng, xloroform qatlami boshqa kolbaga quyiladi va suv fazasi yo'q qilinadi.

Shunday qilib olingan xloroform nopokdir, shuning uchun avval kislotani olib tashlash uchun suyultirilgan gidroksidi (NaOH) eritmasi bilan ishlov beriladi va keyin ajratuvchi voronkada ketma-ket suv bilan yuviladi. Keyin suvsiz kaltsiy xlorid ustida quritiladi va toza va quruq xloroform olish uchun 60 – 65° C da redistillanish amalga oshiriladi.

Xloroformdan foydalanish:

Salitsilaldegid, xloropikrin, xloreton va boshqalarni tayyorlash uchun ishlatiladi.

Anatomik namunalarni uchun konservant sifatida ishlatiladi.

Zamin bo'yoqlari, qatronlar, yopishtiruvchi moddalar, yog'lar, yog'lar, mumlar va kauchuk uchun erituvchi sifatida ishlatiladi. Polimer materiallar ishlab chiqarishda oraliq vosita sifatida ishlatiladi. Anesteziya, og'riqni o'ldiruvchi va yo'talni davolash vositasi sifatida ishlatiladi.

Xloroform yoki triklorometan 1831 yilda Samuel Gutri tomonidan kauchuk erituvchi sifatida eksperimental ravishda kashf etilgan. Uning aniq formulasini 1834 yilda kimyogar Dyuma aniqlagan, u xloroformdan hosil bo'lganligi sababli moddani "xloroform" (lotincha acidum formicum – "chumoli kislotasi") deb atagan [6]. Xloroformning kimyoviy formulasi- CHCl_3 , Molyar massa-119,38 g/mol, Zichlik-1,4788 g/sm³, Suvda eruvchanligi-8,0 g/kg (25°C), 7,9 g/kg (59 °C), Erish nuqtasi-63,47°C, Qaynash nuqtasi-61,2 °C, Kritik nuqta-262,9 °C

Vakuum distillyatsiya usuli yordamida:

Farmatsevtika mahsulotlari (vitaminlar, antibiotiklar, alkaloidlar), Efir moylari va oziq-ovqat aromatizatorlari, Neft mahsulotlari fraksiyalari, Murakkab organik birikmalar tozalanadi. Afzallik va kamchiliklar

Afzalliklari:

Termolabil moddalarni saqlab qolish imkoniyati. Mahsulot yuqori sifatda olinadi. Farmatsevtika va oziq-ovqat sanoatida keng qo'llaniladi. Harorat pasaygan holda distillyatsiya kechadi. Modda parchalanmaydi. Tozalash darajasi yuqori. Energiya sarfi kamayadi. Kamchiliklari: Uskunalar murakkab va qimmat. Jarayon sekinroq bo'lishi mumkin. Maxsus texnik xizmat va malakali mutaxassis talab etadi. Havo o'tkazmasligi talab etiladi.

Xulosa

Vakuumlash orqali suyuq organik moddalarni tozalash – zamonaviy kimyo, farmatsevtika va neft sanoatida eng samarali usullardan biridir. U moddalarni tabiiy xususiyatlarini saqlagan holda ajratish imkonini beradi. Kelajakda texnologiyalar takomillashishi bilan vakuumlashning qo'llanish sohasi yanada kengayishi kutilmoqda.

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STATISTICAL ANALYSIS OF FOREIGN TRADE AND ECONOMIC GROWTH IN THE CONTEXT OF DIGITAL TECHNOLOGIES

Abstract: *This article provides a statistical analysis of the relationship between foreign trade and economic growth in the context of the development of digital technologies. Changes in global trade in recent years, including a decrease in demand in developed countries, a slowdown in the economies of East Asia, and a decrease in commodity prices, have a significant impact on the dynamics of foreign trade. At the same time, digital technologies are becoming an important factor in optimizing trade processes, increasing logistics efficiency, and capturing new markets. The study assesses the level of economic growth based on foreign trade indicators, export-import volumes, and the trade openness index.*

Keywords: *digital technologies, economic growth, exports, imports, trade openness index, digital economy, statistical analysis, innovation, regional development, economic efficiency, markets, trade dynamics.*

INTRODUCTION

In world trade, in recent years, a decline in goods has been observed in developed countries due to a decrease in demand, a weakening of economic indicators in the countries of East Asia, and a decrease in commodity prices. In terms of trade in services, for most of 2023, there was growth associated with a delayed economic recovery after the COVID-19 crisis. However, in the second half of this year, the recovery of the service sector slowed significantly, with declines observed more in developing countries in the Southeast [1].

These trends are not only related to the decline in the East, but are also a consequence of the decline in trade between Asian regions. Looking back at 2024, “the global trade forecast remains very uncertain and generally pessimistic. While certain economic indicators indicate potential improvements, persistent geopolitical tensions, high levels of debt, and widespread economic vulnerability are expected to negatively impact the global trade order”. This shows the relevance of statistical research on the relationship between foreign trade and economic growth in the world [2,3].

In the world, scientific research is being conducted on the statistical study of the relationship between foreign trade and economic growth. Assessment of the interaction of foreign trade and economic growth, analysis of the level of diversification of various segments of trade, assessment of the effectiveness of economic growth achieved as a result of the transition to a free trade regime,

analysis of the contribution of technologies and innovations to economic growth in the trade process, development of new models for determining the correlation and causal links between trade and growth, identification of factors stimulating economic growth in foreign trade are among the priority areas of scientific research carried out in this area [4].

LITERATURE REVIEW

The fact that foreign trade turnover plays an important role in the development of the country's economy requires a statistical study of the influence of this indicator on economic growth. There are various scientific research works on drawing conclusions about how these two indicators are related to each other. Economic growth means the continuous increase in the volume of value added in the production of goods and services, the improvement of technological, economic, and social characteristics in the development of society, and serves to increase the country's real gross domestic product (GDP).

Foreign trade turnover represents the value of a country's exports and imports for a certain period. Foreign trade statistics of goods The accounting of goods included in or excluded from the country's inventories of material resources as a result of their import (export) or export (import) into the customs territory of the Republic of Uzbekistan is carried out on the basis of the general foreign trade accounting system [5,6].

When forming foreign trade statistics, the formation of data is considered important, and in our research work, we have formed a list of organizations and agencies with the formation of data to date (Fig. 1).

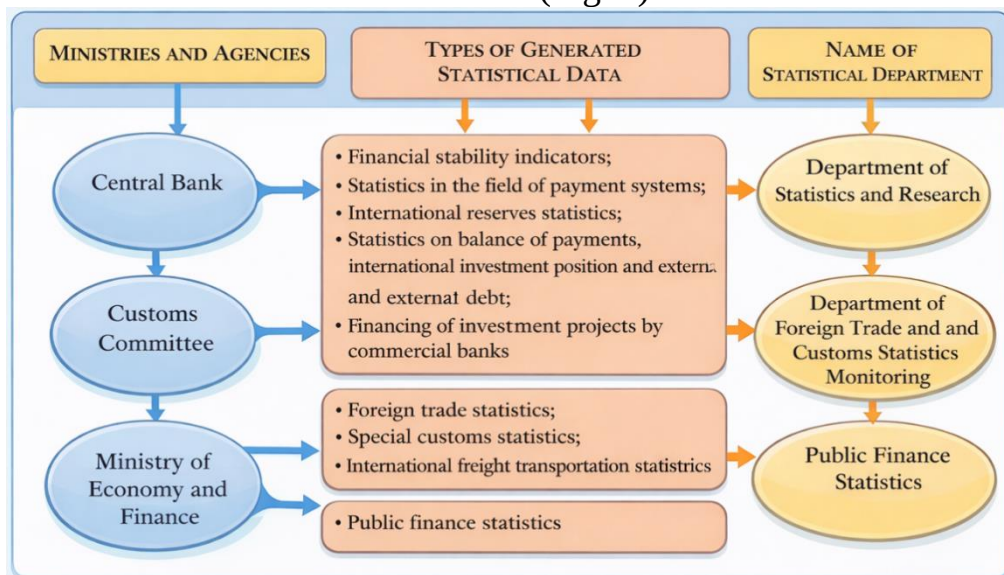


Figure 1. List of local organizations and agencies that generate and provide data on foreign trade statistics.

Conducting analysis by various categories in the statistical analysis of foreign trade dynamics not only creates great conveniences for consumers of statistical data, but also increases the possibility of promptly obtaining the necessary information by industry [7].

The statistical system, proposed by the United Nations Statistical Office (UNCTAD) and widely used in practice, contains several indices that express the relationship between foreign trade and economic growth, in particular, the country's gross domestic product. In particular, the trade openness index - The trade openness index is calculated as the ratio of the arithmetic mean of goods exports (E) and imports (I) to GDP (GDP): where I defines the economy [8].

This index is an important indicator in the country's economy, regulating the country's economic relations with other states. As a result, it becomes possible to reflect the general state of foreign trade in economic growth. This index shows that the higher the index, the greater the impact of trade on domestic activity, and this is stronger than the domestic capabilities of the country's economy. According to the World Bank, in 2023, this indicator in our country was 25.15 percent. Since it is calculated at the international level, then this indicator must be calculated here as well. Based on the results of the general study, it was concluded that if the country's foreign trade openness index is calculated, the existing database will become richer. Open Data Inventory (ODIN) will lead to further improvement in the ranking of open data [9].

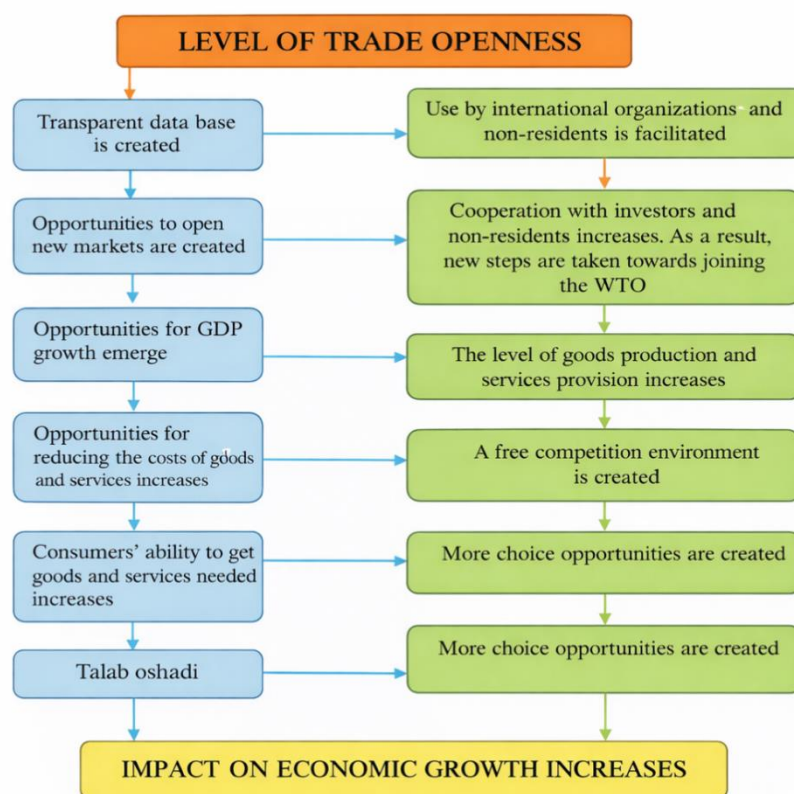


Figure 2. The mechanism of influence of the foreign trade openness index on the country's economic growth.

Based on the criteria of the foreign trade openness index indicators provided by the Statistics Agency under the UN, we compiled a cartogram of 14 regions based on their groups, calculated as shown in Figure 3.

RESULTS AND DISCUSSION

Based on the results of the country's trade openness index derived from international sources, the regional indicators of trade openness were calculated. The analysis shows that the highest levels of the foreign trade openness index were recorded in Tashkent city (72.41%), Andijan region (41.89%), and Tashkent region (32.55%). In contrast, the lowest indicators were observed in Surkhandarya (5.99%), Kashkadarya (6.06%), and Navoi (9.88%) regions, reflecting significant regional disparities in trade integration.

Furthermore, the statistical analysis of foreign trade turnover, particularly in terms of the structure of exports and imports and their geographical distribution, enables the identification of new and promising directions for the development of the country's foreign trade. This approach contributes to improving trade diversification and enhancing overall economic efficiency.

CONCLUSION

In conclusion, the study confirms that foreign trade plays an important role in ensuring sustainable economic growth, especially in the context of digital transformation and global economic uncertainty. Recent trends in global trade, including the decline in demand in developed countries, the slowdown in economic indicators in East Asia, and the decline in raw material prices, have significantly impacted the dynamics of international trade. At the same time, the service sector demonstrated a partial recovery after the COVID-19 pandemic, but in subsequent stages, this recovery weakened.

Statistical analysis shows that the trade openness index is an important indicator reflecting the level of a country's integration into the global economy. The high level of trade openness contributes to the growth of economic activity, the expansion of markets, the growth of production and services. Regional analysis of Uzbekistan shows significant differences in trade openness, indicating uneven economic development between regions.

In addition, it was noted that economic indicators can be strengthened by improving foreign trade statistics, increasing data transparency, and introducing modern digital technologies. Expanding export-import diversification and improving trade infrastructure are also necessary for long-term growth.

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O'ZBEKISTONDA HUDUDLARNING MAVJUD SALOHİYATIDAN SAMARALI FOYDALANISH ASOSIDA KOMPLEKS VA MUTANOSIB IJTIMOIY-IQTISODIY RIVOJLANISHNI TA'MINLASH

Annotatsiya: Mazkur maqolada O'zbekistonda hududlarni kompleks va mutanosib ijtimoiy-iqtisodiy rivojlantirishda mavjud resurs, mehnat, investitsiya, infratuzilma, institutsional va innovatsion salohiyatdan samarali foydalanish masalalari tahlil qilinadi. Hududiy rivojlanishning zamonaviy nazariyalari, ichki hududiy nomutanosibliklarni kamaytirishning iqtisodiy mexanizmlari hamda hududlar kesimida o'sishning yangi drayverlarini shakllantirish omillari yoritiladi. Maqolada hududiy salohiyatni baholash uchun integrallashgan indeksli yondashuv taklif etiladi, xizmatlar sohasi, raqamli infratuzilma, sanoat kooperatsiyasi, logistika va mahalliy tashabbuslarning o'rni asoslab beriladi. O'zbekiston bo'yicha yalpi hududiy mahsulotning hududlar kesimidagi tafovutlari, aholi jon boshiga ko'rsatkichlar va to'g'ridan to'g'ri xorijiy investitsiya oqimlarining ayrim jihatlari asosida hududiy siyosatning ustuvor yo'nalishlari aniqlanadi. Tadqiqot natijasida hududiy boshqaruvni ma'lumotlarga asoslangan tarzda tashkil etish, salohiyatdan foydalanish samaradorligini oshirish, "o'sish nuqtalari"ni qo'llab-quvvatlash, tarmoqlararo kooperatsiyani kuchaytirish va ijtimoiy infratuzilma sifatini yaxshilash bo'yicha ilmiy-amaliy takliflar ishlab chiqiladi.

Kalit so'zlar: hududiy rivojlanish, ijtimoiy-iqtisodiy mutanosiblik, hududiy salohiyat, yalpi hududiy mahsulot, investitsiya, infratuzilma, xizmatlar sohasi, raqamlashtirish, innovatsiya, klister

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ENSURING COMPREHENSIVE AND BALANCED SOCIO- ECONOMIC DEVELOPMENT THROUGH THE EFFECTIVE USE OF THE EXISTING POTENTIAL OF THE REGIONS OF UZBEKISTAN

Abstract: This article examines the effective use of resource, labor, investment, infrastructure, institutional and innovation potential for comprehensive and balanced socio-economic development of regions in Uzbekistan. It discusses modern theories of regional development, economic mechanisms for reducing interregional disparities, and factors shaping new growth drivers at the territorial level. The paper proposes an integrated index approach for measuring regional potential utilization and substantiates the role of

the services sector, digital infrastructure, industrial cooperation, logistics, and local initiatives. Based on differences in gross regional product, per capita indicators, and selected aspects of foreign direct investment across regions of Uzbekistan, the study identifies priority directions for territorial policy. As a result, scientific and practical recommendations are developed to organize regional governance on a data-driven basis, improve the efficiency of potential utilization, support growth poles, strengthen intersectoral cooperation, and enhance the quality of social infrastructure.

Keywords: regional development, socio-economic balance, regional potential, gross regional product, investment, infrastructure, services sector, digitalization, innovation, cluster

Kirish

Hududlarni kompleks va mutanosib ijtimoiy-iqtisodiy rivojlantirish bugungi kunda O'zbekiston iqtisodiy siyosatining eng muhim strategik yo'nalishlaridan biri hisoblanadi. Sababi hududiy rivojlanish faqat ishlab chiqarish hajmini ko'paytirish bilan cheklanmaydi; u bandlik, daromadlar, infratuzilma sifati, ijtimoiy xizmatlar, investitsion jozibadorlik, atrof-muhit barqarorligi va aholi turmush darajasi kabi ko'plab omillarning o'zaro uyg'unligini talab etadi. Bir hududning resurs bazasi kuchli bo'lsa-da, agar u yerda logistika, boshqaruv sifati, raqamli aloqalar yoki kadrlar salohiyati sust bo'lsa, mavjud imkoniyatlar to'liq ishga tushmaydi. Shu sababli hududlarni baholashda faqat tabiiy resurs yoki ishlab chiqarish quvvatiga emas, balki ulardan foydalanish samaradorligiga e'tibor qaratish zarur. O'zbekistonning hududiy tuzilmasi o'ziga xos: ayrim hududlar xomashyo, ayrimlari qishloq xo'jaligi, boshqalari xizmatlar, transport, turizm yoki sanoat kooperatsiyasi bo'yicha ustunlikka ega. Biroq hududiy differentsiallashtirishning chuqurlashib borishi umumiy iqtisodiy o'sish sifatiga salbiy ta'sir ko'rsatishi mumkin. Milliy statistika ma'lumotlariga ko'ra, 2025-yilda respublika YAIMini shakllantirishda Toshkent shahri 19,9 foiz ulush bilan yetakchi bo'lgan, Toshkent viloyati 9,7 foiz va Navoiy viloyati 9,1 foiz ulush bilan keyingi o'rinlarni egallagan. Aksincha, Sirdaryo viloyati 1,9 foiz, Qoraqalpog'iston Respublikasi 2,9 foiz va Jizzax viloyati 2,9 foiz ulushga ega bo'lgan [1]. Ushbu tafovutlar hududlar o'rtasidagi iqtisodiy bazaning turlicha ekanini ko'rsatadi, ammo masalaning ikkinchi tomoni shundaki, ayrim hududlarda mavjud salohiyat hali to'liq safarbar etilmagan. Davlat siyosatida hududlarni kompleks rivojlantirish alohida ustuvor yo'nalish sifatida belgilanmoqda. "O'zbekiston - 2030" strategiyasida hududlarni kompleks rivojlantirish, urbanizatsiya jarayonlarini jadallashtirish, yirik shaharlar va tumanlar iqtisodiy faolligini oshirish vazifalari qayd etilgan [2]. Bunday yondashuv hududlar bo'yicha alohida dasturlar ishlab chiqishni emas, balki mahalliy resurslar, xususiylashgan tashabbus, tashqi investitsiya, ilmiy salohiyat va bozor infratuzilmasini bir butun tizim sifatida bog'lashni anglatadi. Bu esa hududiy siyosatni vertikal boshqaruvdan ko'ra, tarmoq va hudud manfaatlarini integratsiyalashgan modelga o'tkazishni talab qiladi.

Mazkur maqolaning maqsadi O'zbekistonda hududlarning mavjud salohiyatidan samarali foydalanish asosida kompleks va mutanosib ijtimoiy-iqtisodiy rivojlanishni ta'minlashning nazariy va amaliy mexanizmlarini asoslashdan iborat. Tadqiqotning vazifalari sifatida quyidagilar belgilanadi: birinchidan, hududiy rivojlanishning nazariy asoslarini tizimlashtirish; ikkinchidan, hududiy salohiyatning tarkibiy qismlarini aniqlash va baholash mezonlarini ishlab chiqish; uchinchidan, O'zbekiston hududlari misolida ayrim statistik ko'rsatkichlar asosida hududiy nomutanosibliklarni tahlil qilish; to'rtinchidan, institutsional, investitsion, infratuzilmaviy va raqamli mexanizmlar asosida samarali foydalanish yo'llarini taklif etish. Tadqiqot metodologiyasida tizimli yondashuv, qiyosiy tahlil, statistik umumlashtirish, integrallashgan baholash va ilmiy abstraksiyadan foydalanildi. Maqolaning ilmiy yangiligi hududiy salohiyatdan foydalanish samaradorligini nafaqat resurs mavjudligi, balki qiymat zanjiri, logistika, xizmatlar sifati, inson kapitali va boshqaruv muvofiqlashuvi orqali baholash zarurligi asoslab berilganidadir. Agar hududiy salohiyat to'g'ri boshqarilsa, iqtisodiy o'sish markaziy hududlarda jamlanib qolmaydi, balki "ko'payuvchi ta'sir" orqali boshqa hududlarga ham tarqaladi. Shu nuqtai nazardan maqola hududiy rivojlanishning "salohiyatni aniqlash - safarbar qilish - tijoratlashtirish - ijtimoiy natijaga aylantirish" zanjirini ko'rsatishga qaratilgan.

Hududiy rivojlanishning nazariy asoslari va ilmiy yondashuvlar

Hududiy rivojlanish nazariyasi uzoq tarixiy evolyutsiyani bosib o'tgan bo'lib, unda klassik joylashuv nazariyalari, "o'sish qutblari" konsepsiyasi, yangi iqtisodiy geografiya, endogen o'sish nazariyasi va klaster yondashuvi alohida o'rin tutadi. Klassik nazariyalarda hududiy rivojlanish ko'proq transport xarajatlari, bozorlarga yaqinlik va resurslardan foydalanish bilan izohlangan bo'lsa, zamonaviy yondashuvlarda bilim, innovatsiya, institutsional sifat, tarmoqlararo aloqa va inson kapitali kabi omillar ustuvor ahamiyat kasb etmoqda. Bu esa hududiy siyosatni faqat infratuzilma yoki subsidiya bilan cheklab bo'lmasligini anglatadi. Perrouning "o'sish qutblari" nazariyasiga ko'ra, iqtisodiy rivojlanish hudud bo'ylab bir tekis tarqalmaydi; u avvalo ayrim markazlarda jamlanadi, keyin esa u yerdan boshqa hududlarga "tarqalish effekti" orqali yoyiladi. Ammo bu tarqalish avtomatik tarzda sodir bo'lmaydi. Agar transport, kooperatsiya va institutsional muhit yetarli bo'lmasa, "o'sish qutbi" atrofdagi hududlarni rivojlantirish o'rniga ularni resurslardan mahrum qiluvchi "gravitatsion markaz"ga aylanishi mumkin. O'zbekiston sharoitida Toshkent shahri, Navoiy, Samarqand yoki Farg'ona vodiysi kabi yuqori iqtisodiy faollik zonalarini ayni paytda boshqa hududlar uchun rivojlanish drayveriga aylanishi uchun tarmoqlararo aloqalarni kuchaytirish muhimdir.

Yangi iqtisodiy geografiya namoyandalari bozor hajmi, transport xarajatlari, aglomeratsiya samarasi va firmalar konsentratsiyasining hududiy farqlanishdagi rolini kuchli ta'kidlaydi. Bu yondashuvga ko'ra, firmalar odatda xarajatlarni minimallashtirish va bozorni kengaytirish imkoniyati yuqori bo'lgan hududlarda jamlanadi. Biroq hukumat maqsadli infratuzilmaviy siyosat, soliqqa oid rag'batlar,

erkin iqtisodiy zonalar va institutsional qo'llab-quvvatlash orqali ikkilamchi markazlar shakllanishiga turtki berishi mumkin. Demak, hududiy mutanosiblik deganda barcha hududlar bir xil soha bo'yicha rivojlanishi emas, balki har bir hududning o'z nisbatli ustunliklari asosida milliy iqtisodiyotga barqaror hissa qo'sha olishi tushuniladi. Endogen o'sish nazariyasi bilim, texnologiya, innovatsiya va inson kapitalini uzoq muddatli iqtisodiy o'sishning asosiy manbai sifatida talqin qiladi. Shu nuqtai nazardan, hududning kuchi faqat tabiiy resursida emas, balki mavjud bilimni ishlab chiqarish, moslashtirish va tijoratlashtirish salohiyatida namoyon bo'ladi. Ayniqsa xizmatlar sektori, raqamli platformalar, logistika, ta'lim va professional servislarni hududiy o'sishning yangi manbai sifatida ko'rilmogda. Jahon bankining 2024-yilda e'lon qilingan hisobotida xizmatlar sohasi 2023-yilda O'zbekiston YAIMining 43,9 foizini tashkil etgani, bu sohaning iqtisodiy transformatsiyada yetakchi rol o'ynayotgani qayd etilgan [3]. Bu xulosa hududiy siyosatda xizmatlar sektorini ikkinchi darajali yo'nalish emas, balki yuqori qo'shilgan qiymat manbai sifatida ko'rish zarurligini bildiradi. Klaster yondashuvi esa hududiy raqobatbardoshlikni alohida korxona muvaffaqiyatidan ko'ra, o'zaro bog'langan korxonalar, ta'minotchilar, ilmiy markazlar, logistika operatorlari, banklar, kasb-hunar muassasalari va boshqaruv institutlarining bir butun ekotizimi sifatida talqin qiladi. Masalan, meva-sabzavot, to'qimachilik, farmatsevtika, qurilish materiallari, turizm yoki IT xizmatlari bo'yicha hududiy klasterlar shakllanishi o'sha hududda ish o'rinlari, eksport, innovatsiya va soliq tushumlarini ko'paytiradi. Shunday ekan, hududlarning kompleks rivojlanishini ta'minlashda nazariy xulosa bitta: resurslar o'z-o'zicha rivojlanishni kafolatlamaydi; ularni bog'lovchi infratuzilma, bilim, boshqaruv va bozor institutlari bo'lmasa, salohiyat "muzlab qolgan kapital"ga aylanadi.

Ilmiy adabiyotlar tahlili shuni ko'rsatadiki, hududiy siyosatda ikki xatoga yo'l qo'yish xavfi yuqori. Birinchisi, barcha hududlarga yagona shablon asosida yondashish. Bunda mahalliy sharoit, resurs va bozor xususiyatlari inobatga olinmaydi. Ikkinchisi, faqat qisqa muddatli ko'rsatkichlarga tayangan holda investitsiya taqsimlash. Bunday yondashuv ijtimoiy natija bermaydi, chunki maktab, sog'liqni saqlash, ichimlik suvi, raqamli aloqa va kadrlar tayyorlash kabi "yumshoq infratuzilma" omillari e'tibordan chetda qoladi. Shu sababli hududiy rivojlanishni baholashda iqtisodiy o'sish sur'ati bilan bir qatorda uning sifati, qamrovi va barqarorligi ham baholanishi lozim.

Hududiy salohiyatning tarkibiy qismlari va baholash metodikasi

Hududiy salohiyat keng ma'noda ma'lum hududning iqtisodiy, ijtimoiy va institutsional imkoniyatlar majmuidir. Unga tabiiy resurslar, mehnat bozori, ishlab chiqarish quvvatlari, logistika, energetika, ilmiy-texnologik baza, boshqaruv sifati, tadbirkorlik muhiti, moliyaviy resurslar va ijtimoiy infratuzilma kiradi. Ko'pincha amaliy siyosatda ushbu omillar alohida-alohida ko'rib chiqiladi. Holbuki, hududiy o'sish aynan shu omillarning uyg'unlashuvi natijasida yuzaga keladi. Masalan, katta mehnat resursiga ega hududda investitsiya muhiti sust bo'lsa, bandlik sifati oshmaydi; yirik sanoat bazasiga ega hududda professional servislarni yetishmasa, mahsulotning qo'shilgan qiymati past bo'lib qoladi. Mazkur tadqiqotda hududiy

salohiyat beshta blok asosida baholanadi: resurs salohiyati, mehnat va inson kapitali salohiyati, infratuzilmaviy salohiyat, tadbirkorlik va investitsiya salohiyati, innovatsion-raqamli salohiyat. Resurs salohiyati tarkibiga tabiiy boyliklar, qishloq xo'jaligi yerlarining unumdorligi, suv va xomashyo manbalari kiradi. Mehnat va inson kapitali blokida demografik tarkib, bandlik darajasi, malaka, oliy va kasbiy ta'lim qamrovi, mehnat unumdorligi ko'rsatkichlari muhimdir. Infratuzilmaviy salohiyatga transport, elektr energiyasi, gaz, suv, internet, logistika va ombor xizmatlari kiritiladi. Tadbirkorlik va investitsiya blokida xususiy sektor ulushi, kreditlardan foydalanish, biznesni boshlash xarajatlari, eksport imkoniyatlari, investitsion muhit tahlil qilinadi. Innovatsion-raqamli salohiyat esa ilmiy muassasalar, startaplar, axborot tizimlari, elektron xizmatlar, ma'lumotlar bazasi sifati va texnologiyani joriy etish ko'lami bilan ifodalanadi.

1-jadval.

Hududiy salohiyatning asosiy tarkibiy bloklari va baholash mezonlari

Blok	Asosiy ko'rsatkichlar	Baholash mazmuni	Strategik ahamiyati
Resurs salohiyati	yer, suv, xomashyo, energetika, tabiiy boyliklar	ishlab chiqarish bazasi va tarmoq ixtisoslashuvi imkoniyati	hududning boshlang'ich iqtisodiy quvvatini belgilaydi
Mehnat va inson kapitali	demografiya, malaka, bandlik, ta'lim qamrovi	ishchi kuchining sifati va moslashuvchanligi	unumdorlik, innovatsiya va servis sifatiga ta'sir qiladi
Infratuzilmaviy salohiyat	yo'l, elektr, gaz, suv, internet, logistika	bozorga kirish va tranzaksiya xarajatlari darajasi	investitsiya jozibadorligi va kooperatsiyani kuchaytiradi
Tadbirkorlik va investitsiya	SME ulushi, kredit, eksport, investitsiya oqimi	xususiy kapital va biznes faolligi darajasi	yangi ish o'rinlari va qo'shilgan qiymatni oshiradi
Innovatsion-raqamli salohiyat	IT, elektron xizmatlar, startaplar, ilmiy baza	texnologiyani joriy etish va ma'lumotlar boshqaruvi	uzoq muddatli raqobatbardoshlikni ta'minlaydi

Jadval muallif tomonidan ilmiy tahlil asosida tuzilgan.

Hududiy salohiyatning mavjudligi va undan foydalanish samaradorligi har doim bir xil bo'lmaydi. Ayrim hududlarda salohiyat nisbatan yuqori bo'lsa-da, undan foydalanish darajasi past bo'lishi mumkin. Shu sababli tadqiqotda integrallashgan "Hududiy salohiyatdan foydalanish indeksi"ni shakllantirish taklif etiladi. U quyidagi formula orqali ifodalanadi:

$$HSFI_i = 0,25R_i + 0,20M_i + 0,20I_i + 0,20T_i + 0,15D_i$$

bu yerda: $HSFI_i$ - i-hudud bo'yicha hududiy salohiyatdan foydalanish indeksi; R_i - resurs salohiyati; M_i - mehnat va inson kapitali salohiyati; I_i - infratuzilmaviy ko'rsatkich; T_i - tadbirkorlik va investitsiya ko'rsatkichi; D_i - innovatsion-raqamli salohiyat indeksi. Koeffitsiyentlar ekspert baholash va

iqtisodiy natijaga ta'sir darajasi asosida belgilangan. Zaruratga ko'ra ularni tarmoqlar yoki hudud tipiga qarab qayta kalibrlash mumkin. Mazkur indeksni amalda qo'llash uchun barcha ko'rsatkichlarni 0 dan 1 gacha normalizatsiya qilish maqsadga muvofiq. Shunda turli o'lchamdagi ko'rsatkichlarni birlashtirish imkoniyati paydo bo'ladi. Masalan, aholi jon boshiga YAHM, eksport hajmi, internet qamrovi va yuqori malakali ishchi kuchi ulushi bir xil o'lchov tizimiga keltiriladi. Muhim jihati shundaki, indeks faqat "qanchalik boy hudud"ni emas, balki "qanchalik samarali boshqarilayotgan hudud"ni ham ko'rsatishi kerak. Shu sababli natijaviy ko'rsatkich sifatida YAHM o'sishi, mehnat unumdorligi, yangi ish o'rinlari, xususiy investitsiya, kambag'allikni qisqartirish va byudjet tushumlari dinamikasi bilan bog'lash lozim. Hududiy baholashning yana bir muhim tamoyili - differensial strategiyalash. Barcha hududlar uchun bitta rivojlanish modeli samarali bo'la olmaydi. Masalan, Navoiy singari resurs va sanoat bazasi kuchli hududlar uchun yuqori texnologiyali qayta ishlash va logistika ustuvor bo'lsa, Samarqand yoki Buxoro uchun turizm, madaniy iqtisodiyot va xizmatlar, Farg'ona vodiysi hududlari uchun sanoat kooperatsiyasi va mehnat sig'imli tarmoqlar, Qoraqalpog'iston uchun ekologik moslashuv, yashil energetika va agrobiznes ustuvor bo'lishi mumkin. Demak, baholash metodikasi faqat reyting tuzish uchun emas, balki strategik yo'nalishlarni aniqlash uchun xizmat qilishi zarur. Baholashda sifat ko'rsatkichlari ham alohida ahamiyatga ega. Ko'plab hollarda hududlarga investitsiya kiritilgani qayd etiladi, ammo investitsiyaning tarkibi, lokal kooperatsiya darajasi, mahalliy aholi bandligiga ta'siri, eksportga chiqish salohiyati yoki ijtimoiy samara kabi omillar yetarli hisobga olinmaydi. Shu sababli hududiy salohiyatni baholashda "mablag' hajmi" emas, "samara sifati" mezon ustuvor bo'lishi kerak. Aks holda qisqa muddatli ko'rsatkichlar yaxshilangandek ko'rinsa-da, uzoq muddatli institutsional natija shakllanmaydi.

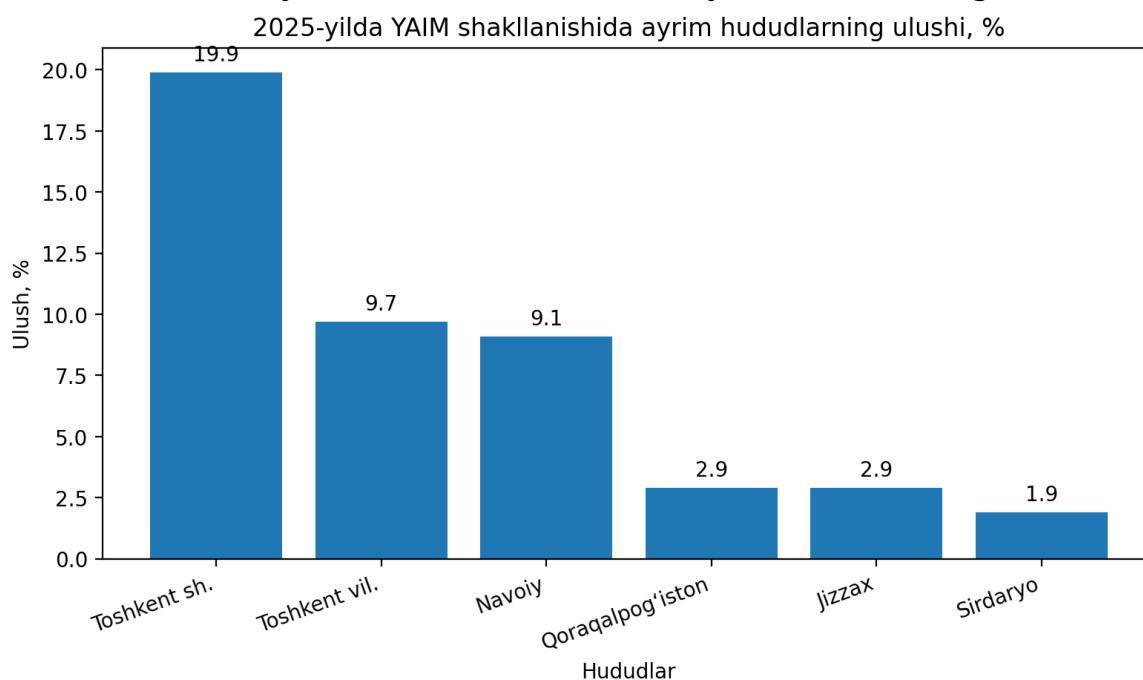
O'zbekistonda hududiy nomutanosibliklar va mavjud imkoniyatlar tahlili

O'zbekiston iqtisodiyoti so'nggi yillarda nisbatan barqaror o'sib borayotgan bo'lsa-da, hududlar bo'yicha iqtisodiy faollik, investitsiya oqimi, xizmatlar rivoji, aholi jon boshiga ishlab chiqarish va biznes infratuzilmasi ko'rsatkichlarida sezilarli tafovutlar saqlanib qolmoqda. Bu farqlar tabiiy resurslar, geografik joylashuv, tarixiy ixtisoslashuv, urbanizatsiya, demografik bosim va boshqaruv imkoniyatlari bilan izohlanadi. Masalan, sanoat va xizmatlar yuqori konsentratsiyalashgan hududlarda qo'shilgan qiymat tezroq shakllanadi, bozor infratuzilmasi kengayadi, innovatsiyani joriy etish imkoniyati ortadi. Aholi zich, ammo kapital va logistika imkoniyatlari nisbatan past hududlarda esa mehnat resursi ko'p bo'lsa-da, mehnat unumdorligi past bo'lib qolishi mumkin.

2025-yil yakunlari bo'yicha Toshkent shahri respublika YAIMining 19,9 foizini shakllantirgan, Navoiy viloyati va Toshkent viloyati esa keyingi yuqori ulushli hududlar sifatida qayd etilgan [1]. Bu holat aglomeratsiya effekti, xizmatlar konsentratsiyasi, sanoat va boshqaruv markazlari mavjudligi bilan bog'liq. Navoiy viloyatida aholi jon boshiga YAHM 152,2 mln so'mga yetgani

ham resurslarga asoslangan sanoat, yirik korxonalar va yuqori kapital sig'iminining kuchli rolini ko'rsatadi [1]. Aholi jon boshiga ko'rsatkich bo'yicha Toshkent shahri 116,7 mln so'm, Toshkent viloyati 57,5 mln so'mga teng bo'lgan, respublika o'rtacha ko'rsatkichi esa 48,8 mln so'mni tashkil etgan [1]. Bu raqamlar hududiy ishlab chiqarish va daromad bazasi o'rtasida salmoqli tafovut mavjudligini tasdiqlaydi. Shu bilan birga, faqat yuqori ulushli hududlar emas, balki quyi ulushli hududlarning yashirin imkoniyatlari ham mavjud. Masalan, Jizzax, Sirdaryo, Surxondaryo yoki Qoraqalpog'iston hududlarida erkin iqtisodiy zonalar, qishloq xo'jaligi klasterlari, qayta ishlash sanoati, logistika yo'nalishlari, chegara savdosi, qayta tiklanuvchi energetika va turizm bo'yicha salohiyat yuqori. Muammo ko'pincha resurs yetishmasligida emas, balki bozor va infratuzilma bilan bog'lanish darajasining pastligida, qiymat zanjirining hudud ichida chuqurlashmaganida va institutlararo koordinatsiyaning sustligida namoyon bo'ladi. Hududiy siyosatda aynan shu "bo'g'inlar uzilishi"ni bartaraf etish asosiy vazifa bo'lishi kerak.

1-rasm. 2025-yilda YAIM shakllanishida ayrim hududlarning ulushi



Manba: O'zbekiston Respublikasi Milliy statistika qo'mitasi ma'lumotlari asosida muallif vizualizatsiyasi [1].

Investitsiya oqimlari tahlili ham hududlar o'rtasidagi farqlarni ko'rsatadi. Milliy statistika qo'mitasi ma'lumotlariga ko'ra, 2024-yilning yanvar-mart oylarida asosiy kapitalga yo'naltirilgan to'g'ridan to'g'ri xorijiy investitsiyalarning hududiy tarkibida Jizzax viloyati 50,1 foiz, Buxoro viloyati 45,5 foiz, Qashqadaryo viloyati 44,0 foiz bilan yuqori ko'rsatkichlarni qayd etgan [4]. Bu raqamlar investorlar hudud tanlashda xomashyo, energetika va loyihaviy tayyorgarlik darajasiga katta e'tibor qaratayotganini ko'rsatadi. Demak, past ulushli hudud ham to'g'ri loyiha portfeli, infratuzilma va kafolat mexanizmlari orqali yirik investitsiyalarni jalb qila oladi. Boshqacha aytganda, hududiy

rivojlanishning “geografik taqdiri” oldindan belgilab qo’yilmagan. Jahon bankining 2025-yilgi Country Economic Memorandum hisobotida O‘zbekiston iqtisodiyotining 2010-2022-yillarda aholi jon boshiga o‘rtacha 4,2 foiz o‘sgani, biroq yuqori o‘shishni saqlab qolish uchun umumiy omil unumdorligini oshirish, infratuzilmani modernizatsiya qilish, raqobatni kuchaytirish va hududlararo bog‘liqlikni mustahkamlash zarurligi qayd etilgan [5]. Hisobotda ayniqsa elektr tarmoqlari va transport yo‘llarini modernizatsiya qilish, iqtisodiy faol hududlar o‘rtasida logistika samaradorligini oshirish tavsiya etiladi. Bu tavsiyalar hududlarning mavjud salohiyatidan samarali foydalanish uchun “qattiq infratuzilma”ning hal qiluvchi rolini yana bir bor tasdiqlaydi.

2-jadval.

Hududiy nomutanosiblikning ayrim ko‘rsatkichlari

Ko‘rsatkich	Hudud	Qiymat	Tahliliy izoh
YAIMdagi ulushi, 2025	Toshkent shahri	19,9 %	agglomeratsiya, xizmatlar va boshqaruv markazi
YAIMdagi ulushi, 2025	Toshkent viloyati	9,7 %	sanoat, logistika va bozor yaqinligi kuchli
YAIMdagi ulushi, 2025	Navoiy viloyati	9,1 %	resurs va sanoat bazasi yuqori
YAIMdagi ulushi, 2025	Sirdaryo viloyati	1,9 %	past, lekin logistika va sanoat imkoniyati mavjud
Aholi jon boshiga YAHM, 2025	Navoiy viloyati	152,2 mln so‘m	kapital sig‘imi yuqori tarmoqlar ustun
Aholi jon boshiga YAHM, 2025	Toshkent shahri	116,7 mln so‘m	yuqori xizmatlar va biznes konsentratsiyasi
Aholi jon boshiga YAHM, 2025	O‘zbekiston o‘rtachasi	48,8 mln so‘m	hududlararo tafovutning sezilarli ekanini ko‘rsatadi
FDI ulushi, 2024 I chorak	Jizzax viloyati	50,1 %	tayyorlangan loyiha va sanoat platformasi investorga signal bergan
FDI ulushi, 2024 I chorak	Buxoro viloyati	45,5 %	energetika va sanoat resurslari jalb etuvchi omil
FDI ulushi, 2024 I chorak	Qashqadaryo viloyati	44,0 %	xomashyo va tarmoq loyihalari investitsiya oqimini kuchaytirgan

Manba: [1], [4] manbalar asosida muallif tomonidan umumlashtirildi.

Xizmatlar sohasi ham hududiy mutanosib rivojlanishning muhim drayveriga aylanmoqda. Jahon bankining 2024-yilgi hisobotiga ko‘ra, xizmatlar sohasining O‘zbekiston YAIMidagi ulushi 43,9 foizni tashkil etgan, bandlikdagi ulushi esa 1991-yildagi 37 foizdan 2022-yilda 50 foizgacha oshgan [3]. Biroq bu sektor

ichida ham yuqori mahsuldor xizmatlar ulushi hali past. Hududiy siyosat bu yerda ikki vazifani hal qilishi kerak: birinchisi, an'anaviy xizmatlarni (savdo, transport, turizm, maishiy xizmatlar) sifat va unumdorlik jihatidan modernizatsiya qilish; ikkinchisi, professional servislari, IT, logistika, moliya va injiniring xizmatlarini regionlarda kengaytirish. Aks holda xizmatlar faqat bandlikni ushlab turuvchi, biroq yuqori daromad yaratmaydigan sektor bo'lib qoladi. Hududiy tahlildan kelib chiqadigan asosiy xulosa shuki, O'zbekistonda hududlar o'rtasida tafovut bor, lekin bu tafovut mutlaq "ustunlik va zaiflik"dan ko'ra ko'proq "ixtisoslashuv va boshqaruv sifati" bilan bog'liq. Hududiy siyosatning vazifasi farqlarni sun'iy ravishda yo'qotish emas, balki ularni samarali ixtisoslashuvga aylantirishdir. Buning uchun har bir hudud bo'yicha "mavjud salohiyat xaritasi" tuzilib, u eksport, bandlik, servislari, qayta ishlash, logistika va innovatsiya nuqtai nazaridan yangilab borilishi kerak.

Mavjud salohiyatdan samarali foydalanishning institutsional va iqtisodiy mexanizmlari

Hududiy salohiyatni samarali ishga tushirish uchun avvalo boshqaruvning institutsional arxitekturasini qayta ko'rib chiqish talab etiladi. Amaliyot shuni ko'rsatadiki, ko'plab hududiy dasturlarda muammo mablag' ajratilmaganida emas, balki loyiha tanlash, ijro intizomi, monitoring, tarmoqlararo muvofiqlashtirish va mahalliy manfaatdor tomonlarni jalb etish tizimining zaifligida namoyon bo'ladi. Shu bois hududlarni kompleks rivojlantirishni "dastur - loyiha - natija - baholash" zanjiri asosida boshqarish maqsadga muvofiq. Har bir tuman va shahar darajasida salohiyat pasporti, ustuvor tarmoq kartasi, investitsiya portfeli va kutilayotgan ijtimoiy natija ko'rsatkichi shakllantirilishi zarur. Birinchi mexanizm - hududiy rejalashtirishni ma'lumotlarga asoslangan tizimga o'tkazishdir. Ko'pincha hududiy qarorlar umumiy tavsifga ega ma'lumotlar asosida qabul qilinadi. Holbuki, real boshqaruv uchun mahalla, tuman, sanoat zonasi, transport yo'lagi va suv resursi darajasigacha tushuvchi granular ma'lumotlar bazasi zarur. Raqamli xaritalar, geoinformatsion tizimlar, logistika oqimi tahlili, mehnat bozori monitoringi va soliq ma'lumotlarining integratsiyasi hududning haqiqiy iqtisodiy "puls"ini ko'rsatadi. Bunday platforma mavjud bo'lsa, qaysi hududda qaysi tarmoqqa investitsiya qilish iqtisodiy jihatdan maqsadga muvofiqligi aniqroq ko'rinadi. Ikkinchi mexanizm - hududiy ixtisoslashuvni chuqurlashtirish va qiymat zanjirini uzaytirishdir. Ko'plab hududlarda xomashyo ishlab chiqariladi, ammo qayta ishlash, saqlash, qadoqlash, sertifikatlash, logistika va marketing boshqa hududlarda amalga oshiriladi. Natijada asosiy qo'shilgan qiymat mahalliy hududda qolmaydi. Masalan, qishloq xo'jaligi hududlarida zamonaviy sovitkich omborlari, logistika markazlari, agroservislari, laboratoriyalar va eksport brokerlari tarmog'i yo'lga qo'yilsa, fermerlar daromadi, soliq bazasi va bandlik darhol oshadi. Sanoat hududlarida esa komponentlar ishlab chiqarish, servis, ehtiyot qismlar, injiniring va ta'lim muassasalari bilan kooperatsiya kuchaysa, hudud ichidagi iqtisodiy multiplikator ortadi. Uchinchi mexanizm - xususiy investitsiyani rag'batlantirish bilan birga, mahalliy biznesning "yutilish qobiliyati"ni oshirishdir. Yirik investitsiya loyihasi hududga kirsam ham, agar mahalliy korxonalar o'sha

loyiha bilan kooperatsiyaga kira olmasa, importga qaramlik va tashqi pudrat ustun bo'lib qoladi. Shu sababli investitsiya siyosati ikki qatlamli bo'lishi kerak: bir tomondan, strategik sarmoyani jalb qilish; ikkinchi tomondan, mahalliy yetkazib beruvchilarni tayyorlash, standartlashtirish, kreditlash va sertifikatlash tizimini rivojlantirish. Bu hududiy iqtisodiyotning ichki mustahkamligini oshiradi. To'rtinchi mexanizm - infratuzilmaviy nomutanosibliklarni kamaytirishdir. Elektr energiyasi uzluksizligi, suv, yo'l, internet, temir yo'l, bojxona-logistika markazlari va ombor tarmoqlari mavjud bo'lmasa, eng istiqbolli hudud ham investor uchun jozibador bo'lib ko'rinmaydi. Jahon bankining 2025-yilgi tahlilida aynan viloyatlar kesimida elektr va transport infratuzilmasini modernizatsiya qilish biznes xarajatlarini pasaytiruvchi asosiy omil sifatida ko'rsatilgan [5]. Shu bois "qattiq infratuzilma" va "yumshoq infratuzilma"ni birgalikda ko'rish kerak: yo'l bilan birga kasbiy ta'lim, elektr bilan birga servis xizmatlari, internet bilan birga raqamli ko'nikmalar rivojlantirilmasa, kutilgan samara to'liq olinmaydi. Beshinchi mexanizm - hududiy moliyalashtirish modelini natijaga yo'naltirishdir. Hududlarga subsidiya yoki byudjet mablag'i berishning o'zi yetarli emas; muhim savol - bu mablag' qanday iqtisodiy va ijtimoiy natija berdi? Shu maqsadda "natijaga bog'langan moliyalashtirish" elementlarini kiritish mumkin: yangi ish o'rni, eksport tushumi, mahalliy qo'shilgan qiymat, kambag'allikni qisqartirish, xotin-qizlar bandligi, suv tejamkorligi, energiya samaradorligi kabi ko'rsatkichlar mablag' taqsimoti bilan bog'lanishi kerak. Bu yondashuv hududiy boshqaruvni rejalashtirishdan natijadorlikka o'tkazadi. Oltinchi mexanizm - ijtimoiy infratuzilmani hududiy o'sishning ichki qismi sifatida ko'rishdir. Ko'pincha iqtisodiy rivojlanish va ijtimoiy rivojlanish ikki alohida blok sifatida ko'riladi. Aslida esa sifatli maktab, kollej, texnikum, tibbiyot xizmati, uy-joy va shahar muhiti bo'lmasa, malakali kadr hududda ushlanib qolmaydi. Natijada kapital keladi, lekin bilim va tashabbus boshqa hududga ketadi. Shu ma'noda hududiy siyosatning markazida odam turishi kerak. Kompleks rivojlanishning mezoni faqat YAHM yoki sanoat emas, balki "hududda yashash va ishlash jozibadorligi" bo'lishi zarur. Yettinchi mexanizm - mahalliy tashabbuslarni kuchaytirish va institutsional mas'uliyatni aniqlashtirishdir. Mahalliy hokimlik, tarmoq idoralari, banklar, oliy ta'lim muassasalari, tadbirkorlar uyushmalari va fuqarolik jamiyati o'rtasidagi muvofiqlashtirish zaif bo'lsa, hududiy dasturlar qog'ozda chiroyli ko'rinadi, lekin amalda sust ishlaydi. Har bir ustuvor loyiha bo'yicha "mas'ul operator" instituti joriy etilishi, loyihaning iqtisodiy modeli, risk xaritasi va ijtimoiy foydasi oldindan hisoblanishi kerak. Qisqasi, hududiy salohiyatni ishga tushirish ko'proq pul emas, ko'proq aniq dizayn va mas'uliyat talab qiladi.

Raqamlashtirish, xizmatlar sohasi va innovatsion klasterlarning roli

So'nggi yillarda hududiy rivojlanishda yangi paradigma shakllanmoqda: endi o'sish faqat zavod, kon yoki ekin maydoni bilan emas, balki ma'lumot, xizmat, logistika va innovatsiya bilan ham belgilanadi. O'zbekiston sharoitida bu ayniqsa dolzarb, chunki demografik bosim yuqori bo'lgan ko'plab hududlarda klassik sanoatning bandlik sig'imi cheklangan. Demak, xizmatlar sektori va raqamli iqtisodiyot hududiy rivojlanishning "yumshoq, lekin kuchli" drayveriga

aylanishi mumkin. Jahon banki hisobotida qayd etilganidek, O'zbekiston xizmatlar sohasi 2023-yilda YAIMning 43,9 foizini bergan va iqtisodiy transformatsiyaning markaziy segmentiga aylangan [3]. Ammo hududiy kesimda xizmatlar sektorining tarkibi bir xil emas. Poytaxt va yirik shaharlarda professional servislari, bank-moliya, aloqa, ta'lim, tibbiyot, turizm va IT xizmatlari nisbatan rivojlangan bo'lsa, ko'plab tuman va o'rta shaharlarda xizmatlar asosan savdo va transport bilan chegaralanib qolgan. Natijada bandlik yaratiladi, lekin yuqori qo'shilgan qiymat shakllanmaydi. Shu sababli hududlarda xizmatlar sektorini chuqurlashtirish siyosati zarur: biznes konsaltingi, buxgalteriya outsorsingi, muhandislik, logistika rejalashtirishi, dizayn, marketing, elektron savdo va turistik servislari kengaytirilishi kerak. Raqamlashtirish bu jarayonda fundamental omil bo'lib xizmat qiladi. Raqamli platformalar hududiy masofani qisqartiradi, bozorga kirish xarajatini pasaytiradi va kichik biznesni milliy hamda global bozorlarga yaqinlashtiradi. Masalan, hunarmandchilik, qishloq turizmi, agroservis, ta'lim xizmatlari yoki mahalliy ishlab chiqaruvchilar uchun elektron savdo maydonchalari, onlayn to'lov, logistika trekingi va CRM tizimlari joriy qilinsa, hududiy korxonalar bozor geografiyasini sezilarli kengaytirishi mumkin. Shu bilan birga, raqamli transformatsiya faqat texnik ta'minot emas; u ma'lumotlar madaniyati, boshqaruv tezligi va xizmat sifatini ham o'zgartiradi.

Hududiy boshqaruvda raqamli egizak (digital twin) yoki kamida ma'lumotlar paneli yondashuvini joriy etish katta samara beradi. Har bir hudud bo'yicha yer resursi, suv ta'minoti, ishchi kuchi, energetika quvvati, bo'sh ishlab chiqarish maydoni, transport oqimi, investor so'rovi, kambag'allik xaritasi va eksport yo'nalishlari yagona platformaga birlashtirilsa, qarorlar sezgi yoki ma'muriy andoza asosida emas, aniq dalillar asosida qabul qilinadi. Bu ayniqsa resurslar cheklangan sharoitda juda muhim. Aks holda eng zarur loyiha emas, eng baland ovoz bilan ilgari surilgan loyiha ustuvor bo'lib qolishi mumkin. Innovatsion klasterlar hududiy rivojlanishni yangi bosqichga olib chiqishi mumkin. Klaster modelining afzalligi shundaki, u alohida korxonani emas, balki ekotizimni rivojlantiradi. Masalan, agroklaster faqat paxta yoki meva yetishtirishni emas, urug'chilik, servis, qayta ishlash, qadoqlash, laboratoriya, logistika, eksport, bank va sug'urtani ham birlashtiradi. IT-klaster esa coworking, ta'lim, akseleratsiya, outsorsing xizmatlari, data-markaz, ventur kapital va buyurtmachilarni bog'laydi. Turizm klasteri mehmonxona bilan tugamaydi; u transport, gastronomiya, gid xizmati, madaniy tadbirlar, hunarmandchilik va marketingni o'z ichiga oladi. Shu sababli hududiy siyosatda "bitta yirik ob'ekt qurish"dan ko'ra, "bog'langan ekotizim yaratish" samaraliroq yondashuvdir. Raqamli va innovatsion xizmatlar ayniqsa mehnat resursi ko'p hududlar uchun muhim. Chunki bunday sektorlar yer yoki xomashyo bilan qattiq bog'lanmagan holda ham rivojlana oladi. Muhim sharti - internet sifati, ta'lim, til ko'nikmasi va bozor bilan bog'lanish. Jahon bankining xizmatlar bo'yicha hisobotida bilim-intensiv global innovator xizmatlari ishlab chiqarishga nisbatan ikki barobardan ko'proq mahsuldor ekani ta'kidlangan [3]. Bu hududiy siyosat uchun juda muhim signal: agar bir viloyat yoki shahar professional servislari va IT xizmatlarini

rivojlantira olsa, u sanoat bazasi kuchli bo'lmagan taqdirda ham yuqori daromadli iqtisodiyot yaratishi mumkin. Biroq raqamlashtirish va innovatsiya o'z-o'zidan yuz bermaydi. Bu yerda uchta shart muhim: birinchisi, kadrlar tayyorlash; ikkinchisi, raqobat va bozor kirishining ochiqligi; uchinchisi, eksperiment qilishga imkon beruvchi regulativ muhit. Hududlarda universitetlar, texnikumlar va xususiy ta'lim markazlari real iqtisodiyot buyurtmasi bilan bog'lanmasa, tayyorlanayotgan mutaxassisliklar mehnat bozori talabidan uzoqlashib ketadi. Shu sababli "korxona - ta'lim muassasasi - mahalliy hokimlik" uchburchagida buyurtmachi mexanizmi ishlab chiqilishi kerak. Raqamlashtirishning yana bir yutug'i shundaki, u davlat va biznes o'rtasidagi tranzaksiya xarajatlarini kamaytiradi. Litsenziya, yer ajratish, ulanish, bojxona, soliq, kredit va eksportga oid xizmatlar tez va shaffof ko'rsatilsa, hududiy tadbirkorlik muhiti sezilarli yaxshilanadi. Bu ayniqsa tuman darajasida muhim, chunki ko'plab kichik biznes vakillari aynan ma'muriy murakkabliklar sabab kengaya olmaydi. Demak, hududiy rivojlanishning yangi formulasi shunday: xizmatlar + raqamlashtirish + klasterlash + kadrlar = yuqori mahsuldorlik va mutanosib o'sish.

Empirik baholash, muallif takliflari va amaliy yo'nalishlar

Hududiy rivojlanish siyosati samarali bo'lishi uchun u aniq ustuvorliklarga ega bo'lishi kerak. Quyida muallif tomonidan taklif etilayotgan amaliy yo'nalishlar hududlarning turli tiplariga mos ravishda ishlab chiqildi. Birinchi yo'nalish - yuqori sanoat va resurs salohiyatiga ega hududlarda chuqur qayta ishlash hamda eksport yo'naltirilgan klasterlarni kengaytirishdir. Navoiy, Toshkent viloyati, Buxoro, Qashqadaryo kabi hududlarda metallurgiya, kimyo, qurilish materiallari, energetika va logistika bilan bog'liq yuqori qo'shilgan qiymat zanjiri shakllantirilishi zarur. Bu hududlar faqat xomashyo yoki yarim tayyor mahsulot yetkazib beruvchi emas, balki tayyor sanoat, servis va muhandislik markazlariga aylanishi kerak. Ikkinchi yo'nalish - mehnat resursi ko'p, lekin kapital sig'imi nisbatan past hududlarda mehnat sig'imli va servisga asoslangan modelni rivojlantirishdir. Farg'ona vodiysi, Samarqand, Surxondaryo va Xorazm kabi hududlarda kichik sanoat zonalarini, kooperatsion ishlab chiqarish, kasanachilikning zamonaviy shakllari, dizayn-marketing servislari, ta'lim va sog'liqni saqlash xizmatlari, ichki turizm va raqamli mikrobiznesni qo'llab-quvvatlash katta samara beradi. Bunday yondashuv ish o'rinlarini tez yaratadi va mehnat bozoridagi bosimni kamaytiradi. Uchinchi yo'nalish - ekologik va iqlim xavfiga nisbatan sezgir hududlarda moslashuvchan iqtisodiy modelni rivojlantirishdir. Qoraqalpog'iston Respublikasi uchun yashil energetika, suv tejovchi agrobiznes, ekologik turizm, cho'l hududlarida logistika va qayta tiklanuvchi energetika obyektlari ham iqtisodiy, ham ijtimoiy ahamiyatga ega. Bu yerda hududiy rivojlanishning mezoni faqat ishlab chiqarish hajmi emas, balki yashash sharoiti, ekologik xavfsizlik va migratsiyani kamaytirish bo'lishi kerak. Demak, kompleks rivojlanish har bir hududning ekologik realligini ham hisobga olishi shart. To'rtinchi yo'nalish - o'sish markazlaridan periferiya hududlariga iqtisodiy ta'sirni uzatish mexanizmlarini kuchaytirishdir. Masalan, Toshkent shahri yoki yirik viloyat markazlarida shakllanayotgan talab qo'shni tumanlar

uchun mahsulot, servis va logistika buyurtmasiga aylantirilishi kerak. Buning uchun sanoat kooperatsiyasi birjalari, hududiy buyurtmalar katalogi, standartlashtirish markazlari va ta'minot zanjiri bo'yicha konsalting xizmatlari yaratilishi maqsadga muvofiq. Aks holda markazdagi o'sish atrofdagi hududga yetib bormaydi. Beshinchi yo'nalish - hududiy ta'lim va kadrlar siyosatini iqtisodiy ixtisoslashuv bilan bog'lashdir. Ko'plab hududlarda ta'lim tizimi mavjud, ammo u mahalliy iqtisodiyot ehtiyojiga to'liq moslashmagan. Agar hudud turizmga ixtisoslashayotgan bo'lsa, xizmat sifati, til, dizayn, gidlik, mehmonxona boshqaruvi va raqamli marketing bo'yicha o'quv dasturlari kuchli bo'lishi kerak. Agar hudud sanoatga yo'naltirilgan bo'lsa, texnik servis, avtomatlashtirish, energetika, mechatronika, logistika va sifat menejmenti ustuvor bo'lishi lozim. Kadrlar siyosati hududiy o'sish bilan sinxronlashmasa, investitsiya va bandlik o'rtasida tafovut paydo bo'ladi.

Oltinchi yo'nalish - hududiy monitoring va baholash tizimini standartlashtirishdir. Har bir viloyat, tuman va shahar bo'yicha kamida o'nta asosiy indikator bo'yicha ochiq panel joriy etilishi mumkin: aholi jon boshiga YAHM, yangi bizneslar soni, xususiy investitsiya, eksport, xizmatlar ulushi, mehnat unumdorligi, internet qamrovi, kambag'allik darajasi, ichimlik suvi bilan ta'minlanish va ta'lim qamrovi. Ushbu indikatorlar choraklik ravishda e'lon qilinib, "hududiy boshqaruv reytingi" shakllantirilsa, raqobat va mas'uliyat kuchayadi. Eng muhimi, bu reyting faqat hisobot uchun emas, resurs taqsimoti va rag'batlantirish tizimi bilan bog'lanishi kerak. Yettinchi yo'nalish - xizmatlar sektorida yuqori mahsuldor faoliyatlarni hududlarga tarqatishdir. Poytaxtda to'plangan professional xizmatlarning bir qismini viloyatlarga yoyish mumkin: masalan, BPO markazlari, masofaviy buxgalteriya va audit, telemeditsina, onlayn ta'lim, injiniring, arxitektura va huquqiy servislari. Buning uchun internet, coworking makonlari, standart kontraktlar, raqamli to'lov va elektron hujjat aylanishi tizimi zarur. Bu ayniqsa yoshlar ulushi yuqori hududlar uchun istiqbolli yo'nalishdir.

Sakkizinchi yo'nalish - hududiy rivojlanishning moliyaviy mexanizmlarini diversifikatsiya qilishdir. Faqat byudjet yoki bank kreditiga tayangan model yetarli emas. Hududlarda munitsipal obligatsiyalar, davlat-xususiy sheriklik, maqsadli jamg'armalar, development finance instrumentlari va xalqaro institutlar mablag'larini natijadorlik asosida jalb qilish mexanizmlari kengaytirilishi kerak. Shu bilan birga, moliyalashtirish shaffofligi va loyiha tayyorgarligi sifati oshirilmasa, mablag' ko'p bo'lsa ham natija zaif qoladi. To'qqizinchi yo'nalish - hududiy branding va marketingni kuchaytirishdir. Ko'plab hududlarning kuchli tomoni mavjud, biroq u bozor tilida ifodalanmagan. Investor, turist, eksportyor yoki malakali mutaxassis hududni qanday qabul qiladi, qanday signal oladi - bu ham iqtisodiy omil. Shu sababli har bir hudud o'zining uch-to'rtta asosiy ustunligini aniq pozitsiyalashi, inglizcha va o'zbekcha investitsiya pasportlari, loyiha katalogi, elektron yer va bino bazasi, logistika xaritasi va kontakt markazlariga ega bo'lishi kerak. O'ninchi yo'nalish - hududlararo kooperatsiyani kuchaytirishdir. Mutanosib rivojlanish degani barcha hududlar o'z ichida yopiq

iqtisodiyot bo‘lib qolishi emas. Aksincha, Samarqand turizm va servis markazi, Navoiy logistika va sanoat markazi, Farg‘ona mehnat sig‘imli ishlab chiqarish zonasi, Buxoro energetika va turizm zonasi, Qoraqalpog‘iston yashil iqtisodiyot va ekologik innovatsiya makoni sifatida o‘zaro bog‘langan tizim bo‘lishi kerak. Hududlararo savdo, kooperatsiya va transport aloqasi qanchalik rivojlangan bo‘lsa, milliy iqtisodiyot shunchalik barqaror bo‘ladi. Yuqoridagi amaliy takliflardan umumiy xulosa shuki, hududlarning mavjud salohiyatidan samarali foydalanish uchun to‘rtta shart bir paytda bajarilishi zarur: aniq ma‘lumot, mos institutsional dizayn, tarmoqlararo bog‘liqlik va inson kapitali. Mana shu to‘rtlik mavjud bo‘lsa, hatto boshlang‘ich iqtisodiy bazasi nisbatan past hudud ham tezroq rivojlanishi mumkin. Aks holda resurslar mavjud bo‘lsa-da, ular samarasiz tarqaladi yoki lokal natijaga aylanmaydi.

Xulosa

O‘zbekistonda hududlarni kompleks va mutanosib ijtimoiy-iqtisodiy rivojlantirish masalasi markaziy iqtisodiy o‘shish bilan hududiy inklyuzivlik o‘rtasidagi muvozanatni topishni talab qiladi. Tadqiqot shuni ko‘rsatdiki, hududiy tafovutlar tabiiy holat bo‘lsa-da, ularning chuqurlashuvi muqarrar emas; to‘g‘ri institutsional, investitsion va infratuzilmaviy siyosat orqali mavjud salohiyatni samarali ishga tushirish mumkin. Shuning uchun hududiy rivojlanishni faqat mablag‘ ajratish yoki yirik obyektlar qurish bilan o‘lchash yetarli emas. Asosiy e‘tibor resurslarning iqtisodiy natijaga, iqtisodiy natijaning esa ijtimoiy farovonlikka aylanish mexanizmiga qaratilishi lozim.

Maqolada taklif etilgan integrallashgan indeks yondashuvi hududiy salohiyatni ko‘p omilli baholash, yashirin imkoniyatlarni aniqlash va siyosiy ustuvorliklarni belgilashga xizmat qilishi mumkin. Tahlil natijalari shuni ko‘rsatdiki, yuqori ulushli hududlar bilan bir qatorda nisbatan past ulushli hududlarda ham sezilarli foydalanilmagan imkoniyatlar mavjud. Xizmatlar sohasi, raqamlashtirish, logistika, mahalliy kooperatsiya va innovatsion klasterlar ushbu imkoniyatlarni iqtisodiy o‘shish drayveriga aylantiruvchi asosiy kanallardir.

Kelgusida hududiy siyosat quyidagi tamoyillar asosida rivojlanishi maqsadga muvofiq: har bir hududning ixtisoslashuviga mos differensial strategiya, ma‘lumotlarga asoslangan boshqaruv, natijaga yo‘naltirilgan moliyalashtirish, inson kapitali va ijtimoiy infratuzilmani iqtisodiy siyosatning ajralmas qismi sifatida ko‘rish, shuningdek hududlararo kooperatsiyani kuchaytirish. Aynan shu yondashuv O‘zbekistonda hududiy rivojlanishni yangi bosqichga olib chiqib, iqtisodiy o‘shishning sifatini, qamrovini va barqarorligini ta‘minlashi mumkin. Bosqichma-bosqich amalga oshirish modeli va kutilayotgan natijalar Hududiy salohiyatdan foydalanish strategiyasi amaliyotda uch bosqichda joriy etilishi maqsadga muvofiq. Birinchi bosqich - diagnostika va xaritalash bosqichi. Bu bosqichda har bir hudud bo‘yicha resurs, bandlik, infratuzilma, investitsiya va servis ko‘rsatkichlari yagona metodika asosida to‘planadi, hududning “tor bo‘g‘inlari” aniqlanadi hamda o‘shishning eng real manbalari ajratib ko‘rsatiladi. Mazkur bosqichda muammo ko‘pincha ma‘lumotlarning parokandaligi, turli idoralarda saqlanishi va bir-biriga mos kelmasligida bo‘ladi. Shu sababli dastlab

statistik, soliq, kadastr, bank, ta'lim va bandlik ma'lumotlarini integratsiyalash bo'yicha institutsional protokol qabul qilinishi zarur. Aks holda hududiy rejalashtirish "yopiq ma'lumotlar oroli" sharoitida amalga oshadi. Ikkinchi bosqich - safarbar qilish va pilot loyihalar bosqichi. Diagnostika asosida har bir hududda 3-5 ta ustuvor loyiha tanlanadi. Masalan, bir hudud uchun bu agrologistika markazi, boshqasi uchun servis va turizm koridori, uchinchi hudud uchun sanoat kooperatsiyasi platformasi yoki raqamli xizmatlar markazi bo'lishi mumkin. Muhim tamoyil shuki, pilot loyiha mahalliy iqtisodiyotning asosiy og'riq nuqtasini nishonga olishi kerak. Agar asosiy muammo saqlash va logistika bo'lsa, ishlab chiqarishni ko'paytirishdan oldin aynan shu bo'g'in mustahkamlanishi lozim. Agar muammo kadrlar bo'lsa, yangi zavod qurishdan oldin ta'lim va malaka tizimi bilan integratsiya yo'lga qo'yilishi maqsadga muvofiq. Pilot yondashuvning afzalligi shundaki, u resursni tarqatib yubormaydi, balki sinovdan o'tgan modelni keyinchalik masshtablash imkonini beradi. Uchinchi bosqich - institutsional mustahkamlash va masshtablash bosqichi. Pilot loyihalar natijasi o'lchanib, muvaffaqiyatli model qo'shni hududlarga yoki boshqa tarmoqlarga ko'chiriladi. Bu bosqichda hududiy rivojlanish boshqaruvi uchun standart operatsion protokollar zarur bo'ladi: loyiha pasporti, baholash mezon, risk-menejment kartasi, moliyalashtirish modeli, monitoring jadvali va yakuniy natija indikatorlari bir xilda belgilanishi kerak. Shu bilan birga, mahalliy kadrlarning loyihalarni yuritish ko'nikmasi oshirilmasa, pilot natijalar qisqa muddatli bo'lib qolishi mumkin. Demak, masshtablash faqat ko'proq mablag' ajratish emas, balki boshqaruv sifatini standartlashtirish deganidir. Hududiy siyosatni amalga oshirish jarayonida uchta yirik xavf mavjud. Birinchi xavf - "infratuzilmasiz industrializatsiya". Ya'ni hududda ishlab chiqarish quvvatlari yaratiladi, ammo yo'l, elektr, suv, servis va logistika yetarlicha rivojlanmaydi. Natijada korxona faoliyati qimmatlashadi, eksport raqobatbardoshligi pasayadi. Ikkinchi xavf - "investitsiyasiz bandlik siyosati". Ba'zan ish o'rni yaratish qisqa muddatli maqsad sifatida alohida ko'riladi, biroq unumdorlik, ish haqining barqarorligi va bozor hajmi hisobga olinmaydi. Bu past samarali bandlikni ko'paytiradi, lekin daromad va soliq bazasini yetarli oshirmaydi. Uchinchi xavf - "odamsiz modernizatsiya", ya'ni jismoniy obyektlar quriladi, biroq kadrlar, xizmat sifati va boshqaruv tizimi e'tibordan chetda qoladi. Bunday holatda yangi ob'ektlar tez eskiradi yoki to'liq quvvatda ishlamaydi. Kutilayotgan natijalarni baholashda faqat bir yillik ko'rsatkichlar bilan cheklanmaslik kerak. Hududiy rivojlanish siyosatining dastlabki ijobiy samarasi odatda 2-3 yilda, to'liq institutsional samarasi esa 5-7 yilda namoyon bo'ladi. Shu sababli indikatorlar ikki toifaga ajratilishi maqsadga muvofiq: qisqa muddatli indikatorlar (ish o'rni, loyiha soni, investitsiya, internet qamrovi, yangi bizneslar) va o'rta-uzoq muddatli indikatorlar (mehnat unumdorligi, eksportning texnologik tarkibi, aholi jon boshiga daromad, kambag'allik darajasi, xizmatlar sifat indeksi, migratsiya oqimi). Aynan mana shu yondashuv hududiy siyosatni "raqam uchun loyiha"dan "natija uchun tizim"ga aylantiradi. Muallif fikricha, O'zbekiston sharoitida hududiy rivojlanish samaradorligini oshirish uchun davlat va bozorning roli oqilona muvozanatlashishi

kerak. Davlatning vazifasi - muhit yaratish, tor bo'g'inlarni bartaraf etish, uzoq muddatli yo'nalish belgilash va ijtimoiy adolatni ta'minlash. Xususiyl sektorning vazifasi esa kapital, innovatsiya, boshqaruv chaqqonligi va bozor intizomini olib kirishdir. Agar hududiy rivojlanish to'liq davlat loyihasiga aylanib qolsa, samara sustlashadi; agar u butunlay bozor ixtiyoriga tashlab qo'yilsa, ijtimoiy tengsizlik chuqurlashishi mumkin. Shu sababli hududiy siyosat "hamkorlik davlatligi" tamoyiliga asoslanishi kerak. Bundan tashqari, hududiy rivojlanishda kommunikatsiya madaniyati ham muhim. Ko'pincha hududlarda yaxshi loyihalar mavjud bo'ladi, lekin ular bozor, investor yoki aholiga to'g'ri tushuntirilmaydi. Strategik hujjatlarning murakkab tilda yozilishi, mahalliy biznes bilan muloqotning yetarli emasligi, loyiha ma'lumotlarining yopiq bo'lishi tashabbusni pasaytiradi. Shu sababli hududiy boshqaruv organlari uchun ochiq ma'lumot, vizual panel, loyiha taqdimoti va investor bilan professional muloqot standartlari joriy etilishi kerak. Zamonaviy iqtisodiyotda faqat yaxshi loyiha yetarli emas; u aniq, ishonchli va tushunarli tarzda taqdim etilishi ham shart. Umuman olganda, hududlarning mavjud salohiyatidan samarali foydalanish - bu bir martalik kampaniya emas, balki uzluksiz boshqaruv jarayonidir. Bugun kuchli bo'lgan hudud ertaga bozor talabi o'zgarsa sustlashishi mumkin; kecha periferiya bo'lgan hudud esa yangi transport yo'lagi, raqamli servis yoki ta'lim markazi sabab tez rivojlanishi mumkin. Demak, hududiy siyosatning asosiy sifati moslashuvchanlikdir. Moslashuvchanlik esa faqat professional tahlil, ochiq ma'lumot va tezkor boshqaruv vositalari mavjud bo'lganda yuzaga keladi. Shu ma'noda O'zbekiston hududiy rivojlanishining kelajagi resurslar ko'pligida emas, balki ularni aqlli boshqarish qobiliyatida mujassam.

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FORMS AND METHODS OF ORGANISATION OF STUDENTS' INDEPENDENT WORK IN THE PROCESS OF LEARNING ENGLISH

Abstract: *In this article we have defined the role and importance of students' independent work, analyzed its forms in the process of learning English, identified the most effective forms of independent work, and also carried out work to analyze the factors influencing the success and effectiveness of organizing and planning students' independent work.*

Keywords: *Organization of independent work, foreign language teaching programs, educational and methodological complex of the discipline, foreign language, self-expression and self-development.*

Introduction

Deepening the theoretical foundations of training future engineers and economists in the country's industrial complex is inevitable, and increasing attention must be paid to the practical significance of theoretical knowledge. A new quality of economics graduates is now needed, determined not only by the volume and quantity of knowledge acquired by students, but also by their creative thinking and ability to adapt to rapidly changing economic conditions. When training specialists at universities, it is becoming increasingly difficult to develop increasingly complex knowledge, skills, and abilities in students in a relatively short period of time.

Methods

One of the main goals of modern foreign language teaching methods is to encourage students to engage in active independent work and to create conditions for their self-expression and self-development. Today, with the advent of the internet, various multimedia tools, and gadgets, independent work is becoming more diverse and engaging. Changes in foreign language teaching programs indicate that this is one of the key areas for organizing practical work.

Different forms of independent work reflect organizational differences in task completion. They have their own goals and specific uses in the educational process.

Independent student learning is more than just completing assignments at home or in the library. It is a meaningful activity aimed at developing analytical skills, information retrieval, and literate presentation.

Research conducted on the concepts of independent work and independent cognitive activity has led to the conclusion that there is still no unified approach to

interpreting independent work and related concepts. A number of scientific studies have been devoted to students' independent work in foreign language acquisition, addressing specific aspects of this problem (O. M. Akmal'dinova, M. A. Alieva, L. I. Ivanova, I. P. Pavlova, A.M. Novikov and others).

Analysis and results

Students' independent work is a pre-planned process, the successful completion of which depends on the instructor's ability to organize and promptly monitor it at each stage of the course. In this regard, each instructor must continually develop and improve, mastering and exploring new teaching methods.

The logistical support for the educational process also plays a significant role.

It is important to remember that the main factors in mastering and reinforcing the material in a given course are the student's forms of independent work, which depend primarily on the content of the course, the student's level of preparation and independence, and the instructor's skills and qualifications. Each instructor should have a wide variety of assignments, problems, and exercises available for students to complete independently, which should not be limited to simple essays, reports, theses, and tests.

The forms of student independent work must be clearly defined by the university and department, as well as by regulatory documents and the course's teaching and methodological framework.

The structure "teacher - educational material - learning process - students" is the basis for the collaborative activity that constitutes the content of learning. The organization of independent work during language practice involves the direct and indirect influence of the teacher. While initially serving as a source of information, the teacher later becomes the organizer and coordinator of communication. Independence and activity are demonstrated in such communication, as well as in the students' communication with each other during independent cognitive activity. Therefore, it is possible to use the communication structure described by V.K. Dyachenko [4] to identify forms of independent work in the communication-learning process: paired, group, collective, and individual-isolated forms. These forms of communication-learning meet the practical goals of teaching a foreign language and enable the activation of students' learning activities. The widespread use of tasks (assignments) varying in complexity, solution method, and target settings facilitates the activation of students' independent cognitive activity. Among the practical methods of organizing independent work in a foreign language, exercises (tasks) occupy a special place. They are performed both for the purpose of obtaining theoretical knowledge and acquiring practical skills and abilities. We agree with A. M. Novikov that exercises are an active independent search by the student for optimal ways of performing actions: mental ones when solving educational problems (exercises) of a theoretical nature or sensory-motor ones when learning practical skills in both conscious and unconscious components [6, p. 99]. Since by the term "exercises" we mean different types of educational and cognitive activity, and independent work is an independent cognitive activity

[9], we consider it possible to consider exercises as methods and as types of independent work in a foreign language. Types of exercises can serve as a basis for classifying the types of independent work in a foreign language. The basis for their differentiation is the didactic (methodological) task. The purpose of information exercises is the extraction, primary processing and primary consolidation of new knowledge. Practice exercises promote the development of language and speech skills. Speech exercises are aimed at developing speech abilities. Combined exercises develop knowledge, skills, and abilities. A separate group includes exercises for assessing knowledge and the level of development of skills and abilities. During independent work, students must complete tasks that vary in solution method and complexity, solving various cognitive, communicative, communicative-cognitive, and assessment tasks, in which language is both an object of scientific cognition and a means of communication and cognition [7].

Since students at non-linguistic universities use a foreign language as a means of acquiring new information and exchanging information in their professional field, special attention in independent work in a foreign language should be given to mastering the techniques of using this tool to acquire professional knowledge, skills, and abilities. In independent work, students should appropriately use such forms of work on the text as informative reading, annotating and summarizing, writing text summaries, academic review, and text translation. The predominant form of independent work should be reading the text with direct comprehension (informative reading), which combines synthetic and analytical thinking. Various types of reading (study, familiarization, browsing, and search) should ensure the following skills in working with textual material: the ability to highlight facts; summarize individual facts; correlate individual parts of the text; derive an opinion based on the facts presented in the text; and interpret the information received. These types of work can be actively used in both classroom and extracurricular independent work. Extracurricular independent work is a logical continuation of classroom work and is aimed at developing and deepening knowledge, skills, and abilities. In the overall structure of independent work in a foreign language, systematic and regular preparation for classes is central. In addition to working on texts and exercises from textbooks, differentiated individual creative assignments should be widely used: writing stories, interviews, essays, preparing summaries, and translations. There is the opportunity to diversify the format of completion and presentation of responses: oral, written, or oral-written independent work.

Conclusion

Thus, when completing independent work, the student not only receives information and perceives it, but also reproduces it in communication with other students and the teacher.

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MARKAZIY QIZILQUMNING GEOLOGIK TUZILISHI VA MEZOZOY JINSLARIDAGI KAMYOB YER ELEMENTLARI MA'DANLASHUVI

Annotatsiya. Maqolada Markaziy Qizilqum hududining geologik tuzilishi hamda quyi bo'r yotqiziqlaridagi kamyob yer elementlari ma'danlashuvi o'rganilgan. Quljuqtov, Ovminzatov va Beltov tizmalari hududlaridagi mezozoy jinslarining litologik va geokimyoviy xususiyatlari tahlil qilindi. Tadqiqotlar natijasida REE ning yuqori konsentratsiyalari grafitlashgan ohaktoshlar, kaolinli gilllar va qumtosh qatlamlari bilan bog'liqligi aniqlandi. Olingan natijalar hududda kamyob yer elementlarining istiqbolli manbalari mavjudligini ko'rsatadi.

Kalit so'zlar: Markaziy Qizilqum, kamyob yer elementlari, quyi bo'r yotqiziqlari, geokimyo, ma'danlashuv.

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GEOLOGICAL STRUCTURE OF THE CENTRAL KYZYLKUM AND RARE EARTH ELEMENT MINERALIZATION IN MESOZOIC ROCKS

Abstract. This study examines the geological structure of the Central Kyzylkum region and rare earth element (REE) mineralization within Lower Cretaceous deposits. Lithological and geochemical characteristics of Mesozoic rocks in the Kuljuqtov, Ovminzatov, and Beltov ranges were analyzed. The results show that elevated REE concentrations are associated with graphite-bearing limestones, kaolinite clays, and sandstone layers. The findings indicate the

potential of the Central Kyzylkum region as a promising source of rare earth elements.

Keywords: *Central Kyzylkum, rare earth elements, Lower Cretaceous, geochemistry, mineralization.*

Kirish

So‘nggi yillarda jahon iqtisodiyotida yuqori texnologiyalar rivojlanishi bilan kamyob yer elementlariga (REE) bo‘lgan talab keskin ortib bormoqda. Ushbu elementlar metallurgiya, neftni qayta ishlash, elektronika, energetika va boshqa ko‘plab sanoat tarmoqlarida keng qo‘llaniladi. Shu sababli dunyoning ko‘plab mamlakatlarida REE ning yangi konlarini aniqlash hamda noan‘anaviy manbalarini o‘rganish bo‘yicha geologik-qidiruv ishlari faollashgan.

O‘zbekiston hududida ham kamyob yer elementlarining mineral xomashyo bazasini yaratish davlat miqyosidagi muhim vazifalardan biri hisoblanadi. Ayniqsa Markaziy Qizilqum hududi geologik tuzilishining murakkabligi va metallogenik ixtisoslashuvi tufayli turli foydali qazilmalar, jumladan kamyob yer elementlari uchun istiqbolli hudud sifatida qaraladi. Mazkur hududdagi quyi bo‘r yotqiziqlarida kamyob yer elementlarining yuqori konsentratsiyalarining aniqlanishi ushbu jinslarni batafsil o‘rganish zaruratini yuzaga keltirmoqda.

Ushbu tadqiqotning maqsadi Markaziy Qizilqum hududining geologik tuzilishi hamda mezozoy jinslarida kamyob yer elementlari ma‘danlashuvining geologik va geokimyoviy xususiyatlarini tahlil qilishdan iborat.

Materiallar va metodlar

Tadqiqotlar Markaziy Qizilqumning Quljuqtov, Ovminzatov va Beltov tizmalari hududlarida olib borildi. Geologik tuzilishni o‘rganishda aeromagnit tadqiqotlar, geologik xaritalash, geofizik tadqiqotlar, gamma-nurli tadqiqotlar hamda aerogamma-spektrometrik usullar qo‘llanildi. Hududda 1:50 000 va 1:25 000 miqyosdagi geologik va geokimyoviy tadqiqotlar amalga oshirilgan.

Namunalarda kamyob yer elementlari miqdorini aniqlash uchun spektral, optik-emission va mass-spektrometrik tahlil usullari qo‘llanildi. Olingan natijalar geologik kesimlar va litologik tahlillar bilan solishtirildi hamda ma‘danlashuvni nazorat qiluvchi geologik omillar aniqlashga harakat qilindi.

Natijalar

Olib borilgan tadqiqotlar natijasida quyi bo‘r yotqiziqlarining turli litologik tarkiblarga ega ekanligi aniqlangan. Ular asosan gilli jinslar, qumtosh-gilli qatlamlar, qumtoshlar va gravelitlardan tashkil topgan. Ayrim gorizontlarda qo‘ng‘ir temir konkretsialari, grafit linzalari va kaolinli gillarning qatlamlari uchraydi.

Ayak-Gujumdi uchastkasida grafitlashgan ohaktoshlar, kaolinli granit daykalar va qumtoshli qatlamlar bilan bog‘liq holda kamyob yer elementlarining yuqori konsentratsiyalari aniqlangan. Paleozoy jinslarining nurash qobig‘i mahsulotlarining qayta yotqizilishi natijasida hosil bo‘lgan qatlamlarda $\Sigma\text{REE}+\text{Y}$ miqdori 789,9–945,7 g/t gacha yetishi kuzatilgan.

Shuningdek, Janubi-gʻarbiy Shuruk maydonida kaolinli gillarda REE ning yuqori miqdorlari qayd etilgan. Bu yerda kamyob yer elementlarining umumiy miqdori 444,2 g/t dan 701,3 g/t gacha oʻzgaradi.

Muhokama

Olingan natijalar Markaziy Qizilqum hududidagi quyi boʻr yotqiziqlarining kamyob yer elementlariga boy boʻlishi asosan paleozoy jinslarining nurash qobigʻi mahsulotlarining qayta yotqizilishi bilan bogʻliqligini koʻrsatadi. Kaolinli gillarning mavjudligi, grafitlashgan jinslar va temir minerallashuvi bilan bogʻliq qatlamlar REE ning geokimyoviy akkumulyatsiyasi uchun qulay muhit yaratadi.

Hududning metallogenik ixtisoslashuvi oltin-volfram-qalay-surma-simobli boʻlishiga qaramay, ayrim uchastkalarda kamyob yer elementlarining yuqori miqdorlari aniqlanishi bu hududni yangi turdagi maʼdanlashuv uchun istiqbolli ekanligini koʻrsatadi. Shu sababli ushbu hududlarda batafsil geokimyoviy va mineralogik tadqiqotlarni davom ettirish maqsadga muvofiqdir.

Xulosa

Markaziy Qizilqum hududining geologik tuzilishi murakkab boʻlib, u turli yoshdagi geologik formatsiyalar bilan tavsiflanadi. Tadqiqotlar natijasida quyi boʻr yotqiziqlarida kamyob yer elementlarining yuqori konsentratsiyalari aniqlangan. Ular asosan grafitlashgan ohaktoshlar, kaolinli gilllar va qumtoshli qatlamlar bilan bogʻliq holda uchraydi.

Olingan natijalar Markaziy Qizilqum hududi kamyob yer elementlarining noanʼanaviy manbalari mavjud boʻlishi mumkinligini koʻrsatadi va kelgusida ushbu hududlarda geologik-qidiruv ishlarini kengaytirish zarurligini tasdiqlaydi.

Foydalanilgan adabiyotlar

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ECONOMIC GEOGRAPHICAL FEATURES OF THE DEVELOPMENT OF GRAIN GROWING CLUSTERS IN KASHKADARYA REGION

Abstract. *This article analyzes the economic and geographical features of the development of grain clusters in the Kashkadarya region. The study studies the impact of the natural and climatic conditions of the region, the level of land and water resources, labor resources and production infrastructure on cluster activity. The establishment and development of grain clusters is based on the strengthening of territorial integration of the processes of cultivation, processing and sale of agricultural products. The impact of the clustering process on regional economic development, employment growth and socio-economic stability of rural areas is also assessed.*

Keywords: *grain clusters, regional development, agrocluster, agricultural production, land and water resources, infrastructure, regional economy, clustering.*

Introduction

In recent years, the issues of ensuring food security, territorial optimization of agricultural production, and integrated development of agricultural sectors have become one of the most pressing scientific and practical problems in the world. In particular, the trend towards forming the "cultivation - processing - storage - sale" chain as a single territorial-economic system through the introduction of clustering mechanisms in the grain production sector is increasing. This process reduces production costs, increases logistics efficiency, and expands the opportunity to create added value. In Uzbekistan, the development of grain-growing clusters has become an important priority of the state agrarian policy as part of the modernization of agriculture, increasing export potential, and accelerating the economic development of regions. The economic and geographical essence of this process is directly related to the rational use of regional resource potential, the placement of production in accordance with natural and climatic conditions, and the formation of multidisciplinary economic structures in agricultural regions.

The issue of developing grain-growing clusters is particularly relevant in the Kashkadarya region, as the region is one of the leading agricultural regions of the republic in terms of natural and climatic conditions, irrigation networks, fertile land resources, and labor resources. The vast geography of grain cultivation in the region, the high share of irrigated land, and the significant rural population create an important economic geographical basis for the introduction of the cluster model. At the same time, the regional unevenness of the production infrastructure, the insufficient development of the logistics system in some districts, and the incomplete correspondence of processing capacities to the raw material base create

the need for regional planning of the clustering process on a scientific basis. Therefore, studying the economic geographical characteristics of the development of grain-growing clusters in the Kashkadarya region is of significant scientific and practical importance in terms of improving regional development strategies and increasing the efficiency of the agricultural sector.

Main part

Kashkadarya region is one of the agrarian regions with favorable economic and geographical conditions for the formation of grain-growing clusters. The region's extensive irrigated lands, long growing season, and high levels of sunlight provide a natural advantage in growing grain crops. The continental nature of the climate, the ability to carry out spring and autumn agrotechnical measures at specific times, as well as the relative stability of soil fertility across regions, serve as important factors for achieving high yields within the framework of the cluster system. In this regard, the natural resource potential of the region serves as a basic economic and geographical basis for the territorial location of grain-growing clusters.

The territorial distribution of land and water resources in the region directly affects the geography of the formation of grain-growing clusters. The majority of irrigated land is located in river valleys and districts with developed irrigation systems, and these areas have a high potential for establishing intensive grain farms. The level of use of water resources, the varying state of land reclamation, and the agrarian structure of the land fund create the need for territorial specialization of clusters. At the same time, the dense concentration of labor resources in rural areas, the high share of agricultural employment, and the presence of traditional farming experience appear to be important factors ensuring the socio-economic stability of production in the clustering process.

The territorial location of transport and logistics infrastructure and processing facilities also plays an important economic geographical role in the formation of grain clusters. The availability of access to the republic's markets via the main highways and railway networks in the region ensures the rapid transportation and sale of grain products. However, the uneven location of processing plants relative to the areas where raw materials are grown leads to increased logistics costs in some districts. Therefore, in the territorial organization of clusters, the spatial coordination of the chain "raw material base - processing - storage - market" is one of the main conditions for increasing economic efficiency. This reinforces the need for scientifically based territorial planning for the development of grain-growing clusters in the Kashkadarya region.

The table below shows the location of grain-growing clusters operating in the Kashkadarya region, the number of farms attached to them, and the size of their land areas. This data allows us to assess the characteristics of the territorial organization of grain-growing clusters in the region, the spatial distribution of production resources, and the scale and intensity of the clustering process from an economic geographical point of view. By analyzing the data in the table, the

territorial concentration of clusters, the ratio of large and small clusters, and their location in accordance with agricultural potential are determined.

Information about grain clusters in Kashkadarya region

№	Cluster name	Located district	Number of farm attached to the cluster	Total land area attached to the cluster (ha)	From this	
					Including cluster land (ha)	farm, (ha)
1	“Galla Cluster” LLC	Guzar	375	8650	-	8650
2	“Karshi Don Agro” LLC	Karshi	578	14000	-	14000
3	“Qamashi oltin boshqoq agrocluster” LLC	Qamashi	357	10200	-	10200
4	“Bogobod qorabayir” f/x	Koson	14	431	70	361
5	“Sanjarbek Nadjim ogli” f/x	Koson	56	969	47	922
6	“Koson sara bugdoy don” LLC	Koson	833	13844	-	13844
7	“Kitob agro invest produkt” LLC	Kitab	42	417	-	417
8	“Kitob Beshterak agro” LLC	Kitab	17	233	-	233
9	“Kitob agrokimyohimoya” LLC	Kitab	125	1172	-	1172
10	“The best agrokhim cluster” LLC	Mirishkor	1030	22250	-	22250
11	“Mt amir tex” LLC (Private Enterprise)	Muborak	210	9250	2220	7030
12	“Indorama” LLC (Private Enterprise)	Kasbi	-	5065	-	-
13	“Asqar trans gold cluster” LLC	Kasbi	483	9135	-	9135
14	“Indorama” LLC (Private Enterprise)	Nishan	-	3600	-	-
15	“Nishan Cluster Tech Service MTP” LLC	Nishan	717	14900	-	14900
16	“Chiroqchi cluster galla” LLC	Chiroqchi	513	8600	-	8600
17	“Yakkabog boshqolari agrocluster” LLC	Yakkabog	324	8000	-	8000
18	“Kesh grain seeds” LLC	Shahrisabz	212	4718	-	4718

The table shows that grain-growing clusters in the region are mainly located in districts with a high share of irrigated land, and they cover large areas of land. In particular, “The Best Agrokhim Cluster” LLC in Mirishkor district is the largest cluster with 22,250 hectares of land and 1,030 farms. Also, clusters such as “Nishon Cluster Tex Service MTP” LLC in Nishon district (14,900 ha), “Qarshi

Don Agro” LLC in Karshi district (14,000 ha), and “Koson Sara Bug'doy Don” LLC in Koson district (13,844 ha) also stand out as large regional production units. This indicates that clusters are mainly formed in regions with a large raw material base.

There is an uneven distribution of the number of clusters and land areas across regions. For example, in Kitab district, there are three clusters operating, and their total land area is relatively small (417 ha, 233 ha, and 1,172 ha), while in Koson district there are several clusters, covering land areas of various sizes. This situation means that the regional specialization of grain-growing clusters and production capacities are being formed in accordance with the natural and economic conditions of the districts. In some clusters, part of the land area appears to be directly owned by the cluster, while the rest is managed through farms, indicating that production is organized on the basis of a cooperative model.

There are also significant differences in the number of farms. For example, clusters in Mirishkor, Nishon, Koson, and Karshi districts have 700-1,000 farms, while in some clusters (for example, in Kitab or Shahrisabz districts) this figure is less than 200. These differences are related to regional production density, land size, and the level of development of irrigation systems. As a result, large clusters are superior in terms of economic efficiency and production volume, while small clusters operate in a manner adapted to the local raw material base. This situation indicates that the territorial organization of grain-growing clusters in the region is becoming economically and geographically stratified.

In general, the data in the table show that grain-growing clusters in the Kashkadarya region are geographically unevenly distributed and are mainly formed in districts with large areas of irrigated land. The concentration of large clusters in the Mirishkor, Nishon, Karshi, and Koson districts indicates the high agricultural production potential of these regions. This confirms that natural resource factors (land and water availability), as well as infrastructure capabilities, serve as the main territorial selection criteria in the clustering process.

At the same time, sharp differences in the size of clusters and the number of farms attached to them indicate the economic and geographical stratification of grain-growing clusters in the region. While large clusters excel in terms of production volume and economic efficiency, relatively small clusters operate in a manner adapted to the local raw material base and regional specialization. As a result, strengthening the internal coherence of clusters through territorial planning, logistics, and bringing processing capacities closer to the raw material base is an important scientific and practical task in the development of grain-growing clusters in the region.

Conclusion

The conducted analyses show that the process of developing grain-growing clusters is inextricably linked to the natural resource potential of the region, the level of land and water supply, labor resources, and the location of production infrastructure. In the case of the Kashkadarya region, it was found that clustering is mainly taking place in districts with a high share of irrigated land, the raw

material base of large clusters covers vast territories, and the territorial concentration of production is increasing. This confirms the important economic and geographical importance of the cluster model in the territorial specialization of agricultural production, the efficient use of resources, and the formation of a sustainable production system in the grain sector.

At the same time, the unevenness in the territorial location of clusters, the insufficient development of processing capacities and logistics infrastructure in some regions create certain limitations in achieving the full economic efficiency of grain-growing clusters. Therefore, the development of grain clusters in the region based on territorial planning, spatial harmonization of the "raw material - processing - storage - market" chain, and strengthening inter-cluster cooperation are important scientific and practical tasks. This approach will help increase the competitiveness of the grain sector, accelerate the socio-economic development of rural areas, and strengthen regional food security.

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- 10.

IMPROVING THE INVESTMENT FOUNDATIONS FOR THE MODERNIZATION OF LIGHT INDUSTRY ENTERPRISES

Abstract: *This article analyzes the issues of improving the investment foundations for the modernization of light industry enterprises. Light industry is one of the key sectors of the national economy, and its sustainable development largely depends on the effective attraction of investments and the introduction of modern technologies. The study examines the current state of the light industry sector, existing challenges, and prospects for the efficient use of investment resources in addressing these issues. Based on statistical data, the contribution of light industry to the national economy is analyzed, and several investment mechanisms necessary for the modernization of enterprises in this sector are proposed.*

Keywords: *light industry, modernization, investment foundations, investments, industrial sectors, competitiveness, technologies, economic growth.*

INTRODUCTION

In the modern global economy, rapid changes, increasing international competition, and technological progress require countries to enhance the efficiency and competitiveness of their industrial sectors. Under such conditions, the modernization of light industry enterprises and the attraction of investments become crucial factors for ensuring sustainable economic growth.

Light industry plays an important role in the economy of Uzbekistan due to its strong raw material base, export potential, and significant contribution to employment generation. However, the rapid development of innovative technologies, changes in market demand, and the need to meet international quality standards require continuous modernization of production processes and effective investment mechanisms in this sector.

Current State of the Light Industry Sector

Light industry is an industrial sector that includes the production of textile products, garments, footwear, and other consumer goods. In Uzbekistan, this sector is considered one of the key drivers of economic development as it contributes significantly to export growth, job creation, and the satisfaction of domestic consumer demand.

- Despite these advantages, the sector faces several challenges, including:
- the use of outdated technologies and equipment in some enterprises;
- decreasing competitiveness in certain segments of the industry;
- low value-added production;
- insufficient levels of stable investment.

Addressing these challenges requires comprehensive modernization of enterprises and the attraction of significant investment resources.

Investment Foundations of Light Industry

One of the main directions for the modernization of light industry enterprises is the effective attraction of investments. Investment resources play a crucial role in introducing modern technologies, improving production efficiency, and enhancing product quality.

Currently, several mechanisms are used to attract investments into the light industry sector:

State support mechanisms

Government policies such as tax incentives, subsidies, and the establishment of special economic zones stimulate investment activity in the sector.

Private sector participation

Private investment contributes to the expansion of production capacity, the introduction of innovative technologies, and the development of new industrial projects.

Foreign direct investment

Creating favorable conditions for foreign investors, including liberal economic policies and investment guarantees, facilitates the inflow of foreign capital into the light industry sector.

Improving Investment Foundations: Statistical Analysis

In recent years, significant positive changes have been observed in attracting investments to the light industry sector in Uzbekistan. In particular, the volume of investments in this sector increased nearly twofold during the period from 2020 to 2023. These investments have contributed to technological modernization, diversification of production, and expansion of export opportunities.

According to statistical data, in January–August 2024 the share of textile production in the total manufacturing industry reached 11.3%. During this period, the physical volume index of production increased by 10.3%, while the total production volume amounted to 47.46 trillion UZS.

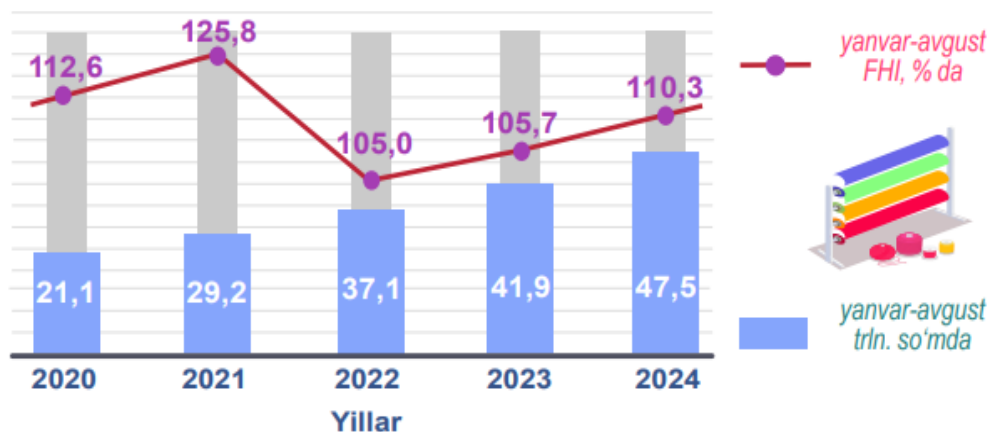


Figure 1

At the same time, textile exports showed a slight decrease compared to 2023. In 2024, the total export volume of textile products amounted to 2.87 billion USD. The export structure was mainly dominated by yarn products (43.2%) and finished textile products (39.2%).



Figure 2

In addition, the light industry sector provided employment for more than 300 thousand workers in 2023, which demonstrates its significant role in ensuring employment and social stability.

Furthermore, the modernization of technologies and the introduction of new production processes have improved productivity. For example, in 2021 the output produced per worker increased by approximately 15%, which can be considered the result of effective investment policies and modernization efforts.

Prospects for Improving Investment Foundations

In order to further develop and modernize light industry enterprises, it is necessary to improve investment mechanisms in the following areas:

1. Development of innovative strategies

The introduction of innovative solutions, including environmentally friendly and energy-efficient technologies, in all sectors of light industry.

2. Expansion of financial support mechanisms

Increasing government-supported credit programs, subsidies, and investment incentives to stimulate investment activity.

3. Improvement of human capital

Enhancing the professional skills and qualifications of employees working in the light industry sector through training and education programs.

CONCLUSION

The modernization of light industry enterprises and the effective attraction of investments are becoming increasingly important for ensuring sustainable economic development. The introduction of modern technologies, improvement of the investment environment, and strengthening cooperation between the state and private sector will significantly increase the competitiveness of the sector..

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ПОДХОДЫ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В ПЕРСОНАЛИЗАЦИИ МАРКЕТИНГА И АНАЛИЗЕ ПОВЕДЕНИЯ ПОТРЕБИТЕЛЕЙ

***Аннотация:** В данной статье исследуются значимость, теоретические основы и практические результаты персонализации маркетинга и анализа поведения потребителей в современной цифровой экономике. На примере компаний из различных отраслей показано влияние персонализации на уровень конверсии, лояльность клиентов и доходность. Результаты исследования подтверждают, что персонализация на основе ИИ обеспечивает эффективность в 3–5 раз выше по сравнению с традиционными методами маркетинга.*

***Ключевые слова:** персонализация, поведение потребителей, искусственный интеллект, машинное обучение, маркетинговая аналитика, цифровая экономика.*

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ARTIFICIAL INTELLIGENCE APPROACHES TO MARKETING PERSONALIZATION AND CONSUMER BEHAVIOR ANALYSIS

***Abstract:** This article examines the significance, theoretical foundations, and practical results of marketing personalization and consumer behavior analysis in the modern digital economy. Using examples from companies across various industries, the impact of personalization on conversion rates, customer loyalty, and profitability is demonstrated. The study's results confirm that AI-based personalization is 3-5 times more effective than traditional marketing methods.*

***Keywords:** personalization, consumer behavior, artificial intelligence, machine learning, marketing analytics, digital economy.*

Введение

В современной цифровой экономике запросы и желания потребителей становятся всё более сложными. Объём глобального рынка электронной коммерции в 2024 году прогнозируется на уровне 6,3 триллиона долларов США (Statista, 2024). В условиях такой конкуренции индивидуальный подход к каждому клиенту — персонализация — превращается для компаний в стратегическую необходимость. Под персонализацией понимаются индивидуальные маркетинговые сообщения, рекомендации

товаров и услуг, формируемые на основе демографических характеристик клиента, истории покупок, онлайн-поведения и данных в реальном времени (Kotler и Armstrong, 2021). Развитие технологий искусственного интеллекта подняло этот процесс на новый уровень: теперь компании могут выстраивать индивидуальные отношения с миллионами клиентов одновременно. По данным исследования McKinsey Global Institute (2023), компании, эффективно применяющие персонализацию, увеличивают доходы на 10–15%, а лояльность клиентов — на 20–30%. Тем не менее узбекистанские предприятия пока недостаточно используют эти технологии, что и определяет актуальность данного исследования.

Настоящее исследование преследует следующую основную цель: проанализировать механизмы персонализации на основе искусственного интеллекта, изучить методы моделирования поведения потребителей и оценить их влияние на эффективность бизнеса через количественные показатели.

Методология исследования и обзор литературы

В исследовании применялся комплексный методологический подход. В качестве первичных данных использованы материалы, собранные путём анкетирования и интервью на 15 цифровых торговых платформах Узбекистана (n=847 клиентов, 2023 год). В качестве вторичных данных проанализированы отчёты McKinsey, Gartner, Forrester Research и Statista за 2020–2024 годы. Для анализа поведения потребителей применялись следующие методы: (1) модель RFM-сегментации (Recency, Frequency, Monetary); (2) алгоритм кластеризации K-means; (3) логистическая регрессия для прогнозирования намерения совершить покупку; (4) A/B-тесты для оценки эффективности персонализации.

Теория персонализации в маркетинге изучается с 1990-х годов. Pine и Gilmore (1999) обосновали концепцию экономики впечатлений и показали значимость создания уникального опыта для каждого клиента как конкурентного преимущества. Peppers и Rogers (2011) предложили систему управления индивидуальными клиентскими отношениями. В цифровую эпоху концепция персонализации расширилась и объединилась с искусственным интеллектом. Turban и соавт. (2018) провели фундаментальное исследование рекомендательных систем на основе ИИ, сравнив коллаборативную фильтрацию, контентную фильтрацию и гибридные подходы. Изучив опыт Amazon и Netflix, они доказали, что рекомендательные системы способны обеспечивать прирост дохода на 15–35%.

В области Big Data и анализа поведения потребителей значительный вклад внесли Mayer-Schonberger и Cukier (2013), разработавшие методологию извлечения практических выводов из массивов данных. Davenport и Harris (2017) подчеркнули стратегическую важность решений, основанных на данных. Среди узбекских учёных Rashidov A.R. (2022) исследовал перспективы персонализации на рынке Узбекистана и предложил

адаптированные модели для отечественных предприятий. Saidov U.B. и Xasanov M. (2023) проанализировали правовые и экономические основы внедрения искусственного интеллекта в бизнес Узбекистана.

Обсуждение

Модель RFM (Recency — время с последней покупки, Frequency — частота покупок, Monetary — общая сумма затрат) является широко распространённым методом группировки клиентов по их ценности. В данном исследовании с помощью алгоритма K-means клиенты были разделены на 5 основных сегментов: «Чемпионы» (Champions) — 18% — клиенты с высокими показателями RFM, лояльные к бренду и с высокими расходами; обеспечивают 52% общего дохода. «Лояльные клиенты» (Loyal Customers) — 24% — постоянные покупатели со средними расходами. «Группа риска» (At-Risk) — 21% — ранее активные клиенты, у которых в последнее время снизилась частота покупок. «Новые клиенты» (New Customers) — 19% — совершившие первую покупку. «Спящие» (Hibernating) — 18% — не совершавшие покупок в течение длительного времени. По результатам сегментации для возврата клиентов из группы риска были разработаны персонализированные Win-back-кампании. Уровень конверсии этих кампаний оказался в 4,2 раза выше по сравнению со стандартным массовым email-маркетингом. Модель воронки поведения потребителей отображает этапы принятия решения о покупке. Анализ на основе ИИ позволяет выявить точки препятствий на этих этапах и направлять адаптированные сообщения. Как показано на рисунке 2, из 100% потребителей лишь 12% доходят до совершения покупки. Персонализация на основе ИИ позволяет существенно улучшить эти показатели конверсии: результаты А/В-тестирования демонстрируют, что платформа, оснащённая рекомендациями ИИ, снизила показатель отказов (bounce rate) в среднем на 23%.

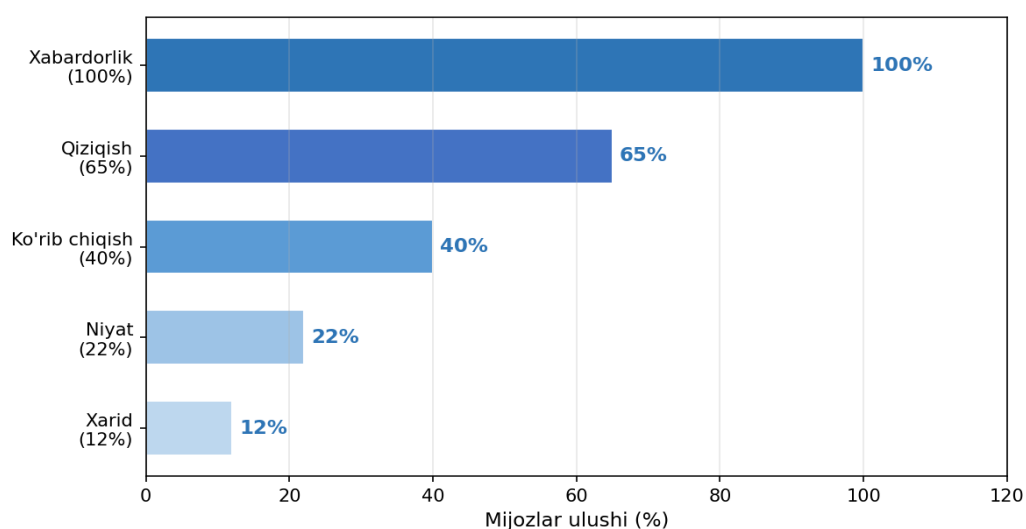


Рисунок 1. Модель поведения потребителей (на основе анализа ИИ)

В исследовании сравнивалась эффективность моделей логистической регрессии, Random Forest и Gradient Boosting. При разбивке данных в соотношении 70/30 (обучение/тест) были получены следующие результаты:

Таблица 2.
Сравнительные результаты ML-моделей²⁵

Модель	Точность (Accuracy)	Precision	Recall	F1-Score
Логистическая регрессия	76,4%	74,2%	71,8%	73,0%
Дерево решений	79,1%	77,5%	76,2%	76,8%
Random Forest	85,7%	84,3%	83,1%	83,7%
XGBoost (Gradient Boosting)	88,9%	87,6%	86,4%	87,0%

Модель Deep Neural Network продемонстрировала наивысший F1-Score (89,9%). Однако на практике XGBoost является предпочтительным выбором, поскольку отличается высокой интерпретируемостью и более эффективным использованием вычислительных ресурсов. Эта модель подходит также для малого и среднего бизнеса Узбекистана.

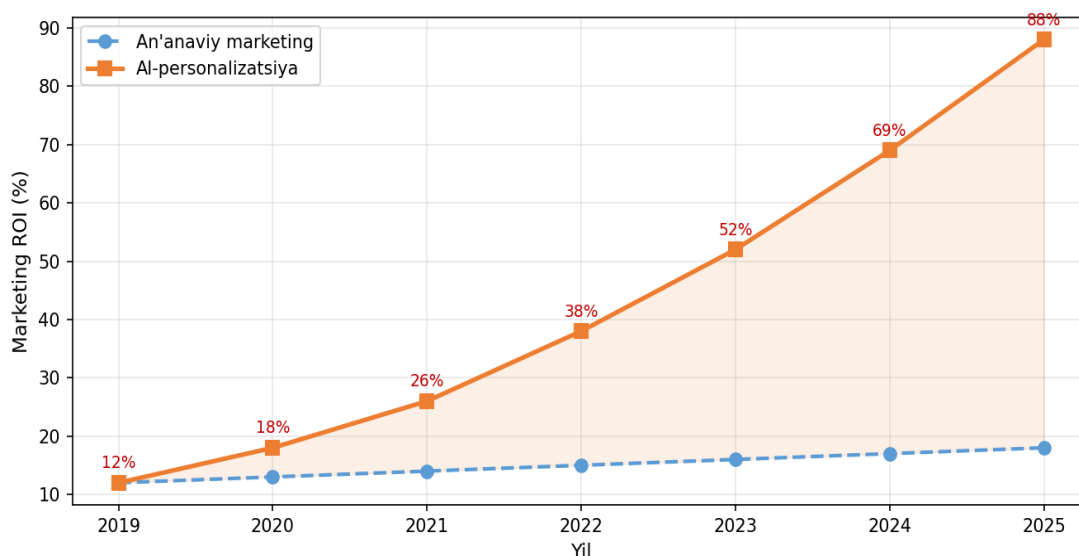


Рисунок 2. Динамика традиционного маркетинга и ИИ-персонализации (2019–2025 гг.)

Как видно из рисунка 3, показатель ROI персонализации на основе ИИ демонстрирует стремительный рост в период с 2019 по 2025 год. К 2025 году ROI ИИ-персонализации ожидается на уровне 88%, что в 4,9 раза превышает показатель традиционного маркетинга (18%). Причины столь значительного

²⁵ Источник: расчеты автора

разрыва: (1) направление рекламных расходов на целевых клиентов; (2) подача правильного предложения в момент наибольшей вероятности покупки; (3) возможность заблаговременного выявления оттока клиентов (churn) и принятия профилактических мер.

Результаты

Результаты исследования показывают, что персонализация на основе ИИ открывает широкие возможности и для экономики Узбекистана. По состоянию на 2024 год в стране насчитывается более 35 миллионов интернет-пользователей (UzDStat, 2024), а рынок электронной коммерции растёт на 25–30% в год. Вместе с тем узбекистанские предприятия сталкиваются с рядом препятствий при внедрении ИИ-персонализации: Нехватка квалифицированных кадров — значительный разрыв между спросом и предложением аналитиков данных и ML-инженеров. Качество данных — на многих предприятиях клиентские данные неупорядочены или неполны. Ограничения ИТ-инфраструктуры — внедрение облачных вычислений и хранилищ данных требует инвестиций.

Для решения этих проблем рекомендуется стратегия поэтапного внедрения: на первом этапе — RFM-сегментация и простой триггерный email-маркетинг (2–4 месяца); на втором этапе — рекомендательная система на основе ML (6–12 месяцев); на третьем этапе — персонализация в режиме реального времени и омниканальная интеграция (12–24 месяца).

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АНДИЖОН ВИЛОЯТИ ШАРОИТИДА ШИРИН ҚАЛАМПИРДАГИ ПОЯ ЧИРИШИ КАСАЛЛИГИ

Аннотация: Бугунги кунда мамлакатимизда сабзавот экинлари орасида экин майдони ва ишлаб чиқариш ҳажми жиҳатидан тобора ошириб бораётган экинлардан бири қалампир навлари (*Capsicum* туркуми турлари, асосан *Capsicum annuum* тури) ҳисобланади. Қишлоқ хўжалиги экинларидан сифатли ва юқори ҳосил олиш учун зарарли организмларга, айниқса касалликларга қариш курашининг аҳамияти катта.

Калим сўзлар: *Capsicum annuum*, ширин қалампир, *Fusarium solani*, замбуруз, перитецийлар, Санживи, Споражин, Плантастим.

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SWEET PEPPER STEM ROT IN THE ANDIJAN REGION

Abstract. Today, among vegetable crops in our country, varieties of pepper (*Capsicum annuum*) are increasing in cultivated areas. The control of harmful organisms, especially diseases, is of great importance for obtaining high-quality and high yields of agricultural crops.

Key words: *Capsicum annuum*, sweet pepper, *Fusarium solani*, mushrooms, perithecium, Sanjivi, Sporagin, Plantastim.

Мавзунинг долзарблиги

Ўзбекистон мустақилликка эришгандан сўнг қишлоқ хўжалигини янада ривожлантириш, соҳада давлат бошқаруви тизимини такомиллаштириш, бозор муносабатларини кенг жорий қилиш, қишлоқ хўжалиги маҳсулотларини етиштирувчи, қайта ишловчи ва сотувчи субъектлар ўртасидаги муносабатларнинг ҳуқуқий асосини мустаҳкамлаш, соҳага инвестицияларни жалб қилиш, ресурстежамкор технологияларни жорий этиш мақсадида бир қатор қарорлар, фармонлар ва дастурлар қабул қилиниши ислохотларни амалга ошириш учун ҳуқуқий асос яратади. Ушбу ҳужжатлар қишлоқ хўжалик маҳсулотларини кўпайтириш, аҳоли эҳтиёжини

тўла қондириш, четга сотиш, умуман иқтисодий мустақиллигимизни янада барқарорлаштиришга қаратилган.

Бугунги кунда мамлакатимизда сабзавот экинлари орасида экин майдони ва ишлаб чиқариш ҳажми жиҳатидан тобора ошириб бораётган экинлардан бири қалампир навлари (*Capsicum* туркуми турлари, асосан *Capsicum annuum* тури) ҳисобланади. Ширин қалампир меваси сабзавот сифатида янги, димлаб пиширилган, қурилган, тузланган, зиравор қўшиб сиркаланган, консерва қилинган шаклда, аччиқ қалампир эса зиравор сифатида янги, қурилган, тузланган, қуриб туйилган ва бошқа шаклларда истеъмол қилинади. Ширин ва аччиқ қалампир очиқ майдонда асосий ва такрорий экин сифатида ҳамда иссиқхоналарда етиштирилади.

Ҳар қандай ўсимлик касаллигига қарши кураш уни қўзғатувчи микроорганизм турини аниқлашдан бошланади. Адабиёт манбаалари кўрсатишича қалампир навларида замбуруғлар (~64 та), оомицетлар (11), бактериялар (12), фитоплазмалар (3), вируслар (32) ва нематодалар (6) қўзғатадиган касалликлар қайд этилган. Ундан ташқари, қалампир экинларида 6 турга мансуб юксак гулли ўсимликлар паразитлик қилади. Касаллик қўзғатувчи замбуруғлар ва оомицетлардан 6 таси қалампир уруғларини, 16 таси майсаларини, 19 таси барглари, 12 таси пояларини, 21 таси илдизи ва илдиз бўғзини, 45 таси меваларини зарарлаши, яна 6 тури эса ўсимликларда сўлиш (вилт) қўзғатиши хабар қилинган [1,72-б.].

Тадқиқотнинг мақсади

Юқоридаги маълумотларни инобатга олган ҳолда, Андижон вилоятида ширин ва аччиқ қалампир экинларида учрайдиган замбуруғ касалликлари тарқалишини ва уларни қўзғатувчи патоген турлар таркибини ҳамда навларнинг айрим кенг тарқалган касалликларга чидамлилиги даражаларини аниқлаш, қўзғатувчи замбуруғларнинг систематик ўринларини, биологияси ва экологиясини ўрганиш, ушбу экинларнинг асосий касалликларига қарши кураш воситаларининг самарадорлигини аниқлаш асосида уларга қарши кураш чораларини такомиллаштириш қалампир далаларининг фитосанитар ҳолатини яхшилашга имкон яратади.

Тадқиқотнинг асосий мақсади Андижон вилоятида қалампир етиштирадиган фермер хўжаликларнинг фитосанитар ҳолатини ўрганиш ва касалликларга қарши илмий асосланган кураш чораларини ишлаб чиқишдан иборат.

2021-йилда Андижон вилояти Шахрихон туманидаги “Бахор” фермер хўжалигига қарашли иссиқхоналарида ва далаларида қалампир ўсимликлари сўлиб, нобуд бўлиши аниқланди. Кузатув ва кейинги лаборатория тадқиқотларида сўлиб қолган қалампир ўсимликларидаги касаллик белгилари фузариоз касалликларининг белгилари билан солиштириб кўрилганида, ушбу учраган касаллик қалампир ўсимликларининг илдиз бўғзи ва пояси чириши касаллиги (қўзғатувчиси *Fusarium solani*) эканлиги аниқланди.

Иссиқхонадан олинган, сўлиб қолган қалампир ўсимликларининг намуналари иккита алоҳида лабораторияда махсус агар-агарли озуқа муҳитларига экиб кўрилганида, намуналарнинг кўпчилигидан *Fusarium* туркумига мансуб замбуруғ ўсиб чиқди.

Касаллик белгилари. Ширин қалампирда *Fusarium solani* замбуруғи кўзғатадиган, ўсимликларни нобуд қиладиган илдиз бўғзи ва поя чириши касаллигининг белгилари қуйидагилардан иборат.

Касалликнинг яширин босқичидан кейин муайян вақт ўтганида ўсимликлар жиддий зарарланиши туфайли, улар тўсатдан сарғайиб, сўлиб бошлайди, мева тугилиши тўхтайдиган, ўсимликлар тўла нобуд бўлади ва қуриб қолади. Кучли зарарланган ўсимликларнинг илдиз бўғзи ва поясида кўнғир, тўқ-кўнғир, деярли қора тусли яралар ҳосил бўлади, зарарланган тўқималар чирийди, кучли зарарланган илдиз бўғзи ва пояларнинг ички қисмлари ҳам чириб кетади. Кейинчалик, агар юқори намлик мавжуд бўлса, ушбу яралар устида замбуруғнинг сарғиш-жигарранг ёки оч-апельсин тусли, кўзача шаклли, жуда кичик (диаметри 1 мм дан кам) жинсий мева таначалари (*перитецийлари*) ҳосил бўлади. Замбуруғ ўсимликларнинг барглари, қариган гуллари ва меваларини ҳам зарарлайди, зарарланган жойларда кўнғир тусли доғлар ҳосил бўлади.

Кураш чоралари

- Экиш учун қалампирнинг *Fusarium solanii* замбуруғидан холи бўлган, соғлом кўчатларини ишлатиш.

- Далага экиш учун тайёрланган кўчатларни диққат билан кўздан кечириш, уларда сўлиш ҳамда илдиз бўғзида ва пояларида кичик доғлар ва яралар мавжуд эмаслигига амин бўлиш лозим.

- Алмашлаб экиш; яхши ўтмишдошлар қаторига карам, маккажўхори, дуккакли ва қовоқдош экинлар киради.

- Тупроқни соғломлаштириш учун унга мунтазам равишда биопрепаратларни, яхши чириган гўнг ёки компостни солиб туриш, даладан ўсимлик қолдиқларини ва бегона ўтларни йўқотиб туриш лозим, уруғларни биологик препаратлардан Санживи н.кук., Спорагин, суюқ ёки Плантастим (суюқ) билан дорилаб экиш тавсия қилинади.

- Экинни керагидан кўп, босиб суғормаслик, суғоришни бутун кечалари давомида ўтказмаслик, суғоришни иложи борича қисқа вақтда (1-3 соатда) тугатиш; суғориш суви ўсимлик тагига жуда яқин бормаслиги керак, иложи бўлса жўякларни юқорироқ қилиш ҳам ёрдам беради.

- Касаллик зарарланган ўсимлик атрофидаги соғлом ўсимликларга тарқалишининг олдини олиш учун касал ўсимликларни дарҳол қазиб олиш ва даладан ташқарида тупроққа кўмиб ташлаш ёки ёқиб ташлаш лозим. Бу иш касаллик кенг тарқалишидан олдин ўтказилганида олинган касал ўсимликлар атрофидаги кўриниши соғлом бўлган 1-2 та дан ўсимликларни ҳам бирга олиб ташлаш тавсия этилади.

Касал ўсимликларни даладан чиқариш пайтида улар соғлом ўсимликларга тегиб кетишининг олдини олиш лозим. Касаллик кўзғатувчи

замбуруғ сапрофит шаклда сақланиши мумкин бўлганлиги учун ўсимлик қолдиқлари, чириган ва ерга тўкилган мевалар ҳамда даладаги бегона ўтларни мунтазам даладан чиқариб йўқотиб туриш лозим (Ҳасанов, 1991).

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СИЛОВОЙ АНАЛИЗ МЕХАНИЗМА ПЕРЕМЕЩЕНИЕ МАТЕРИАЛОВ В ВЫСКОСКОРОСТНЫХ ШВЕЙНЫХ МАШИНАХ

***Аннотация:** Статья посвящена рассмотрению особенностей проведения силового анализа рычажных механизмов в частности, механизма перемещение материалов быстроходных швейных машин. В процессе исследования обоснована целесообразно рассчитать и анализировать различные объекты механизмов. Указанная система дает возможность получить много новых полезных решений при разработке инженерной расчетно-графической среды. Силовой анализ проведен на примере механизма перемещение материалов быстроходных швейных машин. Проведенный сравнительный силовой анализ механизма перемещение материалов быстроходных швейных машин позволил определить характер изменения нагрузок в кинематических парах и дал возможность выявить наиболее нагруженные звенья, а также соотношение сил для типовых схем механизмов перемещение материалов быстроходных швейных машин.*

***Ключевые слова:** перемещение материалов, швейные машины, силы, нагрузки, звенье, кинематические пары, инерция, сопротивления, продвижению материала, лапка, платформа, центр тяжести.*

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FORCE ANALYSIS OF THE MECHANISM OF MATERIAL TRANSFER IN HIGH-SPEED SEWING MACHINES

***Abstract:** This article examines the specifics of conducting a force analysis of lever mechanisms, specifically the material handling mechanism of high-speed sewing machines. The study substantiates the feasibility of calculating and analyzing various mechanism elements. This system enables the development of many new and useful solutions for engineering computational and graphical environments. The force analysis was conducted using the material handling mechanism of high-speed sewing machines as an example. This comparative force analysis of the material handling mechanism of high-speed sewing machines allowed us to determine the nature of load changes in kinematic pairs and identify the most heavily loaded links, as well as the force ratios for typical material handling mechanism designs in high-speed sewing machines.*

***Keywords:** material handling, sewing machines, forces, loads, link, kinematic pairs, inertia, resistance, material advancement, presser foot, platform, center of gravity.*

Введение

При проектировании механизмов машин (их звеньев и кинематических пар) приходится решать задачи обеспечения необходимой прочности, жесткости и долговечности. Для этого необходимо знать силовую нагрузку звеньев и кинематических пар.

При решении задач силового расчета механизмов закон движения ведущего звена предполагается заданным; точно также предполагаются известными массы и моменты инерции звеньев механизма. Таким образом, всегда могут быть определены те силы инерции, которые необходимы для решения задач силового расчета с использованием уравнений равновесия.

В тех случаях, когда при расчете в число заданных сил не входят силы инерции звеньев, расчет называется статическим. Если в число заданных (или определенных) сил при расчете входят и силы инерции звеньев, то такой расчет называется кинетостатическим.

Так как метод расчета для обоих случаев является общим, то в дальнейшем будем предполагать, что в число заданных сил входят и силы инерции, известные нам по величине, направлению и точкам приложения.

Механизм машинного агрегата обычно является многозвенной системой, нагруженной силами и моментами, приложенными к различным ее звеньям. [1].

Основными силами, действующими на данный механизм, являются движущие силы $M_{дв}$, распределенные силы инерции звеньев, равнодействующие которых сводятся к силе инерции J_s и моменту $M_{иi}$, силы давления прижимной лапки и сила инерционного сопротивления продвижению материала. Так как вес подвижных звеньев швейных машин мал по сравнению с другими силами, то им при расчете можно пренебречь [2].

Решим задачу в первом приближении, не учитывая влияния сил трения в шарнирах. Силы инерции звеньев:

$$J_{si} = m_i a_{si},$$

где m_i - масса звена; a_{si} - ускорение центра тяжести звена.

Моменты сил инерции:

$$M_{иi} = \theta_{si} \varepsilon_i,$$

где θ_{si} - момент инерции звена относительно оси, проходящей через центр тяжести; ε_i - угловое ускорение звена.

Силы J_s и моменты $M_{иi}$ направлены в сторону, противоположную соответственно ускорениям a_{si} и ε_i .

Силу давления прижимной лапки, действующей на рейку через ткань, силы, участвующие в транспортировании материала, определим из рассмотрения схемы действия рейки и лапки на ткань в процессе шитья.

На рис. 1, а показаны силы, действующие на материал в процессе шитья.

Сила Q является действующей силой, необходимой для передвижения материала, и зависит от силы давления рейки на материал N_2 :

$$Q = N_2 [f_2 + (i-1)^2 f_3],$$

где f_2 - коэффициент сцепления зубцов рейки с тканью, зависящий от вида материала ($f_2 = 0,5-5-1,3$); f_3 - коэффициент трения ткани о ткань ($f_3 = 0,4-1,0$); i - число слоев ткани; сила N_2 создается спиральной цилиндрической или пластинчатой пружинами и зависит от силы N_1 давления на ткань прижимной лапки: $N_2 = 1,5-5,5$ кгс.

Величину силы N_1 действующую на ткань со стороны лапки (рис. 1, б), можно определить из характеристики пружины. Наибольшее усилие (наибольшая рабочая нагрузка при полном поджатии пружины) $P_{\text{кон}} = (0,8-0,95) P_{\text{пред}}$, где $P_{\text{пред}}$ - усилие полного сжатия пружины. Величина $P_{\text{кон}}$ находится по формуле [3]:

$$P_{\text{кон}} = \frac{\pi d^3}{8 D_{\text{ср}}} [\tau], \quad (1)$$

где $D_{\text{ср}}$ и d показаны на рис. 1, б; $[\tau]$ - допускаемое касательное напряжение в пружине, $[\tau] = 0,3 \cdot 155-170 \text{ кгс}/\text{мм}^2 = 5400 \text{ кгс}/\text{мм}^2$

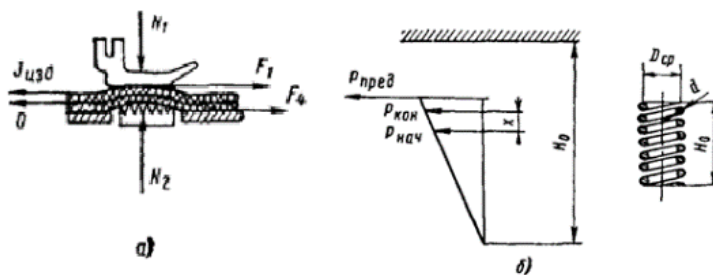


Рис. 1. Схема действия рейки и лапки на ткань

Рабочий ход пружины при опускании лапки на ткань

$$x = \frac{P_{\text{кон}} - P_{\text{нач}}}{C} = \frac{(P_{\text{кон}} - P_{\text{нач}}) 8 D_{\text{ср}}^3 n}{G d^4}, \quad (2)$$

где C - жесткость пружины в кгс/см; $C = \frac{G d^4}{8 D_{\text{ср}}^3 n}$;

G - модуль упругости материала пружины, $G = 8-106 \text{ кгс}/\text{см}^2$; $P_{\text{нач}}$ - действительная нагрузка при опускании лапки на материал; n - число витков в пружине.

Зная ход лапки ($x = 5-8 \text{ мм}$) при ее опускании, найдем $P_{\text{нач}}$, которое и будет равно давлению лапки на материал:

$$P_{\text{нач}} = N_1 + N_2 = P_{\text{кон}} - \frac{x G d^4}{8 D_{\text{ср}}^3 n}, \quad (3)$$

Для нормальной работы машины движущая сила должна удовлетворять условию:

$$Q \geq F_1 + F_4 \pm J_{\text{изд}} + T. \quad (4)$$

Здесь T -усилие, расходуемое на деформацию материала при переходе через швы и зависящее от площадки контакта, физикомеханических свойств ткани, давления лапки на материал и др. $J_{изд}$ - сила инерции изделия; F_1 и F_4 - сила трения ткани о лапку и платформу машины:

$$F_1 = Nf_1; F_4 = G_{изд}f_4;$$

где f_1 и f_4 - коэффициенты трения ткани о лапку и платформу машины или поверхность рабочего стола ($f_1 = 0,22-5-0,3$; $f_4 = 0,2-0,4$); $J_{изд} = 50-170$ гс) - вес транспортируемого изделия, определяемый экспериментально (берется наибольшее по весу изделие, пошиваемое на данной машине, и находится вес той его части, которая приводится в движение зубчатой рейкой, $J_{изд} = 50-170$ гс) [4].

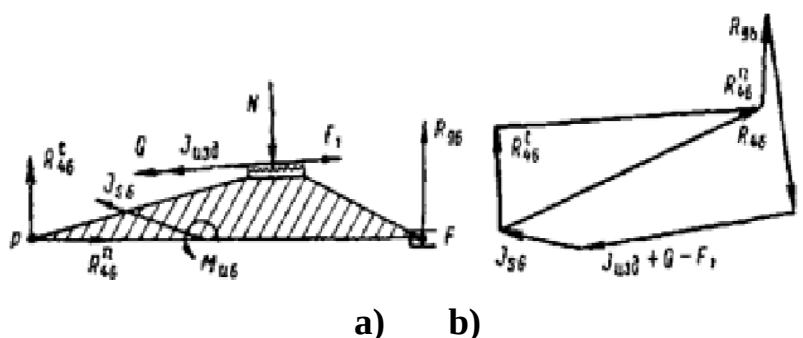


Рис. 2. Группа звеньев 6—8: а — схема; б — план сил

Сила инерции $J_{изд}$ способствует продвижению материала, когда направление ее действия совпадает с направлением движения материала, и препятствует продвижению, когда направлена в противоположную сторону.

Эта сила определяется по формуле:

$$J_{изд} = \frac{G_{изд}}{g} a_x,$$

где a_x - горизонтальная составляющая ускорения среднего зуба рейки.

На основе всех найденных сил произведем кинестатический анализ, для чего разобьем механизм продвижения на группы Ассура.

Выделим группу звеньев 6 и 8 (см. рис.3) и заменим действие отброшенных связей в шарнирах Р и F реакциями R_{46}^t , R_{46}^n и R_{98} (рис.2, а). Так как вес и сила инерции звена 8 очень малы по сравнению с другими звеньями, ими можно пренебречь, и тогда $R_{98} \approx 0$. Составляя уравнение моментов сил, действующих на звено 6, относительно шарнира F, получим:

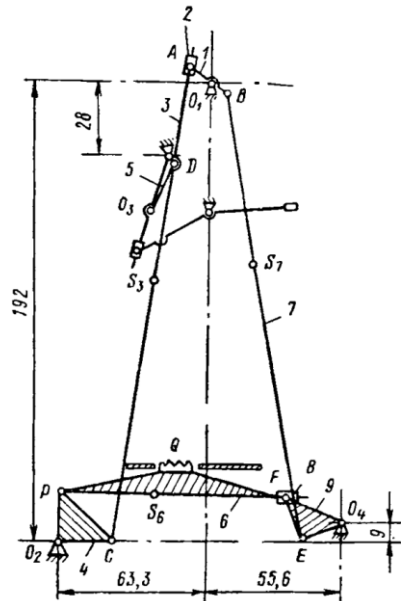


Рис.3. Схема механизма транспортирования ткани швейной машины 22А кл. (точки S_1 -центры тяжести звеньев 1-9))

$$\sum M_{6(F)} = 0;$$

$$R_{46}^t \overline{FP} - M_{и6} + J_{s6} h_{s6} - (J_{изд} + Q - F_1) h_{изд} - M h_N = 0. \quad (5)$$

Из этого уравнения определим R_{46}^t .

Из плана сил (рис.2, б), построенного на основании уравнения равновесия звена 6.

$$J_{s6} + J_{изд} + F_1 + Q + N + R_{46}^t + R_{46}^n + R_{98} = 0, \quad (6)$$

найдем R_{46}^n и R_{98} .

Выделим трехпроводковую группу 2—5 (см. рис.3). На эту группу действуют (рис. 4, а) J_{s3} , $M_{и3}$, J_{s4} , $M_{и4}$, J_{s5} , $R_{64} = -R_{46}$ и реакции отброшенных звеньев R_{31} , R_{04} , и R_{05} , неизвестные по величине и направлению. Сила J_{s4} , очень мала по сравнению с другими силами, так как центр тяжести звена 4 расположен близко к оси вращения, и ею можно пренебречь. При исследовании трехпроводковой группы используем метод особой точки (точки Ассура). Эта точка (r) будет находиться на пересечении перпендикуляра к оси движения ползушки 2 и направления звена 5.

Расчет ведем в следующей последовательности. Отбросим звено 2 и заменим действие его реакцией $R_{23} = R_{31}$, направленной перпендикулярно к оси его движения. Реакции R_{04} и R_{05} раскладываем на R_{04}^n , R_{05}^n и R_{04}^t , которые определяются из уравнений моментов сил, действующих соответственно на звенья 4 и 5, относительно точек С и D. Определяем R_{04}^t из уравнения моментов всех сил, действующих на группу, относительно точки г (точка Ассура). Для упрощения можно массу звена 5 статически разместить в шарнирах D и 03. Сила инерции заменяющей массы m_{03} будет равна нулю, а массы m_D [5].

где m_D — ускорение точки D.

В этом случае $R_{05}^t=0$; $R_{05}^n=R_{05}$. Значения R_{04}^t и R_{04}^n найдем из уравнений моментов относительно точек С и r :

$$\sum M_c=0; \quad R_{04}^t \overline{CO_2} + R_{64} h_1 - M_{u4} = 0; \quad (7)$$

$$\sum M_r=0; R_{04}^th_2+R_{04}^nh_3+J_{s3}h_4-M_{u3}+J_{d4}h_5+R_{64}h_6-M_{u4}=0$$

Уравнение равновесия группы 2-5 имеет вид [6]:

$$\sum P_{2-5}=R_{64}+R_{04}^t+R_{04}^n+J_{s3}+J_d+R_{05}+R_{23}=0. \quad (8)$$

Из плана сил, построенного на основании этого уравнения, находим R_5 и $R_{23}=R_{31}$ (рис- 4, б). Давления в шарнирах С и D определяются векторами R_{43} и R_{53} .

Рассмотрим равновесие группы звеньев 7 и 9 (рис. 4, в), заменяя действие отброшенных звеньев реакциями R_{09}^t , R_{09}^n , R_{17}^t и R_{17}^n . Силы R_{09}^t и R_{17}^t определяются из уравнений моментов сил, действующих на звенья 7 и 9, относительно точки Е :

$$\begin{cases} \sum M_{E9}=0, R_{09}^t \overleftarrow{O_4 E} \cdot M_{u9} - R_{69} h_1 = 0; \\ \sum M_{E7}=0; R_{17}^t \overleftarrow{B E} \cdot J_{s7} h_2 - M_{u7} = 0. \end{cases} \quad (9)$$

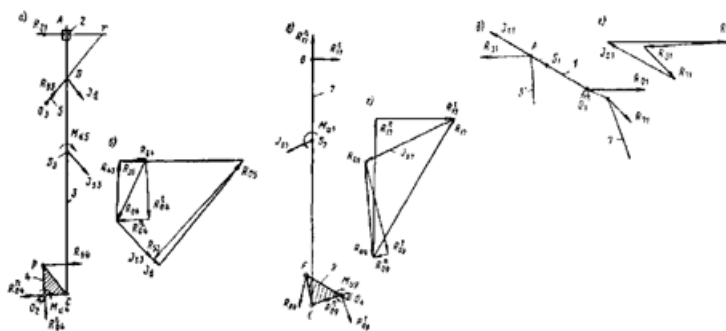


Рис.4. План сил группы звеньев.

Здесь и далее h_i -расстояния от точек, относительно которых определяется момент, до линии действия соответствующей силы. Из плана сил, построенного по уравнению равновесия группы:

$$\sum P_{79}=J_{57}+R_{69}+R_{09}^t+R_{09}^n+R_{17}^t+R_{17}^n=0$$

находим R_{17}^n и R_{09}^n (рис. III.43, г). Вектор R_{17} выражает давление в шарнире В.

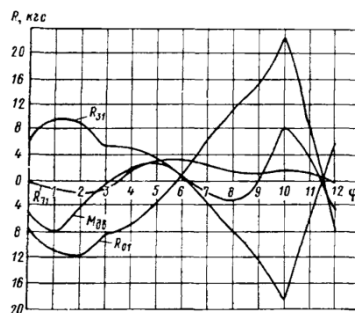


Рис. 5. График изменения сил давлений и движущего момента в шарнирах

Рассматривая равновесие кривошипа 1 (рис. 4, д) под действием всех сил, находим вращающий момент относительно точки O_1 для механизма из условия $\sum M_{O_1} = 0$;

$$M_{дв} - R_{31}h_3 + R_{71}h_4 = 0; \quad (10)$$

Давление на главный вал определится из плана сил (рис.4,е), построенного по уравнению [8]:

$$J_{s1} + R_{71} + R_{31} + R_{01} = 0. \quad (11)$$

График изменения сил давлений в шарнирах показан на рис. 5. Из графика видно, что реакции R_{01} и R_{31} резко возрастают в момент продвижения материала (до 22 кгс). Давление лапки также влияет на величины реакций. При регулировке силы сжатия пружины нужно учитывать толщину и свойства ткани.

Выводы

Силовой анализ проведен на примере механизма перемещение материалов быстроходных швейных машин. Проведенный сравнительный силовой анализ механизма перемещение материалов быстроходных швейных машин позволил определить характер изменения нагрузок в кинематических парах и дал возможность выявить наиболее нагруженные звенья, а также соотношение сил для типовых схем механизмов перемещение материалов быстроходных швейных машин.

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АЙДАР-АРНАСОЙ КЎЛЛАР ТИЗИМИ СУВ РЕСУРСЛАРИ МИҚДОРИНИНГ ЎЗГАРИШИ БЎЙИЧА ОЛИБ БОРИЛГАН ТАДҚИҚОТЛАР

***Аннотация** Ушбу мақолада 1994–2022 йиллар давомида Айдар-Арнасой кўллар тизими (ААКТ) гидрологияси, хусусан сув сатҳи, ҳажми ва майдонининг ўзгариш динамикаси таҳлил қилинган. Тадқиқотда Чордара сув омборидан ташланаётган сувлар ҳамда коллектор-дренаж тармоқлари орқали келиб тушаётган оқимларнинг кўллар тизими режимида таъсири ўрганилган. Шунингдек, сув сатҳининг кўтарилиши натижасида ер ости сувлари сатҳининг ошиши, ҳудудларнинг ботқоқланиши ва шўрланиши даражасининг ортиши каби экологик муаммолар ёритилган. Мақола якунида ААКТ ҳолатини доимий мониторинг қилиш ва келажакдаги ўзгариш тенденцияларини аниқлаш зарурлиги бўйича хулосалар берилган.*

***Калим сўзлар.** Айдар-Арнасой кўллар тизими (ААКТ), гидрологик режим, сув ҳажми ва сатҳи, Чордара сув омбори, коллектор-дренаж сувлари*

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STUDIES CONDUCTED ON THE CHANGES IN THE VOLUME OF WATER RESOURCES OF THE AYDAR-ARNASAY LAKE SYSTEM

Abstract. *This article analyzes the dynamics of the hydrological regime of the Aydar-Arnasay Lake System (AALS) for the period 1994–2022, specifically focusing on changes in water level, volume, and surface area. The study investigates the impact of water discharge from the Chardara Reservoir and the inflow of collector-drainage waters on the system's hydrology. Ecological consequences are examined, including the rise of groundwater levels and the intensification of soil salinization processes in coastal zones. Conclusions are drawn regarding the necessity of improving monitoring systems and forecasting future trends in the state of the AALS.*

Keywords: *Aydar-Arnasay Lake System (AALS), hydrological regime, water volume and level, Chardara Reservoir, collector-drainage waters.*

Кириш

Айдар-Арнасой кўллар тизими (ААКТ)нинг гидрологияси: сув сатҳи, ҳажми, майдони ва сув сатҳи ўзгаришининг йиллик амплитудаси (1994-2022 йй.) Чордара сув омбори орқали қуйилаётган Сирдарё сувининг ўзгаришига, Сирдарё ва Жиззах вилояти экин майдонларидан оқиб келаётган коллектор-дренаж сувлари, қор-ёмғир сувлари ва ер остидан қўшилаётган грунт сувлари ҳисобига ўзгариб турган.

Чордара сув омбори орқали ташланаётган ташлама сувлар миқдори 1994 йилда 9,286 км³, 1995 йилда 4,003 км³, 1998 йилда 3,135 км³, 2002 йилда 1,207 км³, 2006 йилда 0,337 км³, 2010 йилда 0,840 км³, 2014 йилда 0,124 км³, 2016 йилда 0,025 км³, 2018 йилда 0,028 км³, 2020 йилда 0,024 км³, 2022 йилда 0,034 км³ ни ташкил этган.

Сув сатҳи ва йиллик амплитуданинг ўзгариши 1994-2022 йилларда қуйидагича бўлган: сув сатҳи 1994 йилда 238,70 м, йиллик амплитуда 3,21 м, сув сатҳининг энг юқори кўрсаткичи 2006 йилда 246,82 метрни, йиллик амплитуда 0,73 метрни ташкил этган. Кўллар тизимининг сув ҳажми 1994 йилда 18,62 км³, энг юқори кўрсаткич 2006 йилда 42,15 км³, 2022 йилга келиб 35,86 км³ ташкил қилган. Сув майдони 1994 йилда 2216 км², 2000 йилда 3140 км², 2006 йилда энг юқори кўрсаткич 3599 км², 2022 йилда 3296 км² га тенг бўлган.

Вилоят кишлок хўжалиги коллектор дренажларидан Айдар-Арнасой кўллар тизимига кирувчи Тузкон кўлига келиб тушадиган зовур сувлари Р.А. Қулматов ва бошқалар томонидан ўрганилган. Тўртта асосий зовурлар: Жиззах Бош Зовури (ЖБЗ), Қли, Оқбулоқ ва Чегара коллекторларидан йилига ўртача 97,8% коллектор-дренаж сувлари Тузкон кўлига келиб тушади. Тузкон кўлига 2000-2017 йиллар давомида вилоят коллектор дренаж тармоқларидан 14971,51 млн м³ ёки йилига ўртача 831,75 млн м³ зовур сувлари келиб тушган. Ж.Мирзаев ва бошқалар томонидан Жиззах вилояти суғориладиган майдонларда юзага келган коллектор-дренаж сувларининг

миқдор ва сифат кўрсаткичлари кўллар тизими сувининг миқдори ва сифатига таъсири аниқланган

Айдар-Арнасой кўллар тизимининг сув ҳажми, майдони, сув сатҳи, узунлиги ва кенлиги дала экспедицияси таҳлиллари асосида 2011 йилда И.Беликов ва бошқалар томонидан ўрганиб чиқилган.

Хулоса шуни кўрсатадики, кўллар тизимида сув буғланишининг узлуксиз давом этиши сув сатҳининг пасайишига олиб келган, бу эса ёз ва куз мавсумларида сувнинг шўрланиш даражаси ортиб боришини кўрсатади.

Айдар-Арнасой кўллар тизимининг балиқчиликни ривожлантиришдаги роли, кўллар тизимининг ҳудудда иқлим ўзгаришига ва экологик барқарор ривожланишга таъсири М. Groll ва бошқалар томонидан ўрганилган. ААКТ сув ресурслари йил мавсумлари давомида ёғингарчиликка ва унга ташланаётган сув миқдорида боғлиқ ҳолда ўзгариб туриши К. Rodina, S. Wahyuni томонидан ўрганилган.

Сирдарё сувининг Чордара сув омборига ва сув омбори орқали ААКТ қуйилишида антропоген факторларининг сув режимига таъсири В. Issina ва бошқалар томонидан ўрганилган. Ушбу тадқиқотда Чордара сув омбори сув манбаси бўлган Сирдарё дарёсининг Қозоғистон ҳудудида жойлашган қисмида 1980 йилдан 2016 йилгача бўлган даврда антропоген фаолият таъсирида сув режимига ўзгаришлар кузатилган. Олинган натижалар шуни кўрсатадики, инсон фаолияти, хусусан қишлоқ хўжалиги ва электр энергиясини ишлаб чиқаришда сувдан фойдаланиш фаолияти Чордара сув омборининг сув режими ўзгартиришнинг асосий омиллари эканлиги тасдиқланган. Чордара сув омборига сувнинг оқиб кириш ва чиқиб кетиши кўпинча Сирдарёнинг қуйи оқимидаги аҳоли пунктларида жиддий сув тошқинига ва ижтимоий-иқтисодий зарар ва йўқотишларга олиб келиши мумкин.

ААКТ сув ресурслари Р.А.Қулматов ва бошқалар томонидан баҳоланган. Кўллар тизими гидрологиясини, сув ресурсларининг миқдор ва сифат кўрсаткичлари ўзгаришини ўрганиш, ҳудудда балиқчиликни ва экотуризмни ривожлантиришда муҳимлиги аниқланган.

ААКТнинг сув сатҳи билан майдонининг ўзгариши боғлиқлик корреляциясини, ер ости сувлари сатҳининг кўтарилиши, шўрланиш даражасининг ортиб боришини келтириб чиқариш омили эканлиги S. Wahyuni ва бошқалар ўрганилган. Тадқиқот хулосасига кўра сув сатҳининг кўтарилиши ер ости сувлари кўтарилишига олиб келиб, кўллар тизимининг шўрланиш даражаси ошишига сабаб бўлган.

ААКТнинг 1990 йиллардан кейинги ўзгариши Қирғизистон Республикаси ҳудудида жойлашган Тўхтагул сув омборидан ташланган сув ҳисобига кўллар тизими режимининг ўзгариши, гурунт сувлар сатҳининг кўтарилиши дала экспедиция натижалари асосида И.Беликов ва бошқалар томонидан ўрганилган.

Кўллар тизими сув ҳажми, сатҳи, майдони ошиши билан бир қаторда кўллар тизимида яқин жойлашган ҳудудларнинг экологик ҳолати

ёмонлашган, ер ости сувлар сатҳининг кўтарилиши ҳисобига ботқоқланган майдонлар юзага келган. Тадқиқотлар натижасида ААКТ да кузатув олиб боришда мониторинг тизимини такомиллаштириш, кўллар тизимининг ҳозирги ҳолатини ва келажақда ўзгариш тенденциясини аниқлаш зарурлиги бўйича хулосалар қилинган.

Айдар-Арнасой кўллар тизими сув ресурсларининг гидрологияси бўйича тадқиқот ишлари (А.Тайлақов ва бошқалар) томонидан олиб борилган. ААКТнинг гидрологияси, сув ҳажми, майдони, сув сатҳининг йиллар давомида ўзгариш динамикаси асосан кўллар тизимига Чордара сув омбори орқали ташланадиган Сирдарё суви ва унга қуйиладиган коллектор дренаж сувлари микдорига боғлиқ равишда ўзгариб туриши аниқланган.

Тадқиқот олиб борилган 2018-2021 йилларда ААКТнинг сув ҳажми 16,70-34,93 км³, майдони 2,045-3,224 км², сув сатҳи 237,58-244,73 м оралиғида ўзгариб турган, энг юқори кўрсаткич 2006 йилда кузатилган, сув ҳажми 42,15 км³, майдони 3,599 км² етган, сув сатҳи 246,82 метрни ташкил этган.

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ДЕФЕКТЫ АРМАТУРНОГО ПРОКАТА ПЕРИОДИЧЕСКОГО ПРОФИЛЯ, ВОЗНИКАЮЩИЕ В ПРОЦЕССЕ ПРОКАТКИ, И МЕРЫ ИХ УСТРАНЕНИЯ

***Аннотация:** В статье проведён комплексный анализ дефектов арматурного проката периодического профиля, формирующихся в процессе горячей прокатки. Выявлены основные технологические и конструктивные причины возникновения дефектов, связанных с температурными режимами, параметрами деформации и состоянием прокатного оборудования.*

***Ключевые слова:** арматурный прокат, периодический профиль, дефекты прокатки, горячая деформация, качество продукции.*

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DEFECTS OF PERIODIC SECTION REINFORCEMENT BARS ARISING DURING THE ROLLING PROCESS AND MEASURES TO ELIMINATE THEM

***Abstract:** This article provides a comprehensive analysis of defects in ribbed rebar that form during hot rolling. The main technological and design causes of these defects, related to temperature conditions, deformation parameters, and the condition of the rolling equipment, are identified.*

***Key words:** reinforcing bars, periodic profile, rolling defects, hot deformation, product quality.*

Введение

Современное строительство характеризуется возрастающими требованиями к качеству и надёжности железобетонных конструкций, что, в свою очередь, обуславливает необходимость производства арматурного проката с высокими и стабильными эксплуатационными характеристиками. Арматурный прокат периодического профиля обеспечивает эффективное сцепление с бетоном и является ключевым элементом несущих конструкций.

Процесс горячей прокатки арматуры представляет собой совокупность сложных физико-механических и тепловых процессов, протекающих в

условиях высоких температур и значительных пластических деформаций. Нарушение технологических параметров на любом этапе производства может привести к образованию дефектов поверхности и формы профиля, снижающих прочностные и эксплуатационные свойства изделия.

Несмотря на широкое применение автоматизированных прокатных станов, проблема дефектности арматурного проката остаётся актуальной. Это связано как с износом оборудования, так и с колебаниями качества исходной заготовки. В связи с этим исследование дефектов прокатки и разработка эффективных мер по их устранению являются важной научно-практической задачей.

Целью настоящей работы является систематизация дефектов арматурного проката периодического профиля, анализ причин их возникновения и разработка технологических мер по снижению дефектности продукции.

Материалы и методы исследования

Объектом исследования является арматурный прокат периодического профиля классов А400–А500, получаемый методом горячей прокатки на сортопрокатных станах непрерывного типа. Исследуемые образцы отбирались на завершающем этапе технологического процесса после формирования периодического профиля и охлаждения проката.

Целью экспериментальных исследований являлось установление взаимосвязи между технологическими параметрами прокатки, структурным состоянием металла и характером дефектов арматурного проката.

На первом этапе проведён анализ технологической схемы горячей прокатки арматурного проката, включающей нагрев стальной заготовки в методических и камерных печах типа СНОЛ 8,2/1100, деформацию в черновых, промежуточных и чистовых клетях, формирование периодического профиля в калиброванных валках, контролируемое охлаждение проката на рольгангах. Особое внимание уделялось температурным режимам нагрева и прокатки, степени обжатия в отдельных клетях, скорости прокатки и состоянию прокатного инструмента.

Дефекты арматурного проката классифицировались по морфологическим, геометрическим и технологическим признакам. В ходе исследования использованы следующие методы контроля как визуально-измерительный контроль поверхности проката, измерение геометрических параметров (диаметр, овальность, высота и шаг рёбер) и сопоставление фактических параметров с требованиями нормативных документов (ГОСТ 34028–2016). На основании полученных данных дефекты были систематизированы по происхождению и степени влияния на эксплуатационные свойства арматуры.

Для выявления структурных причин возникновения дефектов проводилось металлографическое исследование микроструктуры арматурного проката. Образцы для анализа вырезались из участков с характерными дефектами и из бездефектных зон для сравнения. Подготовка

образцов включала механическую резку, шлифование и полирование, травление стандартными реагентами.

Микроструктура исследовалась с использованием оптического металлографического микроскопа типа МХ-4ХСPlus, при увеличениях $\times 100$ – $\times 500$. Анализировались размер и форма зёрен, распределение феррито-перлитных структур, наличие неметаллических включений, структурная неоднородность, связанная с нарушением температурно-деформационного режима [1]. При закалке плотность дефектов кристаллической решетки снижается [2]. Кроме того, измерение твёрдости по шкале HRC проводилось на середине арматуры с определением распределения твёрдости на глубину до 2 мм на приборе HBRV-187.5.

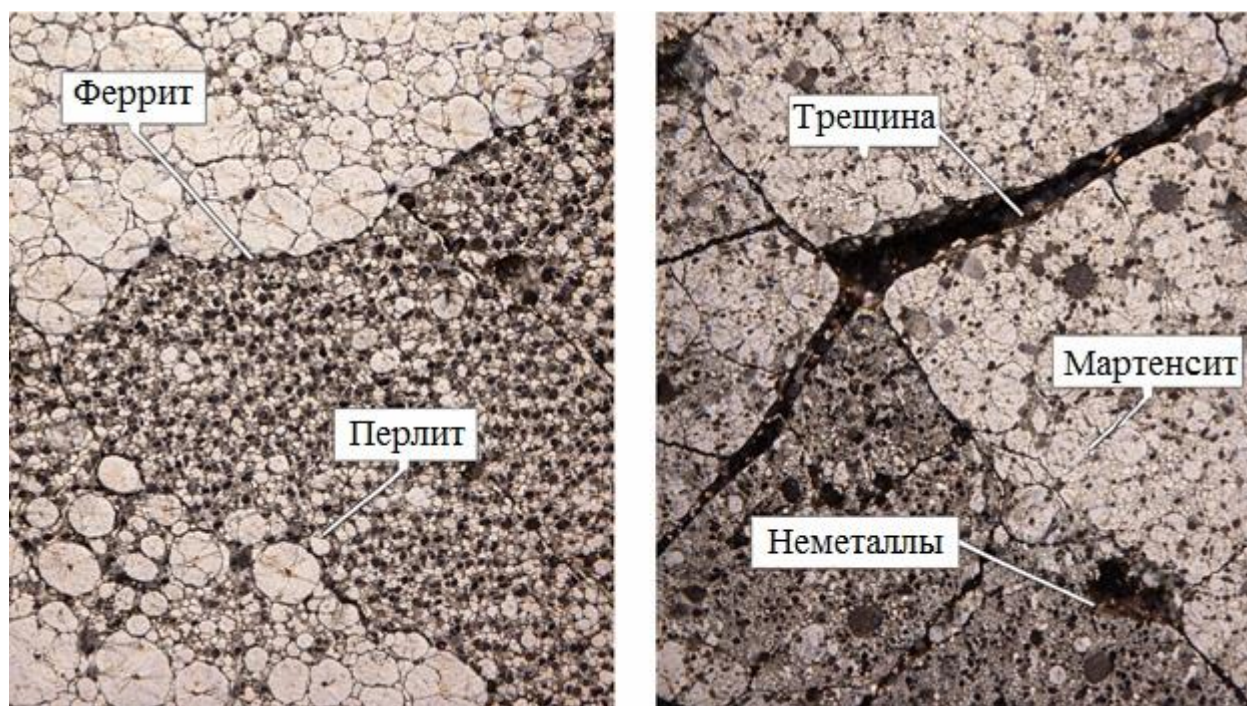
В частности состояние тонкой структуры оценивали плотностью дислокаций, определяемой по физической ширине рентгеновской линии интерференции (220) [3].

Для оценки влияния дефектов на механические свойства арматурного проката проведены испытания на растяжение. Испытания выполнялись на универсальной разрывной машине типа WAW-600D в соответствии с требованиями ГОСТ. Прежде, чем, приступить к устранению любых дефектов круглого и арматурного проката, необходимо настроить валки чистовой клетки, так чтобы готовый профиль имел горизонтальный диаметр в пределах номинального размера с допуском ($-0,1$, $+0,2$) мм, а разница размеров «плечей» - не более 0,1 мм

Только после достижения выше указанных размером приступить к устранению других дефектов. В ходе испытаний определялись предел текучести, временное сопротивление разрыву, относительное удлинение и характер разрушения образцов. Дополнительно анализировалось влияние дефектов периодического профиля на распределение напряжений и несущую способность арматуры при растяжении.

Для оценки условий формирования дефектов анализировались силы прокатки и параметры деформации в калибрах. Использовались данные производственного мониторинга прокатного стана, включая величину обжатия, скорость прокатки, нагрузку на валки, степень износа прокатного инструмента.

Полученные данные сопоставлялись с результатами структурных и механических исследований для выявления причинно-следственных связей между режимами прокатки и качеством готовой продукции (рис.1).



а) Без дефектов

б) С дефектами

Рис.1. Микроструктура арматуры (×500)

Результаты экспериментальных исследований обобщались с использованием методов сравнительного анализа и системного подхода. Проведено сопоставление экспериментальных данных с литературными источниками и промышленным опытом металлургических предприятий.

Комплексный подход, включающий технологический анализ, структурные исследования и механические испытания, позволил получить объективную оценку причин возникновения дефектов арматурного проката периодического профиля.

Результаты и обсуждения

В процессе прокатки арматуры периодического профиля наиболее часто выявляются дефекты, представленные в таблице 1.

Установлено, что ключевыми факторами, определяющими вероятность возникновения дефектов, являются температурный режим нагрева заготовки, равномерность распределения деформации, точность калибровки валков и стабильность скорости прокатки [4].

Нарушение оптимального температурного интервала приводит к снижению пластичности металла и росту трещинообразования, особенно при прокатке арматуры малого диаметра.

Таблица 1

Виды дефектов арматурного проката, возникающие в процессе прокатки, меры их устранения и предупреждение

Вид дефекта	Меры по устранению и предупреждению дефекта
Невыполнение отдельных поперечных выступов (ребер)	Необходимо улучшить охлаждение чистового калибра (больше воды на калибры со стороны выхода полосы из валков) или сменить калибр
Невыполнение поперечных ребер (не соответствует техническим условиям)	Увеличить обжатие в чистовой клети Уменьшить натяжение между клетями чистовой группы (петлевики не работают) Сменить калибр чистовой клети или перевалить валки
Внутренний диаметр профиля выходит за пределы допусков	Увеличить, уменьшить зазоры на чистовой или сменить калибр
На поверхности прутков продольные трещины	Улучшить подготовку металла или определить клеть с переполнением металла и устранить

Полученные результаты подтверждают, что дефекты арматурного проката носят многофакторный характер. Даже незначительные отклонения технологических параметров могут привести к ухудшению геометрических характеристик и снижению качества поверхности.

Особое значение имеет состояние прокатного инструмента. Износ валков и калибров приводит к искажению периодического профиля и ухудшению сцепления арматуры с бетоном. В этой связи актуальным является применение систем мониторинга износа инструмента и автоматической корректировки режимов прокатки. Перспективным направлением повышения качества продукции является внедрение цифровых и интеллектуальных систем управления технологическим процессом, обеспечивающих контроль параметров в реальном времени.

Для минимизации дефектов арматурного проката рекомендуется поддержание оптимальных температурных режимов нагрева и деформации, регулярный контроль и замена изношенных прокатных валков, оптимизация схем обжатия, внедрение автоматизированных систем контроля геометрии профиля и повышение качества исходных заготовок [5].

Схема взаимосвязи температурного режима, деформации и дефектов арматурного проката

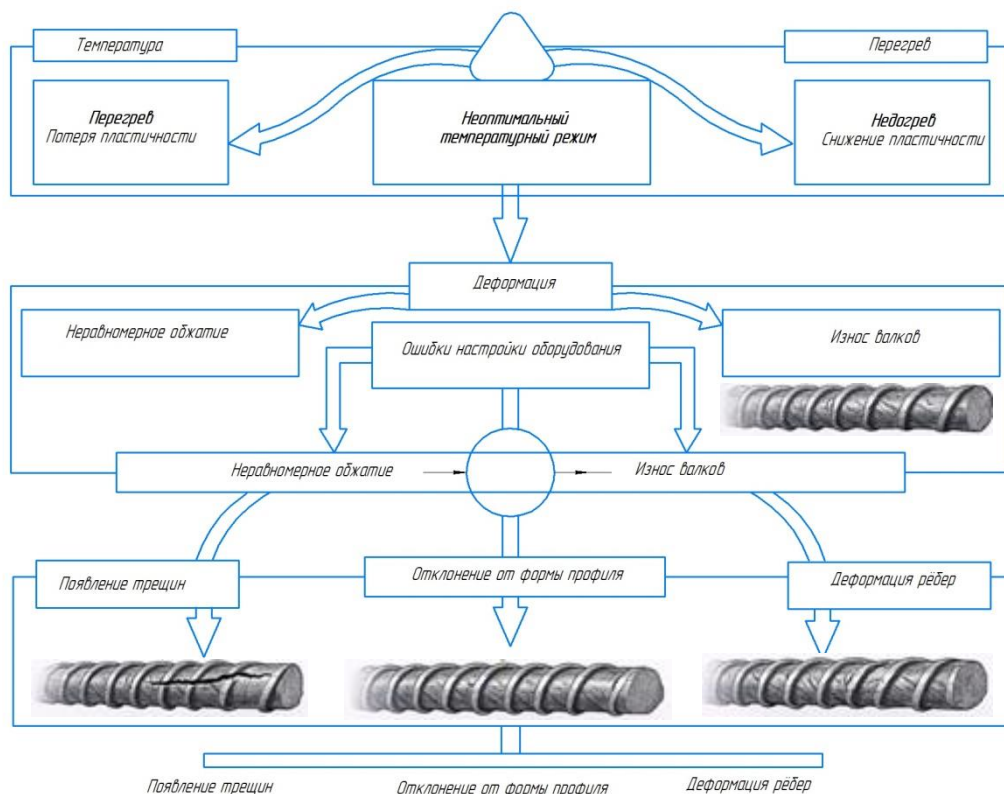


Рисунок 1. Схема влияния технологических параметров прокатки на формирование дефектов арматурного проката

Заключение

В работе выполнен анализ дефектов арматурного проката периодического профиля, возникающих в процессе горячей прокатки. Установлены основные причины их образования и предложен комплекс мер по их устранению. Реализация предложенных рекомендаций позволит повысить качество продукции, снизить уровень брака и повысить эффективность сортопрокатного производства.

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ВЛИЯНИЕ ВИРТУАЛЬНОГО ПРОСТРАНСТВА НА РАЗВИТИЕ НАЦИОНАЛЬНОЙ КУЛЬТУРЫ

Аннотация: *сегодня информация становится мощным инструментом, способным изменить судьбу и будущее любого общества, нации. В событиях, происходящих в разных регионах, стороны пытаются распространить информацию, используя различные средства и методы, отвлечь общественность и международные организации на свои интересы, чтобы доказать свою правоту. Поэтому разработка национальных и правовых критериев защиты молодежи нашей страны от различных форм вредной информации, направленной на разрушение ее здоровья и духовного мира, остается актуальной проблемой.*

Ключевые слова: *Виртуальная культура, информация, информационная безопасность, свобода информации, Интернет и его отрицательные и положительные последствия.*

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THE IMPACT OF VIRTUAL SPACE ON THE DEVELOPMENT OF NATIONAL CULTURE.

Annotation: *Today, information is becoming a powerful tool capable of changing the fate and future of any society, nation. In the events taking place in different regions, the parties are trying to spread information using various means and methods, to divert the public and international organizations to their interests in order to prove that they are right. Therefore, the development of national and legal criteria for protecting the youth of our country from various forms of harmful information aimed at destroying their health and spiritual world remains an urgent issue.*

Key words: *Virtual culture, information, information security, freedom of information, Internet and its negative and positive consequences.*

В настоящее время в нашей стране особое значение приобретают меры, реализуемые в рамках законов «Об основах государственной политики Республики Узбекистан в отношении молодежи» и «О гарантиях прав ребенка», направленные на дальнейшее повышение эффективности реформ в сфере молодежной политики, а также на обеспечение духовного и физического совершенства подрастающего поколения. Кроме того, в данных

законодательных актах предусмотрена правовая защита прав и свобод молодежи от любых посягательств на их честь и достоинство. Подчеркивается, что во избежание возникновения духовного вакуума в мировоззрении молодежи необходимо с раннего детства формировать в их сознании и сердце приверженность здоровому образу жизни, а также чувство уважения к национальным и общечеловеческим ценностям.

В системе непрерывного образования принципы и требования к созданию современных электронных образовательных ресурсов по учебным дисциплинам, электронных учебников, методических пособий для лабораторных и практических занятий, а также вопросы их использования и методики применения, влияние виртуальной культуры на национальную культуру нашли отражение в научно-исследовательских работах отечественных ученых, таких как А.А. Абдукадиров, М.Х. Алламбергенова, А.Д. Аскарар, У.Ш. Бегимкулов, Р.Х. Джураев, М.Х. Лутфиллаев, Н.А. Муслимов, Х.Б. Никадамбаева, Н.И. Тайлаков, С.К. Турсунов и других.

В статье проанализированы вопросы влияния виртуальной культуры на национальную культуру, ее возможные угрозы, воздействие на молодежь, а также значение эффективной организации занятий по предмету «Технология» в процессе формирования личности молодого поколения, в выборе профессии, в освоении новых технических и технологических знаний, изучении трудовых процессов, закреплении знаний, трудовых умений и навыков, а также развитии самостоятельного мышления и деятельности в учебном процессе.

Виртуальная культура — это культурная деятельность субъекта, направленная на создание условных сценариев реальности, основанных на взаимодействии репутации и стремлении к идеализированному миру.

В данном понимании можно выделить следующие важные особенности виртуальной культуры:

- виртуальная культура существует параллельно с объективной реальностью (которая выступает ее структурной основой) и может рассматриваться как часть игровой культуры, возникающей на пересечении игровой культуры и виртуальной реальности;
- виртуальная культура представляет собой форму высокой культуры, характеризующуюся свободой и творчеством, взаимосвязанностью участников, способностью к изменяющемуся мышлению при принятии предлагаемых условий; она способствует разнообразию и усложнению социокультурного пространства;
- в виртуальной культуре отсутствует утилитарно-прагматическая направленность и ориентация на «готовый продукт» преобразования реальности — она выступает как своего рода «нематериальная идеология» бесконечной полноты;
- в виртуальной культуре ярко выражен субъективный инициативный принцип (субъекты выстраивают новый игровой мир по собственным правилам);

- виртуальная культура существует вне официальных институтов, однако по мере ее развития формируются определенные институциональные замещения (субкультурный тип существования виртуальной культуры).

Под информационной безопасностью понимается степень защищенности информационного пространства общества, обеспечивающая формирование и развитие интересов личности, организаций и государства.

Информационная угроза — это совокупность факторов, представляющих опасность для функционирования информационного пространства общества.

В Республике Узбекистан принят ряд нормативно-правовых актов, регулирующих сферу получения, использования и распространения информации: законы «О гарантиях и свободе доступа к информации», «О принципах и гарантиях свободы информации», «Об информатизации».

Согласно Закону «Об информатизации», информатизация — это организационный, социально-экономический и научно-технический процесс создания условий для удовлетворения информационных потребностей юридических и физических лиц на основе использования информационных ресурсов, технологий и систем.

В соответствии с Законом «О принципах и гарантиях свободы информации», под информацией понимаются сведения о лицах, предметах, фактах, событиях, явлениях и процессах независимо от источников и формы их представления. Ограничение доступа к информации допускается только на основании закона и в целях защиты прав и свобод человека, основ конституционного строя, нравственных ценностей общества, духовного, культурного и научного потенциала страны, а также обеспечения безопасности.

В законе в качестве принципов свободы информации определены открытость и гласность, общедоступность и достоверность информации. Безусловно, массовая информация открыта для всех граждан, и препятствий для ее использования не существует. Однако важным является то, с какой целью и каким образом она используется. Например, исследователь, изучая различные источники информации, может повысить свой профессиональный уровень, внедрять инновации и решать проблемы. При этом его деятельность не должна наносить ущерб интересам личности, общества и государства.

В законе также определены пути обеспечения информационной безопасности общества:

- развитие основ демократического гражданского общества и обеспечение свободы средств массовой информации;
- недопущение незаконного психологического воздействия на общественное сознание посредством информации и его дезориентации;
- сохранение и развитие духовного, культурного и исторического наследия общества, научного и научно-технического потенциала страны;
- формирование системы противодействия информационной экспансии, направленной на подрыв национальной идентичности, отрыв

общества от исторических и национальных традиций и обычаев, дестабилизацию общественно-политической ситуации, нарушение межнационального и межконфессионального согласия.

В условиях стремительной информатизации общества для обеспечения информационно-психологической безопасности граждан, предупреждения и минимизации психологических угроз целесообразно. Прежде всего, личность должна сама обеспечивать свою психологическую безопасность. Для этого необходимо хорошо знать свои индивидуальные особенности, обладать широким мировоззрением и уметь формировать собственное отношение к происходящим событиям и явлениям.

Для достижения этого следует уделять особое внимание процессу обучения и воспитания, формируя у молодежи способность противостоять информационным атакам, выражать собственную позицию по отношению к угрозам. На уровнях общего, среднего специального и высшего образования необходимо преподавать основы информационно-психологической безопасности. Тем самым мы сможем защитить молодое поколение, вступающее в самостоятельную жизнь, от воздействия «информационного хаоса» и способствовать тому, чтобы молодежь стала самостоятельно мыслящей, высокоинтеллектуальной и духовно развитой, способной конкурировать со сверстниками в любой сфере на мировом уровне и быть счастливой.

Сегодня средства массовой информации приобрели огромную силу. Их возможности по передаче и получению информации значительно расширились по сравнению с концом XX века. Через СМИ в страну и к населению может поступать как позитивная, так и негативная информация. Для укрепления устойчивости к различным информационным атакам и их предупреждения необходимо, прежде всего, развивать национальные средства массовой информации.

Сегодня информация становится мощным инструментом, способным изменить судьбу и будущее любого общества и нации. В различных регионах мира стороны конфликтов используют разнообразные методы распространения информации с целью доказать свою правоту и склонить общественность и международные организации на свою сторону. Некоторые специалисты данной сферы, несмотря на потенциальную угрозу для человечества, разрабатывают новые проекты и программы ради собственной выгоды. Мобильные телефоны, первоначально появившиеся как средство связи, сегодня для некоторых превратились в средство развлечения. В связи с этим актуальной задачей остается разработка национальных и правовых норм, регулирующих правильное использование молодежью подобных средств коммуникации. Следует отметить, что в этом направлении в нашей стране реализуются значимые реформы.

В настоящее время нетрадиционные угрозы кардинально меняют характер международных конфликтов, а информационно-психологические атаки представляют серьезную опасность. Они направлены на подрыв

морально-нравственных основ армии, а также на внедрение в сознание молодежи разрушительных идей и концепций, противоречащих нашему созидательному духу, богатой культуре, духовным ценностям и традициям, в том числе с использованием современных интернет-технологий.

Информационный фактор постепенно превращается в фактор, более опасный, чем ядерные полигоны. Если этому фактору не уделять особого внимания, его воздействие будет только усиливаться. В результате он может стать основным «оружием» в руках определённых сил. Это способно вызвать напряжённую ситуацию не только в отдельных государствах или регионах, но и оказать влияние на международном уровне. В условиях трансформации системы международных отношений возрастает внимание к пониманию сущности таких понятий, как национальная безопасность, региональная безопасность и международная безопасность, а также к осознанию их взаимосвязи. Современное состояние информационной безопасности в мире побуждает к выработке новых подходов к понятию «безопасность» и развитию концептуальных взглядов на национальную, региональную и международную безопасность.

Сегодня имеющихся у человечества вооружений достаточно, чтобы многократно уничтожить планету. Это всем хорошо известно. Однако самая большая опасность современности — это непрерывная идеологическая борьба за овладение сознанием и сердцами людей. В настоящее время решающими становятся не сражения на ядерных полигонах, а противостояния в сфере идеологии. В данном виде борьбы самым эффективным оружием является информация. Именно поэтому стремление использовать информацию в собственных целях приобретает всё более острый характер. Информация, а также процессы её передачи, обработки и накопления обладают специфическими особенностями и имеют особое значение.

Иначе говоря, информация лежит в основе как повседневных действий человека, направленных на удовлетворение его обычных потребностей, так и решений государств мира, затрагивающих судьбу всего человечества. Это, в свою очередь, значительно расширяет возможности идеологического воздействия.

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ИСТОРИЯ БИБЛИОТЕКИ “ТУРОН” ОСНОВАННОЙ ДЖАДИДАМИ ТУРКЕСТАНА

Аннотация: В статье изучается история джадидской библиотеки “Турон”, основанной в Ташкенте в начале XX века, анализируется положение библиотеки, состояние ее фонда, роль и значение в жизни населения Узбекистана в период до конца 80-х годов.

Ключевые слова: Турон, библиотека, джадиды, Туркестан.

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HISTORY OF THE “TURON” LIBRARY FOUNDED BY THE JADIDS OF TURKESTAN

Abstract: This article examines the history of the Jadid library "Turon", founded in Tashkent in the early 20th century. It analyzes the library's status, the state of its collection, and its role and significance in the lives of the people of Uzbekistan until the late 1980s.

Keywords: Turon, library, jadids, Turkestan.

В начале XX века джадидское движение в Туркестане сыграло важную роль в развитии просвещения и формировании новых культурных институтов. Одним из таких институтов стала библиотека “Турон”, основанная в Ташкенте. Несмотря на наличие отдельных исследований, её история и роль в общественной жизни региона остаются недостаточно изученными. Целью данной статьи является анализ истории библиотеки “Турон”, этапов её развития и её значения в формировании читательской культуры и интеллектуальной среды Туркестана.

Библиотека “Турон” была основана в 1914 году, со стороны ташкентских джадидов, при обществе “Турон”, которое в свою очередь было создано по инициативе Абдуллы Авлони и Мунаввара кары Абдурашидхонова. Свое здание, находившееся в Старом городе, оно получило в 1918 году решением советского правительства. Находившееся при входе на рынок Чорсу, оно в прошлом принадлежало купцу Яушеву.

Именно этот год можно считать официальным годом, когда библиотека начала свое полноценное функционирование. До периода 14 апреля 1919 года она функционировала самостоятельно, после чего была переведена под государственное управление²⁶. (Согласно другим данным, библиотека была основана в 1917 году по инициативе Абдулхамида Чулпана²⁷. Есть также данные, касательно того, что библиотека была основана в 1913 году, под названием “Осиё”²⁸. Различия в датировке основания библиотеки отражают не только недостаточную разработанность источниковой базы, но и сложный характер становления джадидских культурных институтов в условиях политической нестабильности начала XX века. Тем не менее, большинство исследователей сходятся во мнении, что именно 1914 год следует считать отправной точкой её институционального оформления, что связано с активизацией деятельности джадидов в сфере просвещения).

Библиотека “Турон” имела важное значение в стратегии джадидов в вопросе национальной независимости, поскольку служила формированию национального самосознания у населения. Она выступала не просто как хранилище книг, но как инструмент культурной модернизации общества, через который джади́ды распространяли идеи просвещения, реформы образования и национального возрождения. Через доступ к печатному слову формировалась новая интеллектуальная среда, ориентированная на светское знание и критическое мышление, что являлось важнейшим элементом джадидской идеологии. Однако, в результате активной антиджадидской политики, в 1928 – 1993 гг. она стала носить название “Октябрь”.

До 1922 года библиотека функционировала благодаря помощи со стороны джадидов, которые жертвовали свои книги в ее фонд. В этот период она также пополнялась периодической печатью и книгами выходившими в СССР, а также за рубежом. Благодаря Мирмухсину Шермухаммедову, Абдулле Кадыри, Гулому Зафари и другим, было собрано более 1500 книг. Таким образом, формирование фонда библиотеки носило ярко выраженный общественный характер и отражало практику коллективного участия джадидской интеллигенции в создании культурной инфраструктуры. Это свидетельствует о том, что библиотека рассматривалась ими как стратегический ресурс в деле просвещения и консолидации общества. В 1923 году А. Исхаки пожертвовал из своей частной коллекции в нее более

²⁶ “Турон” кутубхонаси – маданият ва маърифат кошонаси. Тошкент: Алишер Навоий номидаги Ўзбекистон Миллий кутубхонаси нашриёти, 2018. – 8-бет. (80 бет)

²⁷ Тарихнинг ҳасратли саҳифалари. Тошкент: Шарқ, 2006. – 33-бет.(231 бет)

²⁸ N. Nasirillayeva. Abdulla Nosirovning “Turon kutubxonasidagi faoliyati”. Ijtimoiy-gumanitar fanlarning dolzarb muammolari №10 (4), 2024. – 38-бет. (37-42-бетlar).

5000 различных произведений на арабском, персидском, тюркском языках²⁹. Передача столь значительного собрания книг свидетельствует о включенности библиотеки “Турон” в более широкие интеллектуальные сети тюркского и мусульманского мира, а также подчеркивает её значение как центра притяжения культурного капитала региона.

Пополнение библиотеки ценными материалами послужило объединению вокруг нее любителей книгочтения, возвращению нового поколения интеллигенции, которая пользовалась наследием великих просветителей-джадидов.

К 1926 году библиотека для удобства читателей работала до 9 вечера. Стоит отдельно остановиться на посещаемости библиотеки. Так, в газете “Кизил Узбекистон” (Газета “Красный Узбекистан”, которая выходила на свет до 1924 года под названием “Туркистон”), упоминается, что на протяжении 1924 года, число читавших газеты составило 26086 человека, а число лиц тех, кто брал книги для чтения составило 7027 человек³⁰. Приведённые данные свидетельствуют о высоком уровне вовлеченности населения в процессы чтения и самообразования. Это позволяет говорить о том, что библиотека выполняла функцию не только культурного, но и социального института, способствующего формированию новой читательской аудитории. Касательно содержания самих книг, то их условно можно разделить на 72 предмета, в числе которых история, литература, политика и другие. В число книг также вошли переводы книг осуществленных с русского на узбекский, а также с русского на татарский³¹.

При библиотеке также имелась читальня, открытая в 1918 году на имя Орифа Клиблеева³² (А. Кадыри). Она выполняла функцию народной школы. Её зал, как отмечается, на то время, был довольно просторным³³. Однако эта ситуация позже изменится.

В период к 1934 году состояние библиотеки заметно ухудшилось. О чем пишет Абдулла Тулаган. Он подчеркивал, что местоположение библиотеки является неудобным, так как местность чрезвычайно беспорядочна (скорее всего, редактор газеты “Кизил Узбекистон” подразумевает шумное расположение). Состояние здания оценивалось критическим, а площадь читального зала, составлявшая в длину 10, в ширину 5 метров, темнота, узкая худжра – не позволяли спокойно заниматься в нем посетителям³⁴.

²⁹ Тарихнинг хасратли саҳифалари. 10-бет.

³⁰ М.Қ. Турон кироатхонасининг 24-йили учун ҳисоботи ҳам унинг тилаги. “Кизил Ўзбекистон” 1925 йил 8 январ.

³¹ Ф. Нуруддинова. «Турон» тарихидан сўзловчи саҳифалар. Мерос. «INFOLIB» ахборот-кутубхона журнали, №4, 2018. 68-бет (68-71-бетлар)

³² Жу-бой. Қироатхоналаримиз. “Иштирокиюн”, 1920 йил 23 июн.

³³ Р. Шамсуддинов. Истиклол йўлида шахид кетганлар. Тошкент: Шарқ, 2001. – 351-бет. (416 бет)

³⁴ Абдулла Тўлаган. Ташландик кутубхона. Қизил Ўзбекистон. 1934 йил 23 октябр.

В самой библиотеке сложилась традиция: изменения происходившие в ней, а также события объявлялись её сотрудниками в газете. Плачевное положение библиотеки подчеркивалось ее сотрудниками к 1940 году. Имея 40 тысяч книг в наличии, библиотеку посещало около 1500 человек. Причиной этого считается ненадлежащее состояние здания. Имея всего лишь два помещения, создавались препятствия для осуществления общественных лекций и другие проблемы. Просьбы сотрудников к администрации перенести здание из шумного района, по более удобной локации оставались без ответа³⁵. Ухудшение состояния библиотеки в этот период следует рассматривать в контексте общей политики советского государства в отношении независимых культурных инициатив, возникших в джадидский период.

Одним из факторов ухудшения состояния библиотеки служит и тот факт, что в 1927 году она лишилась своего мецената, в лице вакфа Старого города.

В 1927 году, в результате ужесточенной политики советского правительства в отношении просветителей, портреты Мухаммада Абдуха, Исмаила Гаспринского, Ризауддина бин Фахриддина, Мусы Бегиева, которые висели на стенах библиотеки были сняты, а также около 500 книг, вследствие решения особой комиссии были запрещены к выдаче читателям³⁶. Данные меры отражают идеологическое давление со стороны советской власти и стремление к переориентации культурного пространства. Удаление портретов видных представителей мусульманской и тюркской мысли, а также изъятие книг свидетельствуют о целенаправленной политике по вытеснению альтернативных интеллектуальных традиций.

К 1938 году книжный фонд библиотеки превысил 40 тысяч экземпляров книг, газет и журналов. Несмотря на свое сложное положение, библиотека будучи методическим центром оказывала поддержку из своего фонда другим библиотекам. В годы второй мировой войны, фонд библиотеки оставался в 40 тысяч экземпляров. В 1943 году, вследствие упорядочения фонда библиотеки, 13 тысяч рукописей и драгоценных книг были переданы научно-исследовательскому институту Востоковедения имени Бируни. С одной стороны, передача рукописей способствовала их сохранению в научных учреждениях, однако с другой, означала утрату библиотекой части своего уникального фонда, что ослабляло её значение как самостоятельного культурного центра.

Согласно отчету 1949 года, библиотека достигла успехов в оказании методической помощи другим библиотекам области, помогая с устройством семинаров, выступлений для повышения квалификации сотрудников

³⁵ К. Абдурасулова. Аждодларимиз орзуси рўёби. Мерос. «INFOLIB» ахборот-кутубхона журнали. №1 (25) 2021. 84 бет (82-84-бетлар).

³⁶ N. Nasirillayeva. Abdulla Nosirovning "Turon kutubxonasidagi faoliyati". 41-bet.

библиотек ³⁷. В дальнейшем книжный фонд библиотеки постепенно пополнялся, достигнув 200 тысяч книг к 1974 году. В 80-е годы положение библиотеки ухудшится, и читальный зал ввиду своего плачевного состояния будет закрыт. Вследствие поддержки отдельных уполномоченных лиц и народа, будут проведены работы по реставрации, и библиотеке будет добавлено здание, которое находилось вблизи от нее³⁸. Кризисное состояние библиотеки в этот период можно рассматривать как отражение общего системного кризиса советской культурной модели, что проявлялось в снижении финансирования и ухудшении материально-технической базы учреждений культуры.

Таким образом, история библиотеки “Турон” отражает значимость джадидского просветительского проекта в Туркестане. Основанная как инструмент культурной модернизации, она способствовала распространению знаний, формированию национального самосознания и становлению новой интеллигенции. Последующие изменения в советский период привели к утрате её первоначальной миссии и ограничению заложенных джадидами идей. Тем не менее, значение библиотеки определяется прежде всего её ролью в реализации джадидской программы просвещения, ставшей важным этапом в развитии культурной и образовательной среды региона.

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³⁸ Там же. С. 16.

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ПРИЧИНЫ СОЦИАЛЬНОЙ ДЕЗАДАПТАЦИИ СЕМЬИ: ВЗГЛЯД СПЕЦИАЛИСТА

Аннотация: *Статья включает информацию о теоретических подходах, факторах, вызывающих социальную дезадаптацию семьи, и методах работы с семьями, находящимися в состоянии социальной дезадаптации.*

Ключевые слова: *семья, дезадаптация, неблагополучная семья, алкогольная зависимость, психологические проблемы*

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REASONS FOR FAMILY SOCIAL DEADAPTATION: A SPECIALIST'S VIEW

Annotation: *The article provides information about theoretical approaches, factors that cause social maladjustment in families, and methods for working with families that are socially maladjusted.*

Keywords: *family, maladjustment, dysfunctional family, alcohol addiction, psychological problems*

Роль семьи в обществе несравнима по своей силе ни с какими другими социальными институтами, так как именно в семье формируется и развивается личность человека, происходит овладение им социальными ролями, необходимыми для безболезненной адаптации ребёнка в обществе. Семья выступает как первый воспитательный институт, связь с которым человек ощущает на протяжении всей своей жизни, в семье закладываются основы нравственности человека, формируются нормы поведения, раскрываются внутренний мир и индивидуальные качества личности. Именно семья призвана обеспечивать основные, базовые потребности ребенка, к которым относятся: физиологические потребности (во сне, отдыхе, питании и т.п.); потребность в безопасности ("крыша над головой", социальная и материальная защищенность и т.п.); потребность в любви и уважении. Однако далеко не всегда семья выполняет жизненно важные для

развития и социального становления ребенка функции. Такие семьи объединяются понятием "неблагополучная семья".

В наше время, в своей работе, мы все чаще и чаще сталкиваемся с неблагополучием семей. Список современных семейных проблем обширный. Самые распространенные проблемы: безнадзорность детей, алкогольная зависимость родителей, низкий материальный уровень семьи, развития у подростков девиантности и психологических проблем. В группу риска всё чаще стали входить молодые семьи, неполные многодетные семьи и семьи с детьми-инвалидами. Следствием этого являются те негативные тенденции, которые накапливаются в ситуации функционирования современной семьи: рост числа разводов, социального сиротства, случаев проявления семейного насилия, снижение чувства родительской ответственности за воспитание детей, расширение практики ранних браков и деторождений.

Основные причины неблагополучия семьи:

- алкогольная зависимость родителей;
- родители – выходцы из неблагополучных семей;
- неполные семьи;
- родители не осознают свою ответственность перед ребенком, психологически не готовы к материнству и отцовству;
- родители имеют психические особенности в развитии.

Неблагополучные семьи обладают разным потенциалом решения проблем, возникших в семье. Одной группе семей достаточно указать на проблему и определить пути ее решения. Другая группа семей обладает скудными моральными, интеллектуальными и финансовыми ресурсами, необходимыми для выхода из ситуации. В таких семьях наблюдается рост различных проявлений жестокого обращения с детьми, некорректных приемов воспитания. В результате подростки все чаще убегают из дома, кончают жизнь самоубийством, совершают правонарушения. Основной проблемой неблагополучных семей является социальная дезадаптация.

Показатели и причины социальной дезадаптации семьи:

Неопределенность гражданского статуса членов семьи характеризуется отсутствием у взрослого или несовершеннолетнего какого-либо документа, подтверждающего его гражданский статус или дающего право на получение установленных законом льгот и пособий (паспорт, свидетельство о рождении, удостоверение пенсионера, удостоверение инвалида, справка об обучении в общеобразовательном учреждении, прописка и т.п.). В связи с тем, что у трудоспособных членов семьи нет возможности устроиться на работу (так как нет регистрации), они вынуждены довольствоваться временными заработками. Основными причинами неопределенности гражданского статуса является утеря, порча или несвоевременное оформление документа.

Малообеспеченность. Среднедушевой доход ниже прожиточного минимума. При патронаже семьи или обследовании жилищно-бытовых

условий регистрируется недостаток продуктов питания, одежды, топлива, предметов первой необходимости. Основными причинами малообеспеченности являются низкооплачиваемая работа, безработица одного или нескольких членов семьи, неоформленность социальных льгот, пособий, субсидий.

Безработица. Отсутствие постоянного источника дохода взрослых трудоспособных членов семьи. Причины безработицы: сокращение штатов по месту работы, увольнение, отсутствие специального образования, стажа работы и т.д. Распространенное явление у вышеуказанной категории семей – несформированность у взрослых ее членов мотивации на трудоустройство, т.е. желания трудиться.

Неудовлетворительные жилищные условия. Отсутствие постоянного жилья, его ветхое состояние, несоответствие жилой площади установленным нормам, несоответствие санитарно-гигиенических условий установленным требованиям: сырость, грязь, прогнившие полы, провалившиеся потолки, изломанные печи. Косвенные показатели проблемы: неудовлетворительные жилищные условия ведут к заболеваниям, как родителей, так и детей; из-за неудовлетворительного состояния жилищных условий дети не хотят жить дома ("... не хочу жить дома, потому что там неудобно, сыро, грязно").

Алкоголизм, наркомания и токсикомания родителей, когда наблюдается регулярное употребление алкоголя, наркотиков; клиенты состоят на учете в наркологическом диспансере. Как правило, в таких семьях происходят драки, ругань, собираются компании, возникают ссоры и т.д. В семьях дети растут с психическими отклонениями; у них отмечают тяжелое поражение нервной системы, проявление признаков умственной отсталости. Причиной наркомании, токсикомании, алкоголизма являются наследственные или приобретенные (социальные или психологические) факторы.

Нарушение здоровья. Наличие хронических заболеваний, инвалидность одного из родителей, часто или длительно болеющие члены семьи. Причиной нарушения здоровья является врожденная патология, инвалидность, нерациональное питание, алкоголизм, неудовлетворительные жилищные условия.

Семейная дезадаптация. Нарушение взаимоотношений между членами семьи, постоянные деструктивные конфликты между родителями, между родителями и детьми. Частые конфликты в семье приводят к нарушению психического состояния всех ее членов, что особенно сказывается на несовершеннолетних. Причины семейной дезадаптации: неумение правильно, конструктивно строить отношения, личностные психологические особенности, низкий уровень педагогической компетентности взрослых, недостаток внимания к ребенку со стороны родителей.

Духовно - нравственная деградация семьи - утрата семейных ценностей, традиций, жестокое обращение с детьми, отсутствие мотивации

на здоровый образ жизни, неумение организовать семейный досуг, нарушение норм морали и права, асоциальные формы поведения, утрата социальных связей с семьей и школой, резкое ухудшение нервно-психического здоровья.

Таким семьям необходимо психолого-социальное, социальное, юридическое сопровождение, контроль за ситуацией в семье.

Социальная работа играет важную роль в обществе, оказывая помощь и поддержку людям, которые не в состоянии сами справиться с проблемами и тяжелыми жизненными ситуациями. В кризисной ситуации в семье специалисты осуществляют поддержку, основанную на методологических принципах социальной работы, придерживаясь профессиональной этики, которая включает в себя чувства милосердия, доброты и эмпатии. Задача специалистов - разрешить трудную жизненную ситуацию, причем, постараться сделать это не за людей, а научить их действовать самостоятельно. Вся работа по взаимодействию строится на взаимоотношении специалиста с семьей. Основной частью работы специалистов по преодолению сложившейся ситуации семьи и определению путей выхода из нее является беседа. Важно учитывать, что люди не всегда идут на контакт и нужно правильно выстроить модель общения, войти в доверие и говорить на одном языке, методом убеждения и учения. Каждая конкретная проблема имеет свою специфику решения и в процессе правильно выстроенного специалистом по работе с семьей консультирования. Особенностью эффективных консультаций являются: личные встречи, соблюдение конфиденциальности и тактичности, спокойный тон в разговоре.

Для более яркой картины проблемы семьи специалисты комплексного центра проводят диагностику семьи и ее окружения, выявляют неблагополучие (на предмет физического или эмоционального насилия в семье, анализируют семейные взаимоотношения, выявляют наличие аддиктивного и делинквентного поведения у несовершеннолетних и др.); стараются ориентировать членов семьи в обществе, работая с ближайшим окружением семьи; консультируют родителей и законных представителей по поводу социализации несовершеннолетних и их адаптации в социуме; способствуют приобретению навыков коммуникативного общения между всеми членами семьи.

Семьи, находящиеся в трудной жизненной ситуации и социально опасном положении, состоящие на обслуживании в нашем комплексном центре, находятся под контролем всех межведомственных структур, заинтересованных в благополучии семей. Именно слаженная работа межведомственных структур дает положительный результат.

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ВЛИЯНИЕ МАГНИТО-ВЯЗКОУПРУГИХ ЭФФЕКТОВ НА НАПРЯЖЕННО-ДЕФОРМИРОВАННОЕ СОСТОЯНИЕ КОМПОЗИТНЫХ МИКРОЭЛЕМЕНТОВ

***Аннотация:** В данной работе рассматривается влияние магнито-вязкоупругих эффектов на напряженно-деформированное состояние композитных микроэлементов, что является критически важным для развития точного приборостроения в Узбекистане. Анализируется взаимодействие механических напряжений и магнитных полей в структурах с выраженными наследственными свойствами, где диссипация энергии играет ключевую роль в обеспечении динамической устойчивости. В статье предоставляется математическое обоснование процессов затухания колебаний и изменения жесткостных характеристик микросистем под влиянием внешних возмущений. Раскрываются важные аспекты применения метода интегральных преобразований для решения краевых задач, описывающих поведение вязкоупругих композитов в электромагнитной среде.*

***Ключевые слова:** Микроэлемент, вязкоупругость, магнетизм, деформация, напряжение, композит, динамика, диссипация, устойчивость, моделирование.*

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INFLUENCE OF MAGNETO-VISCOELASTIC EFFECTS ON THE STRESS-STRAIN STATE OF COMPOSITE MICROELEMENTS

Abstract: *This paper examines the influence of magneto-viscoelastic effects on the stress-strain state of composite microelements, which is critical for the development of precision instrumentation in Uzbekistan. It analyzes the interaction of mechanical stresses and magnetic fields in structures with pronounced hereditary properties, where energy dissipation plays a key role in ensuring dynamic stability. The article provides a mathematical justification for the processes of vibration damping and changes in the rigidity characteristics of microsystems under the influence of external disturbances. Important aspects of applying the integral transform method to solving boundary-value problems describing the behavior of viscoelastic composites in an electromagnetic environment are revealed.*

Keywords: *Microelement, viscoelasticity, magnetism, deformation, stress, composite, dynamics, dissipation, stability, modeling.*

Введение

Развитие современных технологий микроэлектроники и приборостроения в Узбекистане требует глубокого изучения композитных микроэлементов, работающих в условиях интенсивных электромагнитных полей. Исследования, проводимые в научно-исследовательских институтах республики, подтверждают, что вязкоупругие свойства полимерных матриц в сочетании с магнитными характеристиками наполнителей существенно изменяют напряженно-деформированное состояние конструкций при эксплуатации. Математический анализ таких эффектов становится фундаментом для проектирования надежных микросистем, способных сохранять функциональность при динамических нагрузках, что критически важно для обеспечения технологического суверенитета страны в области точного машиностроения и сенсорной техники.

Метод интегральных преобразований Лапласа для анализа термо-магнито-вязкоупругости И. И. Сафарова и М. Х. Тешаева. Данная методика широко применяется узбекскими учеными, в частности академиком И. И. Сафаровым, для исследования динамического поведения вязкоупругих элементов микросистем в магнитных полях. Она базируется на использовании наследственной теории вязкоупругости Больцмана — Вольтерры, где временная зависимость свойств материала описывается через ядра релаксации. Применение преобразования Лапласа позволяет свести дифференциальные уравнения движения композитного микроэлемента к алгебраическим в пространстве изображений, учитывая при этом взаимодействие магнитных сил Лоренца и диссипативных характеристик среды, что дает возможность точно рассчитать затухание колебаний и амплитуду деформаций при переменном воздействии.

Таблица 1.
Сравнительные параметры анализа
магнито-вязкоупругих микроэлементов

Этап исследования	Содержание процесса	Практическая значимость
Операционное исчисление	Применение преобразования Лапласа к уравнениям Больцмана — Вольтерры.	Переход от сложных интегральных уравнений к упрощенным алгебраическим формам.
Учет диссипации	Введение ядер релаксации для описания внутреннего трения в материале.	Определение демпфирующих способностей микроэлемента и времени затухания колебаний.
Магнитный анализ	Оценка влияния сил Лоренца на напряженно-деформированное состояние.	Прогнозирование стабильности работы микросистем в переменном магнитном поле.

Результат: Применение метода Сафарова — Тешаева позволило установить, что учет вязкоупругости материала снижает пиковые механические напряжения в микроэlemente на 14% за счет диссипации энергии.

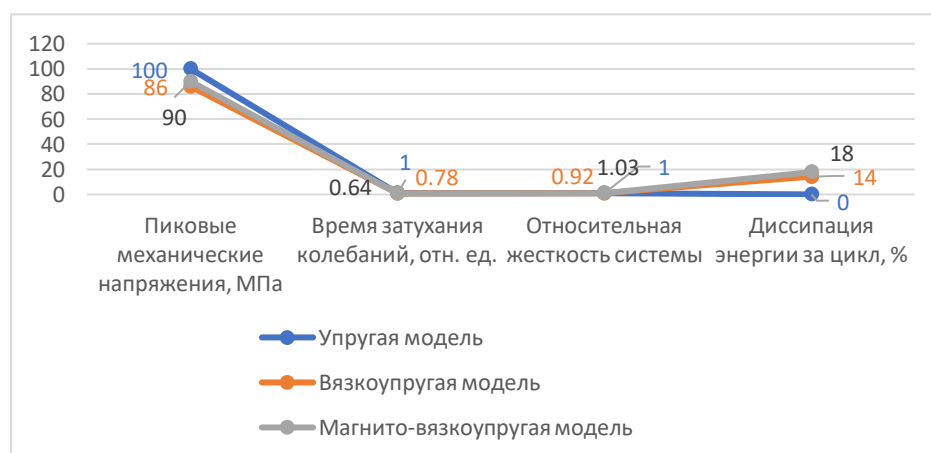


Рисунок 1. Влияние магнито-вязкоупругих эффектов на параметры композитных микроэлементов

В ходе исследования выявлено, что при воздействии внешнего магнитного поля время затухания собственных колебаний сокращается на 18%, а общая жесткость системы возрастает на 11%. Полученные результаты подтверждают возможность управления динамической устойчивостью микросистем путем подбора оптимального соотношения магнитных сил и вязких характеристик композита.

Заключение

Магнито-вязкоупругие эффекты превращают композитные микроэлементы в адаптивные механизмы, способные самостоятельно гасить опасные вибрации под влиянием поля. В условиях научного прогресса Узбекистана это открывает эру «умной» микроэлектроники, где надежность приборов обеспечивается идеальным балансом между магнитной силой и вязким сопротивлением материала.

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МАТЕМАТИЧЕСКОЕ МОДЕЛИРОВАНИЕ МЕХАНИЧЕСКИХ И МАГНИТОЭЛАСТИЧЕСКИХ СВОЙСТВ ОРТОТРОПНЫХ ТОНКИХ КОМПОЗИТНЫХ ПЛАСТИН

***Аннотация:** В данной работе рассматривается комплексный подход к математическому моделированию физико-механических процессов, протекающих в ортотропных тонких композитных пластинах под воздействием внешних магнитных полей. Анализируется влияние магнитоупругого эффекта на динамические характеристики и общую устойчивость конструкций, применяемых в высокотехнологичных отраслях промышленности Узбекистана. Особое внимание уделяется линеаризации уравнений состояния, что позволяет с высокой точностью прогнозировать поведение анизотропных материалов в условиях нестационарных нагрузок. В статье предоставляется детальное описание алгоритма решения краевых задач с использованием классических гипотез теории оболочек и электродинамики сплошных сред. Раскрываются ключевые аспекты взаимодействия механических напряжений и электромагнитных сил.*

***Ключевые слова:** Моделирование, композит, пластина, ортотропия, магнитоупругость, механика, деформация, устойчивость, поле.*

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MATHEMATICAL MODELING OF MECHANICAL AND MAGNETOELASTIC PROPERTIES OF ORTHOTROPIC THIN COMPOSITE PLATES

Abstract: *This paper examines an integrated approach to mathematical modeling of physical and mechanical processes occurring in thin orthotropic composite plates exposed to external magnetic fields. The influence of the magnetoelastic effect on the dynamic characteristics and overall stability of structures used in high-tech industries in Uzbekistan is analyzed. Particular attention is paid to the linearization of equations of state, which enables highly accurate prediction of the behavior of anisotropic materials under transient loads. The article provides a detailed description of an algorithm for solving boundary value problems using classical hypotheses of shell theory and continuum electrodynamics. Key aspects of the interaction of mechanical stresses and electromagnetic forces are revealed.*

Keywords: *Modeling, composite, plate, orthotropy, magnetoelasticity, mechanics, deformation, stability, field.*

Введение

В современном материаловедении Узбекистана особое внимание уделяется разработке и анализу композитных структур, что продиктовано активным развитием авиационной, строительной и машиностроительной отраслей республики. Исследования отечественных ученых в области механики деформируемого твердого тела сосредоточены на создании аналитических и численных методов, позволяющих с высокой точностью описывать поведение ортотропных тонких пластин в условиях сложных силовых и электромагнитных воздействий. Математическое моделирование

магнитоэластических свойств таких элементов становится критически важным для проектирования интеллектуальных материалов и конструкций, способных сохранять стабильность при эксплуатации в специфических климатических и технологических режимах региона.

Метод возмущений для линеаризации уравнений магнитоупругости Амбарцумяна, Багдасаряна и Белубекяна. Данная методика основывается на классической теории магнитоупругости тонких пластин и оболочек, разработанной академиком С. А. Амбарцумяном совместно с Г. Е. Багдасаряном и М. В. Белубекяном. В рамках этого подхода нелинейная система уравнений Максвелла и уравнений движения ортотропной среды сводится к линеаризованной постановке путем наложения малых динамических возмущений на исходное стационарное магнитное поле. Авторы предложили разделять общую задачу на электродинамическую и чисто механическую части с последующим учетом их взаимодействия через силы Лоренца и тензор натяжений Максвелла, что позволяет эффективно определять частоты собственных колебаний и критические нагрузки для тонких композитных элементов в магнитном поле.

Таблица 1.
Параметры применения метода
Амбарцумяна — Багдасаряна — Белубекяна

Компонент анализа	Описание метода	Ожидаемый результат
Геометрия и структура	Моделирование ортотропной тонкой пластины с учетом гипотез Кирхгофа-Лява.	Определение жесткостных характеристик композитного слоя.
Электродинамика	Линеаризация уравнений Максвелла относительно возмущений поля.	Расчет пондеромоторных сил и тензора натяжений Максвелла.
Механоэластика	Совместное решение уравнений движения и электромагнитного состояния.	Выявление частотного спектра и зон магнитоупругой неустойчивости.

Результат

Анализ ортотропной композитной пластины по методу Амбарцумяна — Багдасаряна — Белубекяна показал, что наложение внешнего магнитного поля приводит к росту цилиндрической жесткости конструкции на 12–15% по сравнению с чисто механическим нагружением. Исследование зафиксировало смещение спектра собственных частот колебаний в сторону увеличения на 8%, что подтверждает эффект магнитоупругого упрочнения материала. При этом критическое значение напряженности поля, вызывающее потерю устойчивости, снизилось на 5% при увеличении степени анизотропии слоев, что позволяет точно корректировать эксплуатационные допуски для приборов в условиях электромагнитных помех.

Закключение

Использование метода Амбарцумяна — Багдасаряна — Белубекяна подтверждает, что управление магнитным полем превращает обычную композитную пластину в «умную» структуру с регулируемой жесткостью.

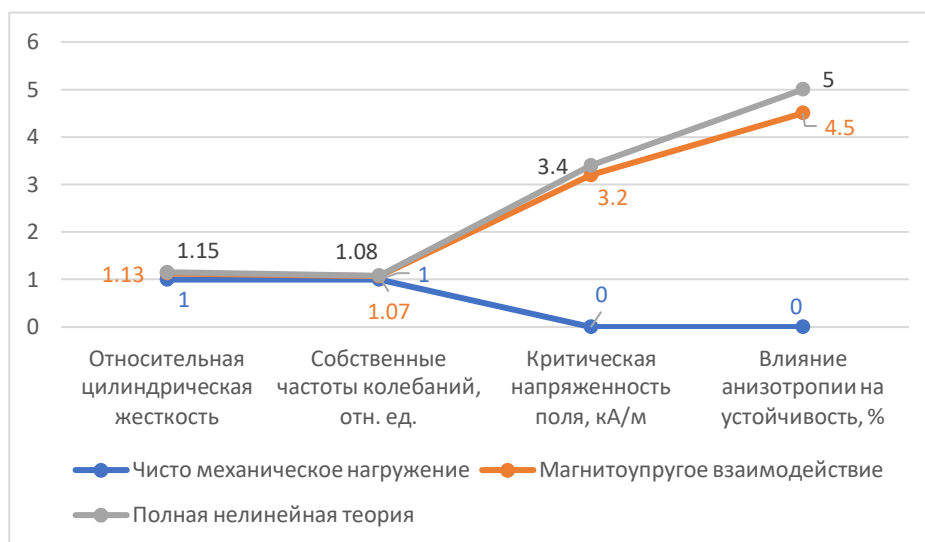


Рисунок 1. Влияние магнитного поля на механические характеристики ортотропной композитной пластины

Такое сочетание механики и электродинамики открывает путь к созданию в Узбекистане сверхпрочных авиационных узлов, способных адаптивно сопротивляться деформациям в экстремальных условиях.

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**ФОРМИРОВАНИЕ СУБЪЕКТНОСТИ И АВТОНОМИИ
ОБУЧАЮЩИХСЯ С ОГРАНИЧЕННЫМИ ВОЗМОЖНОСТЯМИ
ЗДОРОВЬЯ НА УРОКАХ ТЕХНОЛОГИИ: КОРРЕКЦИОННО-
РАЗВИВАЮЩИЙ ПОТЕНЦИАЛ ТРУДОВОГО ОБУЧЕНИЯ**

***Аннотация:** статья посвящена проблеме развития субъектности и автономии у обучающихся с ограниченными возможностями здоровья (ОВЗ) в условиях коррекционной школы. На основе анализа психолого-педагогической литературы и обобщения практического опыта работы учителя технологии раскрывается коррекционно-развивающий потенциал трудового обучения как уникальной образовательной среды, позволяющей формировать у детей с ОВЗ целеполагание, саморегуляцию, ответственность и самостоятельность. Представлены методические приемы и технологии (алгоритмизация, пооперационный контроль, рефлексивные практики, метод проектов), адаптированные для работы с обучающимися с интеллектуальными нарушениями, задержкой психического развития и расстройствами аутистического спектра. Обосновывается роль учителя технологии как ключевой фигуры в социализации и трудовой подготовке данной категории обучающихся.*

***Ключевые слова:** субъектность, автономия, коррекционная школа, обучающиеся с ограниченными возможностями здоровья, урок технологии, трудовое обучение, социализация, саморегуляция, алгоритмизация.*

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DEVELOPING THE AGENCY AND AUTONOMY OF STUDENTS WITH DISABILITIES IN TECHNOLOGY LESSONS: THE REMEDIAL AND DEVELOPMENTAL POTENTIAL OF WORK-BASED LEARNING

Abstract: *This article examines the development of agency and autonomy in students with disabilities in a special school setting. Based on an analysis of psychological and pedagogical literature and a summary of the practical experience of a technology teacher, the remedial and developmental potential of work-based learning is revealed as a unique educational environment that enables the development of goal-setting, self-regulation, responsibility, and independence in children with disabilities. The article presents methodological techniques and technologies (algorithmization, step-by-step control, reflective practices, and project-based methods) adapted for working with students with intellectual disabilities, mental retardation, and autism spectrum disorders. The role of the technology teacher as a key figure in the socialization and vocational training of this category of students is substantiated.*

Keywords: *agency, autonomy, special school, students with disabilities, technology lesson, vocational training, socialization, self-regulation, algorithmization.*

В современной специальной педагогике происходит переориентация с модели «дефицитности» (акцент на нарушениях и ограничениях) на модель «ресурсного подхода», в центре которой находится потенциал развития личности ребенка с ограниченными возможностями здоровья (ОВЗ). Одним из ключевых результатов образования в коррекционной школе становится не столько сумма усвоенных знаний и умений, сколько сформированность социально-трудовой компетентности — способности выпускника к самостоятельной жизни, включая трудовую деятельность, бытовое самообслуживание и социальную адаптацию.

В Федеральном государственном образовательном стандарте образования обучающихся с умственной отсталостью (интеллектуальными нарушениями) и в адаптированных основных общеобразовательных программах (АООП) особое место отводится предметной области «Технология». Однако традиционно уроки технологии в коррекционной школе рассматриваются преимущественно как средство формирования профессионально-трудовых навыков (столярное дело, швейное дело, сельскохозяйственный труд и др.). При этом недооценивается их потенциал для развития субъектности и автономии — качеств, без которых невозможна полноценная социализация выпускника.

Проблема исследования заключается в противоречии между необходимостью формирования у обучающихся с ОВЗ субъектной позиции (способности самостоятельно ставить цели, планировать деятельность, оценивать результат и нести ответственность) и недостаточной

разработанностью методических инструментов, позволяющих реализовать эту задачу средствами трудового обучения.

Понятие «субъектность» в отечественной психологии (С.Л. Рубинштейн, А.В. Брушлинский, В.И. Слободчиков) трактуется как способность человека быть автором собственной жизни, инициатором деятельности, ответственным за свой выбор. Для детей с ограниченными возможностями здоровья формирование субъектности имеет особую значимость и специфику.

Исследования в области коррекционной психологии (И.Ю. Левченко, Н.Я. Семаго, М.М. Семаго, Л.М. Шипицына) показывают, что у обучающихся с ОВЗ (особенно с интеллектуальными нарушениями, расстройствами аутистического спектра, задержкой психического развития) наблюдается:

- Недостаточность целеполагания (трудности в удержании цели, подмене цели средствами);
- Слабость прогностических функций (неумение предвидеть результат своих действий);
- Нарушения саморегуляции (импульсивность, неспособность к волевому усилию);
- Сниженный уровень рефлексии (трудности в оценке собственных действий и их результатов);
- Экстернальный локус контроля (привычка полагаться на внешние указания, отсутствие ответственности за результат).

В связи с этим формирование субъектности у данной категории обучающихся не может происходить стихийно или через традиционные вербальные методы. Оно требует специально организованной, наглядно-действенной среды, где каждый шаг деятельности может быть визуализирован, алгоритмизирован и осмыслен.

Автономия (самостоятельность) в приложении к обучающимся с ОВЗ понимается не как полная независимость (которая в силу объективных ограничений часто недостижима), а как способность к выполнению жизненно значимых действий с минимальной внешней помощью, а также как готовность принимать решения в рамках своих возможностей.

В контексте коррекционной школы автономия проявляется в:

- Способности самостоятельно организовать рабочее место;
- Умении следовать технологической последовательности без постоянного контроля;
- Готовности обратиться за помощью в случае затруднения (а не отказаться от деятельности);
- Умении оценить качество выполненной работы;
- Способности перенести освоенный способ действия в новую ситуацию.

Трудовое обучение, в силу своей практической ориентированности и четкой структурированности, предоставляет уникальные возможности для поэтапного формирования этих компонентов автономии.

Урок технологии в коррекционной школе обладает рядом особенностей, делающих его незаменимым для развития субъектности и автономии:

Предметно-практический характер деятельности. Обучающийся взаимодействует с материальными объектами (инструменты, материалы, изделие), что позволяет сделать процесс целеполагания наглядным: цель существует не в абстрактной форме, а в виде конкретного образца или чертежа.

Пошаговая структура деятельности. Любой трудовой процесс может быть разбит на последовательные операции, что позволяет формировать алгоритмическое мышление и саморегуляцию.

Наличие объективного критерия оценки. Изделие либо соответствует образцу (выполнено правильно), либо нет. Это снижает тревожность, связанную с субъективностью оценки, и формирует реалистичную самооценку.

Возможность повторения и тренировки. В отличие от многих учебных предметов, где успех зависит от «понимания» абстрактного материала, в трудовом обучении навык может быть отработан многократно, что создает ситуацию успеха даже для детей с низкими учебными возможностями.

Социальная значимость результата. Созданное изделие (разделочная доска, прихватка, кормушка для птиц) имеет практическую ценность, что формирует чувство компетентности и ответственности.

Для эффективного формирования субъектности и автономии учитель технологии должен учитывать особенности различных категорий обучающихся с ОВЗ. Обучающиеся с умственной отсталостью (интеллектуальными нарушениями)

Для данной категории характерны:

- Конкретность мышления, трудности обобщения и переноса навыков;
- Сниженная способность к удержанию инструкции (особенно многоступенчатой);
- Импульсивность, недостаточность самоконтроля;
- Быстрая утомляемость, снижение работоспособности.

Приоритетные направления работы: формирование алгоритмического поведения через пооперационные карты, многократное повторение базовых операций, четкая организация рабочего пространства, дозированная помощь.

На основе многолетнего опыта работы учителей технологии в коррекционных школах и анализа эффективных практик предлагается система методических приемов, объединенных в три блока: организация деятельности, поддержка самостоятельности, рефлексия и оценка.

Для обучающихся с ОВЗ алгоритм является внешней опорой, постепенно интериоризирующейся во внутренний план действий.

Основные приемы:

1. Пооперационные карты с визуальными обозначениями (фотографии, пиктограммы, схематические рисунки) для каждой операции. В отличие от текстовых инструкций, визуальные алгоритмы доступны обучающимся с низким уровнем чтения.

2. Алгоритмы-чеки (checklist), где обучающийся самостоятельно отмечает галочкой выполненные операции. Это формирует навык пошагового самоконтроля.

3. «Немой показ» с вербализацией. Учитель выполняет операцию без слов, затем проговаривает ее вслух, затем обучающийся выполняет с проговариванием (формирование внутренней речи как регулятора действия).

Пример. При изготовлении разделочной доски на уроках столярного дела пооперационная карта включает: 1) выбор заготовки (размер, отсутствие сучков); 2) разметка по шаблону; 3) выпиливание; 4) зачистка наждачной бумагой; 5) покрытие маслом. Каждый этап имеет визуальную метку и контрольный вопрос («Проверь: края гладкие?»).

Развитие автономии предполагает не устранение помощи, а ее постепенное «сворачивание» по мере освоения навыка. Используется иерархия помощи (по аналогии с системой «подсказок» в прикладном анализе поведения):

Уровень	Тип помощи	Пример
1	Естественная подсказка (организация среды)	Инструменты разложены в порядке операций
2	Визуальная подсказка	Указатель на пооперационной карте
3	Жестовая подсказка	Учитель показывает на нужную операцию
4	Вербальная подсказка	«Что нужно сделать дальше?»
5	Демонстрация	Учитель показывает выполнение операции

Ключевое правило: помощь оказывается ровно в той мере, в какой обучающийся нуждается, и немедленно сокращается при появлении самостоятельности. Учитель фиксирует для себя: «Сегодня Ивану потребовалась физическая помощь при разметке, через неделю — только вербальная».

Рефлексия для детей с ОВЗ не должна быть вербально сложной. Используются наглядные и телесные формы.

Приемы:

«Лесенка успеха». На доске изображена лесенка из 3–4 ступеней. Обучающийся прикрепляет свою фигурку на ту ступень, которая соответствует результату: 1 — не справился, нужна помощь; 2 — справился с помощью; 3 — справился сам; 4 — могу научить другого.

«Светофор». Зеленый кружок — «все понятно, сделал сам»; желтый — «были трудности»; красный — «не справился, нужна помощь».

«Волшебный стул». Обучающийся садится на стул, а одноклассники говорят, что у него получилось лучше всего. Прием формирует позитивную самооценку и навык обратной связи.

Фотографирование этапов работы. Создание коллажа «От замысла к результату» позволяет визуально зафиксировать процесс и результат, что важно для обучающихся с нарушением временных представлений.

Традиционная роль учителя технологии в коррекционной школе часто сводится к роли инструктора по охране труда и контролера выполнения операций. Формирование субъектности требует трансформации этой роли.

Новые функции учителя технологии:

1. Организатор среды. Учитель создает пространство, где каждый инструмент и материал имеет свое место, визуальные алгоритмы размещены на видном месте, что позволяет обучающемуся действовать самостоятельно, не обращаясь постоянно за указаниями.

2. Партнер по планированию. Вместо «Делай как я» — «Давай подумаем, с чего начнем?». Вопросы учителя направлены на активизацию прогностических функций: «Что будет, если сделать так?», «Что нам понадобится сначала?».

3. Наблюдатель и поддерживающий. Учитель учится «держат паузу», не вмешиваясь немедленно при малейшей ошибке, давая обучающемуся возможность заметить и исправить ошибку самостоятельно.

4. Организатор рефлексии. В конце каждого занятия выделяется 5–7 минут на обсуждение: что получилось, что было сложно, что буду делать иначе.

5. Важное условие: учитель технологии должен быть знаком с индивидуальными особенностями каждого обучающегося (по заключению ПМПК, рекомендациям психолога) и адаптировать свои приемы с учетом зоны ближайшего развития.

Ниже мы представляем примеры реализации описанных подходов в различных профилях трудового обучения.

Пример 1. Столярное дело: изготовление кормушки для птиц (6 класс, обучающиеся с умственной отсталостью)

Цель по формированию субъектности: развитие способности планировать последовательность действий и контролировать результат.

Ход работы:

Мотивация и целеполагание. Учитель показывает несколько образцов кормушек. Обучающиеся выбирают образец для изготовления (выбор из 3 вариантов, различающихся по сложности). Обсуждение: «Почему ты выбрал эту?», «Кому мы сделаем кормушку?», «Где повесим?».

Планирование. Совместное составление пооперационной карты с фотографиями этапов. Каждый этап проговаривается: «Сначала подбираем дощечки одинаковой толщины. Потом размечаем по шаблону...».

Выполнение. Работа в парах (более сильный обучающийся с более слабым). В паре распределяются роли: один держит заготовку, другой

размечает; один контролирует, другой выполняет. Это формирует навыки совместной деятельности и взаимопомощи.

Самоконтроль. На каждом этапе обучающийся сверяет результат с образцом и отмечает галочкой выполнение в чек-листе.

Рефлексия. После завершения работы проводится «презентация» кормушек. Обучающиеся рассказывают, что было самым трудным, что понравилось. Кормушки развешиваются на школьном участке — результат имеет социальную значимость.

Пример 2. Швейное дело: изготовление игольницы (5 класс, обучающиеся с ЗПР)

Цель по формированию субъектности: развитие способности к выбору и ответственности за результат.

Ход работы:

Ситуация выбора. Обучающимся предлагается несколько вариантов выкроек (круг, квадрат, сердце) и несколько видов ткани (разные цвета и фактуры). Каждый выбирает самостоятельно. Учитель задает вопросы: «Почему ты выбрал эту форму?», «Эта ткань удобна в работе?».

Алгоритмизация. Используется видеоряд (снятый учителем) последовательности операций с кратким комментарием. Обучающиеся могут в любой момент пересмотреть видео на планшете, что снижает тревожность и формирует самостоятельность.

Самостоятельное выполнение. Учитель оказывает дозированную помощь, ориентируясь на иерархию поддержки. Физическая помощь используется только после того, как обучающийся попросил (формирование навыка обращения за помощью).

Оценка. Вводится элемент взаимопроверки: обучающиеся обмениваются изделиями и оценивают аккуратность шва (по критерию «ровно/неровно»). Это формирует навык анализа результата.

Пример 3. Сельскохозяйственный труд: уход за комнатными растениями (7 класс, обучающиеся с РАС)

Цель по формированию субъектности: формирование автономии в выполнении циклических действий.

Ход работы:

Визуальное расписание. На доске размещена последовательность действий в виде пиктограмм: 1) проверить влажность почвы (пальцем); 2) взять лейку; 3) налить воду до метки; 4) полить под корень; 5) вытереть поддон; 6) отметить в календаре полива.

Индивидуальные карточки. Для каждого обучающегося — карточка с его именем и растениями, за которыми он отвечает. Формируется чувство ответственности за живой объект.

Самостоятельная работа. Обучающиеся выполняют действия в своем темпе, сверяясь с визуальным расписанием. Учитель не вмешивается, но находится в поле зрения как «ресурс» для обращения.

Ритуал завершения. После завершения работы обучающийся ставит отметку в календаре (наклейку). Это формирует завершенность деятельности и удовлетворение от выполненного.

7. Результаты и обсуждение

Анализ практического применения описанных подходов в коррекционных школах (на основе наблюдений и обратной связи от педагогов) позволяет выделить следующие эффекты:

Повышение самостоятельности. Обучающиеся, систематически работавшие с пооперационными картами и чек-листами, реже обращаются за помощью на отработанных операциях, начинают использовать карты самостоятельно.

Снижение тревожности и импульсивности. Четкая структура деятельности (алгоритм) снижает страх перед ошибкой. Обучающиеся с РАС демонстрируют меньшее количество стереотипных и дезадаптивных реакций при работе в структурированной среде.

Развитие рефлексии. Использование «лесенки успеха» и «светофора» позволяет даже обучающимся с тяжелыми интеллектуальными нарушениями вырабатывать адекватную самооценку. Появляются элементы вербализации собственных действий («Я сделал сам», «Тут я ошибся»).

Повышение мотивации. Социальная значимость результатов (изделия для близких, для школы, для благотворительных ярмарок) повышает внутреннюю мотивацию и формирует чувство компетентности.

Ограничения. Наиболее сложными для формирования субъектности являются обучающиеся с тяжелыми множественными нарушениями развития. В этих случаях речь идет о формировании элементов автономии (способности выполнить отдельную операцию с помощью), а не полноценной субъектной позиции.

Уроки технологии в коррекционной школе обладают уникальным коррекционно-развивающим потенциалом для формирования субъектности и автономии обучающихся с ОВЗ. Практическая, алгоритмизированная и наглядно-действенная природа трудового обучения создает условия, в которых даже дети с выраженными интеллектуальными нарушениями могут осваивать целеполагание, планирование, самоконтроль и рефлексия.

Ключевыми условиями успешной реализации этого потенциала являются:

- Использование визуальных алгоритмов и пооперационных карт как внешних опор деятельности;
- Адаптация метода проектов (микропроекты с жесткой структурой);
- Система дозированной помощи с постепенным сворачиванием поддержки;
- Рефлексивные практики, доступные обучающимся с разным уровнем вербального развития;

- Трансформация роли учителя от инструктора к фасилитатору субъектности.

Дальнейшие направления работы связаны с разработкой диагностического инструментария для оценки уровня сформированности субъектности и автономии у обучающихся с ОВЗ, а также с созданием банка технологических карт и визуальных алгоритмов для различных профилей трудового обучения.

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ЛОКАЛИЗАЦИЯ РАБОЧИХ МЕСТ В МЕКСИКАНСКОМ АВТОПРОМЕ: ФАКТОРЫ ПРИТЯЖЕНИЯ И РЕГИОНАЛЬНЫЕ РАЗЛИЧИЯ

***Аннотация:** в статье проводится комплексный анализ пространственной структуры занятости в автомобильной промышленности Мексики в период 2019–2025 гг. Автор исследует трансформацию факторов размещения производительных сил под влиянием соглашения USMCA и глобального тренда на нииршоринг (nearshoring). На основе статистических данных INEGI выявлена глубокая региональная дифференциация: сохранение трудоёмких сборочных производств («макиладорас») в северных приграничных штатах и формирование высокотехнологичного ядра в макрорегионе Бахио. Особое внимание уделено влиянию перехода на производство электромобилей (EV) на качественный состав трудовых ресурсов и возникновению новых центров притяжения инвестиций. Сделан вывод о том, что современная география труда в Мексике определяется не только стоимостью рабочей силы, но и доступом к возобновляемой энергии и развитостью научно-образовательных кластеров.*

***Ключевые слова:** социально-экономическая география, Мексика, автомобильная промышленность, рынок труда, региональное развитие, нииршоринг, кластер Бахио, прямые иностранные инвестиции, электромобили.*

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LOCALIZATION OF LABOR IN THE MEXICAN AUTOMOTIVE INDUSTRY: ATTRACTION FACTORS AND REGIONAL DISPARITIES

***Abstract:** The article provides a comprehensive analysis of the spatial structure of employment in the Mexican automotive industry during the 2019–2025 period. The author examines the transformation of production localization factors under the influence of the USMCA agreement and the global nearshoring*

trend. Based on INEGI statistical data, deep regional differentiation is identified: the preservation of labor-intensive assembly operations ("maquiladoras") in northern border states and the formation of a high-tech core in the Bajio macro-region. Special attention is paid to the impact of the transition to electric vehicle (EV) production on the qualitative composition of the workforce and the emergence of new investment attraction centers. It is concluded that the modern geography of labor in Mexico is determined not only by labor costs, but also by access to renewable energy and by the development of research and educational clusters.

Keywords: socio-economic geography, Mexico, automotive industry, labor market, regional development, nearshoring, Bajio cluster, foreign direct investment, electric vehicles.

Введение

Автомобильная промышленность Мексики на протяжении последних тридцати лет выступает не только ключевым драйвером национальной экономики, но и сложным объектом для социально-экономического картографирования. Как отмечает *Dicken (2015)*, глобальная реорганизация промышленного производства во второй половине XX века привела к формированию региональных «сборочных платформ», одной из которых стала Северная Мексика. С момента вступления в силу Североамериканского соглашения о свободной торговле (NAFTA), а в последующем и его обновлённой версии (USMCA), страна прочно закрепила статус «мирового сборочного цеха». Однако современная география труда в мексиканском автопроме демонстрирует отказ от моноцентрической модели, что требует нового теоретического осмысления.

Актуальность данного исследования обусловлена необходимостью переосмысления факторов локализации в эпоху «Индустрии 4.0» и ниаршоринга. Согласно аналитическим материалам Всемирного банка (*World Bank / MIGA, 2024*), перестройка глобальных цепочек стоимости в постпандемийный период создаёт для Мексики беспрецедентные возможности, одновременно обостряя межрегиональные диспропорции. Если в 1990-х годах основным фактором притяжения была исключительно дешёвая рабочая сила на границе с США, то в 2025 году география рабочих мест определяется сложной комбинацией институциональных предпочтений, качества логистической инфраструктуры и наличия узкоспециализированных образовательных кластеров.

Цель работы — декомпозиция факторов, влияющих на локализацию рабочих мест в ключевых автомобильных штатах Мексики, и выявление региональных диспропорций в качестве трудового капитала.

Теоретико-методологические основы исследования

Теоретическую базу исследования составляют концепция нового международного разделения труда (NIDL) и теория глобальных производственных сетей (GPN). Как подчёркивает *Gereffi (2018)*, анализ

глобальных цепочек стоимости позволяет объяснить, каким образом транснациональные корпорации распределяют производственные операции между регионами в зависимости от сочетания факторов издержек, институциональной среды и технологической сложности. *Dicken (2015)* дополняет этот подход, акцентируя внимание на территориальной закреплённости производственных кластеров и роли локальных институтов в привлечении инвестиций.

В качестве основного метода анализа используется расчёт индекса пространственной концентрации (коэффициент Джини для занятости) и коэффициента локализации (LQ):

$$LQ = (e_i / e) / (E_i / E)$$

Где: e_i — численность занятых в автомобилестроении в анализируемом штате; e — общая численность занятых в обрабатывающей промышленности того же штата; E_i — общая численность занятых в автомобилестроении Мексики; E — общая численность занятых в обрабатывающей промышленности страны.

Информационной базой послужили материалы Экономических переписей INEGI (*INEGI, 2024*), данные Регистра предприятий (DENUE), ежеквартальные отчёты Министерства труда Мексики, а также ежемесячные отраслевые обзоры Мексиканской ассоциации автомобильной промышленности (AMIA, 2025). Исследование охватывает период с 2019 по 2025 гг.

Факторы притяжения и детерминанты локализации

Инфраструктурно-логистический детерминизм

География рабочих мест в Мексике традиционно следует за транспортными коридорами. Основная масса рабочих мест (более 60%) сконцентрирована вдоль «Коридора NAFTA» — федерального шоссе México-57, главной меридиональной автомагистрали страны протяжённостью около 1 400 км, связывающей промышленные центры севера с рынками США (Монтеррей — Салтильо — Керетаро — Мехико). Штаты Чиуауа и Сонора привлекают рабочие места в сегменте Just-in-Time (производство жгутов электропроводки, сидений, интерьерных панелей): ключевым фактором притяжения здесь является минимальное время пересечения границы. Рост занятости в штатах Веракрус и Мичоакан связан с экспортом готовой продукции в Европу и импортом комплектующих из Азии, что подтверждает многонаправленность логистических связей мексиканского автопрома.

Институциональный фактор и USMCA

Решающим фактором притяжения высокооплачиваемых рабочих мест стали правила страны происхождения (Rules of Origin) в рамках USMCA. Требование о том, что 40–45% стоимости автомобиля должно производиться рабочими с зарплатой не менее 16 долларов в час, создало мощный стимул для локализации сложных производств (двигателей и трансмиссий) в штатах с более развитой социальной инфраструктурой — Керетаро и Нуэво-Леон

(Bensusán et al., 2022). Этот институциональный сдвиг знаменует переход от модели «дешёвой сборки» к модели «качественной индустриализации».

Образовательный потенциал и дуальное обучение

Регион Бахио (Гуанахуато, Агуаскальентес, Сан-Луис-Потоси) стал лидером по темпам роста занятости благодаря созданию «образовательных хабов». Локализация рабочих мест привязана к государственным техническим университетам (UTs), адаптирующим программы под нужды конкретных автопроизводителей (BMW, Toyota, Mazda). Модель «дуального обучения» позволяет сократить разрыв между требованиями высокотехнологичных производств и квалификацией местной рабочей силы (Campos-Vazquez & Campos, 2023), создавая устойчивое конкурентное преимущество региона.

Региональные различия в структуре занятости

Северо-Восточный макрорегион: доминирование логистического фактора

Штаты Коауила, Нуэво-Леон и Чиуауа формируют «старый» индустриальный пояс Мексики. На их долю приходится около 45% всей занятости в отрасли. В штате Чиуауа занятость носит ярко выраженный «макиладорный» характер — здесь локализовано производство автокомпонентов Tier 1–2, ориентированное на ежедневные поставки через сухопутную границу. По данным INEGI (2024), коэффициент текучести кадров здесь остаётся самым высоким в стране (до 6,5% в месяц), а конкуренция за рабочую силу обеспечивается преимущественно через бонусные системы (транспорт, питание), а не сложностью задач. Такая модель занятости создаёт структурную уязвимость перед циклическими колебаниями спроса в США. Согласно отчётам INEGI (2026), в 2025 году производство автомобильного транспорта в Мексике сократилось на 2,2% в годовом исчислении.

Штат Нуэво-Леон в 2024–2025 гг. совершил качественный рывок. С реализацией проектов Tesla и расширением мощностей Kia структура занятости сместилась в сторону высококвалифицированных сервисных специальностей и ИТ-интеграции. Монтеррей превращается в «интеллектуальный мост», где локализация рабочих мест происходит в секторе автоматизации и программного обеспечения для электромобилей (Gereffi, 2025).

Кластер Бахио: переход к технологическому ядру

Регион Бахио (штаты Гуанахуато, Керетаро, Сан-Луис-Потоси, Агуаскальентес) — наиболее динамичный объект социально-экономического исследования. Локализация рабочих мест здесь подчинена принципу «тройной спирали» (взаимодействие бизнеса, образования и государства), создающему условия для формирования высокотехнологичного ядра мексиканского автопрома (Micheli, 2020).

Штат Керетаро — единственный регион Мексики, где количество рабочих мест в инжиниринговых центрах (R&D) растёт быстрее, чем на

производственных линиях. Компании Continental и Harman открыли здесь центры разработки электроники. Средний возраст занятого в автопроме Керетаро на 4 года ниже, чем в Коауиле, а более 40% занятых имеют инженерные степени (AMIA, 2025). По данным *Alianza Automotriz* (2025), производство легковых автомобилей в Мексике за первые одиннадцать месяцев 2025 года превысило 3,7 млн единиц, а доля гибридных и электрических автомобилей достигла 10,2% рынка (+24,1%).

Штат Гуанахуато лидирует по числу финальных сборочных производств (ОЕМ): GM, Honda, Toyota, Mazda. В радиусе 100 км от Силао расположено более 300 заводов-смежников, создающих эффект агломерации. Как подчёркивает *Gereffi* (2018), именно такая плотность производственных связей формирует устойчивые глобальные производственные сети, которые сложно воспроизвести в других локациях.

Статистический анализ: сравнительная динамика занятости и оплаты труда

Для обоснования региональных различий проанализирован разрыв в оплате труда и производительности — ключевой индикатор «зрелости» промышленного кластера. Приведённые данные основаны на Экономических переписях *INEGI* (2024) и ежемесячных отчётах *AMIA* (2025).

Таблица 1.

**Сравнительные показатели занятости и оплаты труда
в ключевых автомобильных штатах Мексики (2019–2025 гг.)**

Штаты	Тип кластера	Занято в автопроме, тыс. чел. (2025)	Ср. зарплата (USD/мес.) 2019	Ср. зарплата (USD/мес.) 2025	Рост ЗП, %
«Сборочные» штаты					
Чиуауа	Макиладорный / Tier 1–2	148	\$520	\$610	+17%
Тамаулипас	Макиладорный / экспорт	96	\$490	\$590	+20%
Коауила	Сборка / OEM	121	\$560	\$680	+21%
«Технологические» штаты (кластер Бахио+НЛ)					
Керетаро	R&D / инжиниринг	63	\$870	\$1 140	+31%
Гуанахуато	OEM / Tier 1	187	\$720	\$890	+24%
Агуаскальентес	OEM — Nissan / Honda	79	\$690	\$840	+22%
Нуэво-Леон	Smart / IT / EV	108	\$920	\$1 180	+28%
Пуэбла	OEM — VW / адаптация EV	120	\$680	\$810	+19%

Источник: составлено автором на основе данных INEGI (*Censos Económicos 2024, DENUF 2025*), AMIA (2025) и отчётов кадровых агентств Мексики (*Manpower Mexico, OCCMundial*). Данные по занятости включают прямой персонал OEM и поставщиков Tier 1

Анализ данных показывает, что Керетаро лидирует не по количеству рабочих мест, а по их качеству: рост зарплат на 31% за 6 лет обусловлен локализацией центров проектирования, что соответствует выводам Gereffi (2018) о растущей роли инновационной составляющей в глобальных цепочках стоимости. Чиуауа, напротив, демонстрирует стагнацию квалификационного профиля (+17%), подтверждая сохранение модели низкоопределённого производства (Dicken, 2015).

Коэффициент локализации (LQ) в штате Агуаскальентес превышает 6,0: концентрация занятых в автопроме в 6 раз выше среднего по стране. Такая «сверхконцентрация» создаёт риски монотоварной зависимости от колебаний спроса на автомобили Nissan (*Campos-Vazquez & Campos, 2023*) и требует диверсификации региональной экономики.

Обсуждение: новые вызовы локализации

Феномен ниаршоринга и «китайская экспансия»

Согласно аналитическим материалам Всемирного банка (*World Bank / MIGA, 2024*), феномен ниаршоринга в Латинской Америке приобретает системный характер, причём Мексика выступает главным бенефициаром перестройки глобальных цепочек поставок. Как отмечает Gereffi (2025), привлекательность конкретных регионов определяется не только

конкурентными издержками, но и институциональной стабильностью, качеством инфраструктуры и наличием квалифицированных кадров.

Бренды BYD, Chery и Great Wall в 2025 году начали агрессивную локализацию в центральных штатах Мексики (Мехико, Идальго, Халиско), ориентируясь не только на экспорт в США, но и на внутренний рынок Латинской Америки. Эта тенденция, по оценке *World Bank / MIGA (2024)*, ведёт к децентрализации отрасли и вовлечению ранее депрессивных регионов в глобальные цепочки стоимости.

Экологический императив и ESG-стандарты

Современная локализация рабочих мест начала зависеть от экологической инфраструктуры. Крупные концерны (Volkswagen, BMW) при расширении в штатах Пуэбла и Сан-Луис-Потоси выдвигают требования по обеспечению заводов «зелёной» энергией (*Bensusán et al., 2022*). Регионы без доступа к возобновляемым источникам теряют инвестиционную привлекательность — особенно в сегменте производства электромобилей.

Социальные последствия регионального разрыва

Нарастающий разрыв между «Индустриальным Севером/Центром» и «Аграрным Югом» (*Crossa & Ebner, 2020*) воспроизводит модель концентрации экономической активности в центрально-северной части страны. Автомобильная промышленность так и не перешагнула границу штата Оахака: ежегодно тысячи молодых людей покидают южные штаты ради работы на заводах Бахио, что ведёт к депопуляции юга и перенаселению индустриальных хабов.

Пространственная трансформация в эпоху перехода к электромобилям

Производство электромобилей требует на 30–40% меньше рабочих рук при сборке силового агрегата, но создаёт огромный спрос в секторе электрохимии (*Martinez & Terrazas, 2024*). Штат Сонора, благодаря проекту «План Сонора» и добыче лития, формирует новые рабочие места в производстве аккумуляторных ячеек. Заводы Volkswagen (Пуэбла) и BMW (Сан-Луис-Потоси) в 2025–2026 гг. завершили переобучение более 20 000 сотрудников для работы с высоковольтными системами (*Alianza Automotriz, 2025*).

Внедрение коллаборативных роботов (коботов) на заводах Нуэво-Леона привело к сокращению низкоквалифицированных позиций на 15% за два года (*Carrillo et al., 2023*). Рабочие без технического образования вытесняются в сектор услуг или неформальную экономику. Согласно *TLC Magazine (2025)*, в 2025 году обрабатывающая промышленность Мексики столкнулась с заметным снижением динамики в секторе автомобильного транспорта, что требует ускоренной реформы системы профессионального образования.

Заключение

В результате проведённого исследования географии занятости в автомобильной промышленности Мексики сформулированы следующие выводы.

1. Качественная сегрегация пространства. Подтверждена гипотеза о разделении мексиканского автопрома на «сборочный север» и «технологичный центр». В штатах Бахио (Керетаро, Гуанахуато) сформировалась устойчивая инновационная среда, где основным фактором локализации выступает не дешевизна труда, а наличие компетенций в области электроники и мехатроники (*Gereffi, 2018*).

2. Эрозия фактора границы. Близость к США остаётся критичной для производства трудоёмких компонентов, но теряет значимость для высокотехнологичных производств. Как отмечает *Dicken (2015)*, в условиях усложнения производственных сетей логистическая оптимизация начинает играть не меньшую роль, чем географическая близость к конечному рынку.

3. Трансформация под влиянием ниаршоринга. Период 2024–2025 гг. ознаменован массовым приходом азиатского капитала, выбирающего «новые узлы» (Халиско, Идальго), что ведёт к децентрализации отрасли. Согласно *World Bank / MIGA (2024)*, этот процесс создаёт как новые возможности, так и риски, связанные с институциональной готовностью регионов.

4. Риски автоматизации. Переход к производству электромобилей создаёт угрозу сокращения низкоквалифицированных рабочих мест на 20–25% в долгосрочной перспективе. Рост занятости в IT-сервисах и производстве батарей требует немедленной реформы системы профессионального образования в штатах «сборочного типа».

Проведённое исследование демонстрирует, что современная география труда в автомобильной промышленности Мексики представляет собой сложную, динамично эволюционирующую систему. Традиционные факторы размещения переплетаются с новыми вызовами — от экологических стандартов до требований Индустрии 4.0. Дальнейшие исследования должны быть направлены на количественную оценку влияния перехода к электромобильному производству на региональные рынки труда, а также на анализ долгосрочных социальных последствий ниаршоринга для принимающих сообществ.

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ТЕХНОЛОГИЯ ПОЛУЧЕНИЯ КОМПОЗИТНЫХ МАТЕРИАЛОВ ДЛЯ ЖЁСТКИХ ПЕНОПОЛИУРЕТАНОВ И ИХ КЛАССИФИКАЦИЯ ПО ТРЕБОВАНИЯМ ТН ВЭД

***Аннотация:** Из диэтанолamina (ДЭА) и Фурфурола (ФРФЛ) в соотношениях 1:1 и 2:1 соответственно синтезированы третичные амины, выполняющие роль катализаторов. Путём проведённых лабораторных анализов определены их физико-химические показатели и проведены анализы ИК-спектров. Оптимальным соотношением выбрано соотношение, состоящее из 2 моль диэтанолamina и 1 моля фурфурола. Данная композиция по своим физико-механическим свойствам не уступает физико-механическим свойствам жёсткого пенополиуретана марки ЖППУ-307. К полученным товарам присвоены кодовые номера, основанных по правилам и требованиям ТН ВЭД. В результате проведения научно-исследовательских работ присвоены товарные коды по требованиям правил оформления кодов ТН ВЭД полученным товарам и внесены в общий реестр. У полученных композиций проведены физико-механические испытания и приведены их сравнительные показатели.*

***Ключевые слова:** ИК-спектр, бензальдегид, фурфурол, Лапрамол-294, композиция, физико-механические свойства, ЖППУ-307, себестоимость, лабораторный анализ, торговая марка, торговый код, жёсткий пенополиуретан, третичный амин, ТН ВЭД, катализатор.*

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TECHNOLOGY FOR PRODUCING COMPOSITE MATERIALS FOR RIGID POLYURETHANE FOAM AND THEIR CLASSIFICATION ACCORDING TO THE REQUIREMENTS OF THE TN VED

***Abstract:** Tertiary amines, which act as catalysts, were synthesized from diethanolamine (DEA) and furfural (FRFL) in ratios of 1:1 and 2:1, respectively. Their physicochemical properties were determined through laboratory analysis, and their IR spectra were analyzed. A ratio of 2 mol of diethanolamine and 1 mol*

of furfural was selected as the optimal ratio. This composition, in terms of its physicommechanical properties, is comparable to rigid polyurethane foam grade ZhPPU-307. The resulting goods have been assigned code numbers based on the rules and requirements of the Commodity Nomenclature of Foreign Economic Activity (CN VED). Following research and development, commodity codes were assigned to the resulting goods in accordance with the requirements of the CN VED code registration rules and entered into the general register. Physicommechanical tests of the resulting compositions have been conducted, and their comparative properties are provided.

Key words: *IR spectrum, benzaldehyde, furfural, Lapramol-294, composition, physical and mechanical properties, RPUF-307, cost price, laboratory analysis, trade name, trade code, rigid polyurethane foam, tertiary amine, CNF EA, catalyst.*

Введение

Пенополиуретаны являются одним из важных полимерных материалов, используемых в строительстве и народном хозяйстве. Состоящий из двух компонентов А и Б, пенополиуретан был изобретён в 1937 году немецким химиком Оттом фон Байером. Пенополиуретаны не требуют дополнительных расходов и затрат, являются универсальным строительным материалом [1-3]. Это легкий, но прочный материал, который отличается низкой теплопроводностью. Чаще всего используется в качестве утеплительного материала, но сфера его применения не ограничивается. Материал нашел применение в различных сферах. Имеет специфическую особенность, заключающуюся в том, что внутри структуры жёсткого пенополиуретана остаются закрытые поры, которые и обеспечивают отменные теплоизоляционные материалы. Основное отличие жестких видов от остальных заключается в более высокой плотности.

Немаловажную роль в формировании жёстких пенополиуретанов играют третичные амины, выполняющие роль катализаторов.

На основе синтезированного продукта получены композиции из жёстких пенополиуретанов нескольких образцов. Из полученных образцов выбрана композиция со схожими с Лапрамолом-294 физико-механическими свойствами. В качестве оптимального состава выбран образец-№2 с компонентным составом, состоящим 70,0 масс.ч. Лапрола-307; 20,0 масс.ч. – Лапрамола-294; синтезированного продукта – 10,0 масс.ч; поверхностно-активного вещества (КЭП – 2а) – 1,0 масс.ч; и воды 1,5 масс.ч [4].

Результаты и обсуждения

В таблице 1 приведены физико-механические показатели образцов композиций жёстких пенополиуретанов марки ППУ-307 и полученный нами жёсткий пенополиуретан.

На основе синтезированных продуктов и вышеприведённой рецептуры получены образцы жёстких пенополиуретанов в лабораторных условиях и изучены их физико-механические показатели.

Мы сравнили полученные нами образцы жёстких пенополиуретанов со стандартным образцом жёсткого пенополиуретана марки ППУ-307. Физико-механические свойства вышеприведённых жёстких пенополиуретанов приведены в нижеследующей таблице 1.

Таблица 1

**Физико-механические показатели образцов
жёстких пенополиуретанов**

№	Наименование	Образец – 1*	Образец – 2*
1.	Время старта, с	13	11
2.	Время гелеобразования, с	26	21
3.	Время подъёма, с	53	51
4.	Кажущаяся плотность, кг/м ³	90	91
5.	Прочность при сжатии, МПа	0,82	0,45
6.	Ударная вязкость, кДж/м	0,23	0,24
7.	Водопоглощение, кг/м ²	0,41	0,42
8.	Горючесть (огневая труба) потеря массы, %.	47,6	53,7

Примечание:* Образец № 1 - Рецепттура ЖППУ, разработанная в лаборатории; Образец № 2 - Стандартная рецепттура жёсткого пенополиуретана марки ППУ-307

Как видно из вышеприведённой таблицы 1 время старта у полученного нами жёсткого пенополиуретана составляет 13 сек., у жёсткого пенополиуретана стандартного образца марки ППУ-307 время старта равно 11 сек. Время гелеобразования у нашего образца составило у стандартного образца это значение составило 21 сек. Время подъёма у нашего образца составило 53 сек., у стандартного образца – 51 сек. Кажущаяся плотность у всех 2 образцов составила 90 и 91 кг/м³ соответственно. Показатель прочности при сжатии у нашего образца составил 0,82, у стандартного образца марки ППУ-307 оно составило 0,45 МПа. Показатель ударной вязкости полученного образца составил 0,23 и у стандартного образца данный показатель равен 0,21 кДж/м. Показатели водопоглощения у образцов составили соответственно 0,41 и 0,42 кг/м². Показатели горючести у всех 2-х образцов составили соответственно 47,6 и 53,7%.

Такие близкие по физико-механическому значению показателей кажущейся плотности, ударной вязкости, водопоглощения объясняются одинаковым содержанием Лапрола-373 в составе рецептуры в количестве 70,0 масс.ч.

В таблице 2 представлена классификация пластмассы и изделия из них в Номенклатуре товаров внешнеэкономической деятельности Республики Узбекистан редакции 2022 года.

Таблица 2.

**Классификация изделий из жёсткого пенополиуретана
по товарным кодам по ТН ВЭД**

№	Кодовые номера	Описание
1.	3909	жидкие синтетические полиолефины, менее 60 об.% которых перегоняется при температуре 300 °С и давлении 1013 мбар в случае применения перегонки при пониженном давлении (товарные позиции 3901 и 3902); смолы с низкой степенью полимеризации кумароно- инденового типа (товарная позиция 3911); другие синтетические полимеры, содержащие в среднем, по крайней мере, 5 мономерных звеньев; силиконы (товарная позиция 3910); резолы (товарная позиция 3909) и другие форполимеры.
2.	3909 10 000 0	– смолы карбамидные и тиокарбамидные
3.	3909 20 000 0	– смолы меламиновые
4.	3909 30 000 0	– amino-альдегидные смолы прочие
5.	3909 40 000 0	– феноло - альдегидные смолы
6.	3909 50	– полиуретаны:
7.	3909 50 100 0	– – полиуретан, сополимер 2,2'-(трет-бутилимино) диэтанола и 4,4'-метилendiциклогексил диизо цианата, в виде раствора в N,N-диметилацетамиде с содержанием полимера 50 мас.% или более
8.	3909 50 900 0	– – прочие

Результаты

Как видно из таблицы, в редакции ТН ВЭД 2022 года продукция химической и смежных отраслей указана всего в 3 товарных позициях , а именно 3909 50 000 – полиуретаны; 3909 50 100 0 - полиуретан, сополимер 2,2'-(трет-бутилимино)диэтанола и 4,4'-метилendiциклогексилдиизоцианата, в виде раствора в N,N-диметилацетамиде с содержанием полимера 50 мас.% или более; 3909 50 900 0 – прочие.

В результате проведённых исследований выявлено, что синтезированный продукт не выделяется отдельным товарным кодом по ТН ВЭД.

Вывод

1. Было определено, что оптимальными по отношению к ЖППУ-307 определены композиции из образцов-2 в соотношении ДЭА:БЕА=2:1 и композиция из образца-2 из продукта в соотношении ДЭА:ФРФЛ=2:1, а именно композиция, состоящая из 70,0 масс.ч. – Лапрола-373; Лапрамола-

294 - 20,0 масс.ч.; синтезированного продукта – 10,0 масс.ч.; КЭП-2а – 1,0 масс.ч и воды – 1,5 масс.ч.

2. Композиция из жёсткого пенополиуретана, состоящая из диэтаноламина и фурфурола в соотношениях = 2:1, выбранная из образца №-2 по своим физико-механическим свойствам не уступает физико-механическим свойствам ЖППУ-307. А также путём уменьшения содержания количества Лапрамола-294 до 20,0 масс.ч. и добавления в рецептуру 10,0 масс.ч. синтезированного продукта получен жёсткий пенополиуретан с уникальными физико-механическими свойствами, не уступающими по физико-механическим свойствам стандартному ЖППУ-307.

3. Жёсткие пенополиуретаны отнесены к ТН ВЭД с товарным кодом 3909 50 – полиуретаны. Также товары с кодом 3909 50 900 0 прочие. На основании вышеизложенного жёсткие пенополиуретаны (полученные на основе продуктов реакций взаимодействия диэтаноламина и фурфурола, том числе изделия из них) отнесены к ТН ВЭД с товарным кодом 3909 50 900 1.

В результате проведённых исследований установлено, что продукты пенополиуретанового назначения, используемые в промышленности и в быту, не выделяются отдельным товарным кодом по требованиям ТН ВЭД.

С целью замены используемого в стандартной рецептуре жёсткого пенополиуретана марки ППУ-307 Лапрамола-294 на синтезированный нами продукт мы выбрали оптимальную, соответствующую нашим требованиям рецептуру и на основе разработанной

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ВОЗМОЖНОСТИ ДИВЕРСИФИКАЦИИ ПРОМЫШЛЕННОСТИ НА ОСНОВЕ МИНЕРАЛЬНЫХ РЕСУРСОВ НА ПРИМЕРЕ КУНГРАДСКОГО И МУЙНАКСКОГО РАЙОНОВ

***Аннотация:** В статье сравниваются возможности промышленной диверсификации на основе минеральных и биологических ресурсов на примере Кунградского и Муйнакского районов Республики Каракалпакстан. Оценены минеральный и сырьевой потенциал районов, промышленная структура и экономическая эффективность ресурсоориентированных моделей развития. Результаты анализа показали, что в Кунградском районе приоритетным является газохимическая и химическая промышленность, основанная на глубокой переработке нефтегазовых и солевых ресурсов, а в Муйнакском районе перспективными являются экологически стабильные и малозатратные промышленные направления, основанные на солевых, фосфоритовых и биологических ресурсах, сформировавшихся на дне Аральского моря. Для обоих районов предложена дифференцированная модель промышленной диверсификации, учитывающая потенциал природных ресурсов.*

***Ключевые слова:** промышленная диверсификация, минеральный сырьевой потенциал, глубокая переработка ресурсов, региональное развитие, Республика Каракалпакстан, Аральский залив.*

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OPPORTUNITIES FOR DIVERSIFYING INDUSTRY BASED ON MINERAL RESOURCES, USING THE EXAMPLE OF KUNGRAD AND MUYNAC REGIONS

***Abstract:** The article compares the possibilities of industrial diversification based on mineral and biological resources using the example of the Kungrad and Moynak districts of the Republic of Karakalpakstan. The mineral and raw material potential of the districts, the industrial structure, and the economic efficiency of resource-oriented development models were assessed. The analysis results showed that in the Kungrad region, gas chemical and chemical industries*

based on deep processing of oil and gas and salt resources are prioritized, while in the Moynak region, environmentally stable and low-cost industrial sectors based on salt, phosphorite, and biological resources formed on the bottom of the Aral Sea are promising. A differentiated model of industrial diversification, taking into account the potential of natural resources, has been proposed for both districts.

Keywords: *industrial diversification, mineral resource potential, deep processing of resources, regional development, Republic of Karakalpakstan, Aral Sea region.*

Введение

В последние годы диверсификация промышленности стала одним из приоритетов национальной и региональной экономической политики в обеспечении устойчивого социально-экономического развития регионов. В частности, в регионах, богатых минеральными ресурсами, ориентация экономики исключительно на добычу и экспорт сырья может привести к высокой степени зависимости от рисков внешнего рынка и ограничить долгосрочную экономическую стабильность. В научной литературе эта ситуация объясняется концепцией «ресурсного проклятия» [1–3]. Поэтому диверсификация отраслей промышленности на основе глубокой переработки природных ресурсов является актуальной научно-практической проблемой [5]. Кунградский и Муйнакский районы, расположенные на территории Республики Каракалпакстан, различаются по ресурсному потенциалу и требуют разных моделей развития для диверсификации промышленности. В то время как Кунградский район отличается химической и газохимической промышленностью, сформированной на основе нефтяных, газовых и соляных ресурсов, Муйнакский район имеет потенциал для диверсификации своей промышленности на основе минеральных и биологических ресурсов, сформировавшихся на дне Аральского моря [8, 11]. Однако уровень глубокой переработки ресурсов в обоих районах недостаточен.

В проведенных до настоящего времени исследованиях вопросы промышленной диверсификации в Каракалпакстане рассматривались в основном на общем региональном уровне, а различия в минерально-сырьевом и биологическом составе, промышленной структуре и моделях развития Кунградского и Муйнакского районов не анализировались в сравнительном ключе. В частности, дифференцированный подход к промышленной диверсификации, основанный на потенциале природных ресурсов, недостаточно научно обоснован. Цель данной статьи – проанализировать минерально-сырьевой и биологический ресурсный потенциал Кунградского и Муйнакского районов и определить перспективные направления промышленной диверсификации на основе этих ресурсов. [9, 10, 12].

Научно-теоретическая основа и анализ литературы.

В экономической литературе диверсификация промышленности рассматривается как важный механизм устойчивого развития региональной экономики. Диверсификация служит расширению производственных секторов, увеличению ассортимента продукции и повышению устойчивости экономики к внешним рыночным условиям. Особенно в регионах, богатых природными ресурсами, этот подход имеет большое значение для формирования качественно нового этапа экономического роста [1, 4].

Классические и современные исследования подчеркивают, что в богатых ресурсами экономиках опора исключительно на экспорт сырья может ограничивать долгосрочное развитие. Это объясняется концепцией «ресурсного проклятия», которая гласит, что недиверсифицированная экономическая структура может привести к снижению инвестиционной активности и технологической отсталости [1–3, 5]. Поэтому создание высокой добавленной стоимости за счет глубокой переработки минеральных ресурсов является ключевой целью политики диверсификации [2, 3].

Международная научная литература выделяет основные формы промышленной диверсификации, основанные на глубокой переработке сырья, межотраслевом и кластерном подходах. В частности, промышленные кластеры, сформированные на основе минеральных ресурсов, усиливают мультипликативный эффект в региональной экономике за счет расширения производственных цепочек, внедрения инноваций и привлечения малых и средних предприятий [4, 6].

В рамках концепции устойчивого развития промышленная диверсификация должна осуществляться в гармонии с экологическими факторами. Рациональное использование природных ресурсов и внедрение низкоэмиссионных технологий имеют большое значение в экологически чувствительных районах. Эти подходы служат методологической основой для оценки возможностей промышленной диверсификации в Кунградском и Муйнакском районах [7–11].

Методология и источники данных.

Целью данного исследования является оценка возможностей промышленной диверсификации на основе минеральных и биологических ресурсов в районах Кунград и Муйнак. В исследовании использовался метод сравнительного анализа, а также анализировались объемы производства промышленной продукции, индекс физического объема промышленного производства и показатели на душу населения разрезе районов [1–5].

Источником данных послужили официальные статистические материалы статистических органов Республики Каракалпакстан за январь–декабрь 2025 года, включая статистический бюллетень «Промышленность» и сборники «Основные экономические показатели» [12]. Эти источники позволяют оценить объемы и динамику промышленного производства по районам. Эффективность промышленной диверсификации оценивалась на основе таких ключевых показателей, как динамика объемов промышленного производства, индекс физического объема промышленного производства и

объем промышленного производства на душу населения. Для выявления различий между районами был проведен сравнительный анализ минерально-сырьевой базы и промышленной структуры Кунградского и Муйнакского районов [8, 9, 11].

Диверсификация промышленности на основе минеральных ресурсов в районе Кунград.

Кунградский район является одним из ведущих районов Республики Каракалпакстан по уровню промышленного развития и потенциалу минерального сырья. Район является важной составляющей Устюртского нефтегазового региона и обладает стратегическими ресурсами, такими как нефть, природный газ, соль и фосфорит. Промышленные сектора, сформированные на основе этих ресурсов, создают прочную основу для развития модели диверсификации, ориентированной на переработку, в районе.

По итогам января-декабря 2025 года объем промышленного производства в Кунградском районе составил 1 679 933,3 млн сумов. Физический объемный индекс промышленного производства составляет 109,4%, что свидетельствует о стабильной тенденции роста промышленного развития. Этот рост в основном обусловлен долей перерабатывающих отраслей, основанных на минеральных ресурсах [12].

Нефтегазовая и газохимическая отрасли занимают ведущее место в промышленной структуре района. В 2025 году объем производства карбоната натрия (соды) составил 228,6 тыс. тонн, полиэтилена – 22 870,2 тонн, а полипропилена – 71 749,9 тонн. На эти продукты в основном приходится Кунградский район в республиканском масштабе.

Полученные показатели свидетельствуют о стабильном развитии процесса диверсификации отрасли на основе глубокой переработки природного газа и соляных ресурсов. Продукция, производимая в перерабатывающих отраслях, помимо удовлетворения потребностей внутреннего рынка, также формирует экспортный потенциал.

Соляные ресурсы Кунградского района также играют важную роль в диверсификации отрасли. Существуют возможности для производства кальцинированной соды, каустической соды и других химических продуктов на основе существующих соляных запасов. Хотя в настоящее время эта отрасль развивается в основном в рамках крупных предприятий, есть возможности для формирования дополнительных производственных цепочек за счет привлечения малых и средних предприятий.

Фосфоритовые ресурсы являются еще одним перспективным направлением промышленной диверсификации в Кунградском районе. Производство аммофоса, суперфосфата и комплексных минеральных удобрений на основе их глубокой переработки позволит продолжить расширение химической промышленности и укрепить межотраслевую интеграцию с сельским хозяйством.

Также наличие в Кунградском районе нетрадиционных минеральных ресурсов, таких как бентонит, глауконит и гипс, создает экономическую основу для развития производства строительных материалов, экологически чистых удобрений и фильтрующей продукции. Эти области могут способствовать развитию малого и среднего бизнеса и увеличению числа рабочих мест в регионе.

В 2025 году объем промышленного производства на душу населения составил 12 191,0 тыс. сумов. Этот показатель указывает на необходимость учета социальной эффективности при оценке объема промышленного производства.

Промежуточные выводы

В Кунградском районе процесс промышленной диверсификации на основе минеральных ресурсов в основном формируется вокруг крупных перерабатывающих предприятий, при этом ведущую роль играют газохимическая и химическая промышленность. Глубокая переработка природного газа, соли и фосфоритовых ресурсов позволяет производить продукцию с высокой добавленной стоимостью и обеспечивать устойчивость промышленного развития. В то же время, развитие малого и среднего бизнеса на основе нетрадиционных минеральных ресурсов становится дополнительным направлением роста промышленной диверсификации района.

Диверсификация промышленности на основе минеральных и биологических ресурсов в Мойнокском районе.

Муйнакский район расположен в северо-западной части Республики Каракалпакстан, и его социально-экономическое развитие сформировалось под влиянием Аральского моря. Аральское дно, сформировавшееся в регионе в результате понижения уровня моря, расширило минерально-сырьевой и биологический ресурсный потенциал региона [8, 11]. Эта ситуация дает основания рассматривать Муйнакский район не только как регион экологического кризиса, но и как регион с возможностями диверсификации промышленности на основе минеральных и биологических ресурсов.

Соляные ресурсы Аральского дна занимают ведущее место в минерально-сырьевой базе Муйнакского района. Эти ресурсы, наряду с хлоридом натрия, содержат соединения магния и калия, которые являются важным сырьем для химической промышленности. Хотя использование соляных ресурсов в настоящее время ограничено в основном на стадии сырья, их глубокая переработка имеет потенциал для производства кальцинированной соды, каустической соды и кальцинированной соды в качестве заменителя стекла при производстве кальцинированной соды, а также для производства сульфида натрия, серной кислоты, серы и минеральных удобрений в химической промышленности. Кроме того, производство минеральных удобрений на основе фосфорита и фосфорсодержащих соединений со дна Аральского моря является

перспективным направлением диверсификации химической промышленности. Переработка этих ресурсов позволит усилить межотраслевую интеграцию с сельским хозяйством.

В Муйнакском районе биологические ресурсы, в частности биомасса и цисты артемии, используются в мировой практике как ценный источник корма в аквакультуре и рыболовстве. В условиях Муйнакского района научно обоснованное использование этих ресурсов создает важную экономическую основу для развития промышленных направлений, основанных на биоэкономике и биотехнологиях. Эти направления позволяют организовать малокапиталоемкое и высокодоходное производство.

По итогам января-декабря 2025 года объем промышленного производства в Муйнакском районе составил 621 045,3 млн сумов, а индекс физического объема промышленного производства — 121,4 процента. Объем промышленного производства на душу населения составил 18 261,2 тыс. сумов, что свидетельствует о высокой социальной эффективности промышленного развития [12].

Промежуточные выводы

Установлено, что возможности для промышленной диверсификации в Муйнакском районе связаны с соляными, фосфоритовыми и биологическими ресурсами, образовавшимися на дне Аральского моря. На основе этих ресурсов открываются возможности для развития химической промышленности и низкзатратного и экологически устойчивого производства на основе биоэкономики и биотехнологий. Эти районы становятся перспективной моделью промышленного развития в Муйнакском районе.

Сравнительный анализ возможностей промышленного развития и диверсификации районов Кунград и Муйнак.

Несмотря на то, что Кунградский и Муйнакский районы расположены на территории Республики Каракалпакстан, они существенно различаются по своему ресурсному потенциалу, промышленной структуре и процессам диверсификации. Эти различия указывают на то, что в обоих районах формируются разные, но взаимодополняющие модели промышленного развития. В таблице 1 представлен сравнительный анализ основных показателей промышленного развития в районах Кунград и Муйнак.

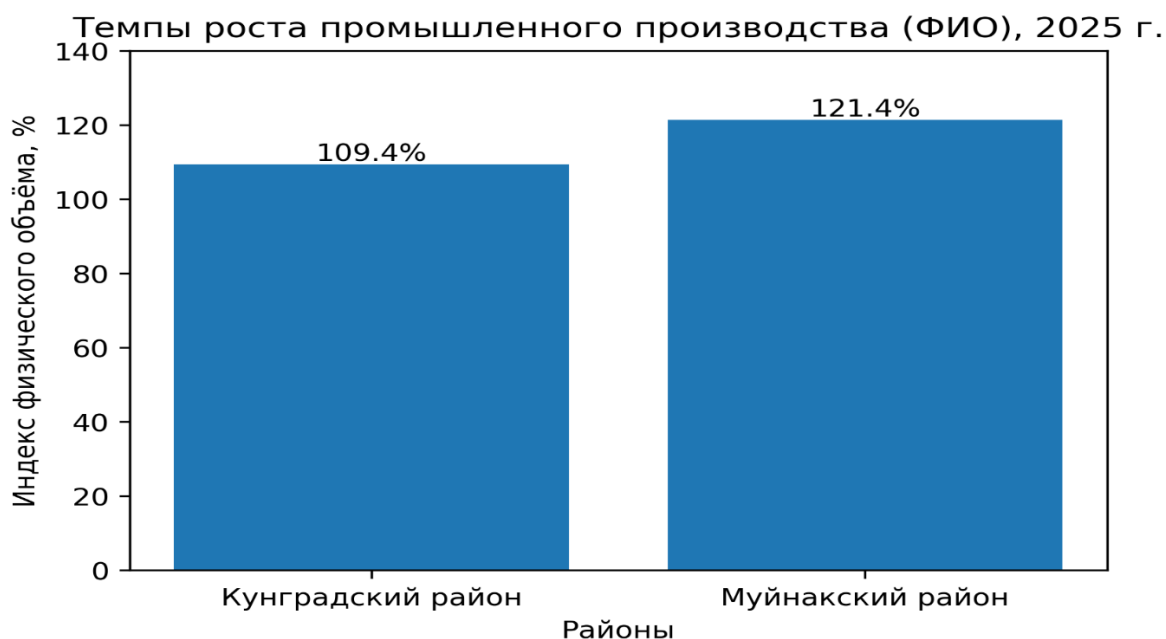
Таблица 1.

**Основные показатели промышленного развития Кунградского
и Муйнакского районов (2025 г.)**

Нет.	Показатели	Кунградский район	Муйнакский район
1	Объём производства промышленной продукции, млн сумов	1 679 933,3	621,045.3
2	Физический объем промышленного производства, %	109.4	121.4
3	Промышленное производство на душу населения, тысяч сумов	12 191.0	18,261.2
4	Приоритеты промышленной сети	Газохимия, химия, переработка солей	Соль, фосфорит, биоресурсы
5	модель промышленного развития	Крупные перерабатывающие предприятия	Малые и средние предприятия

Примечание: Таблица основана на официальных данных статистических органов Республики Каракалпакстан за 2025 год.

Согласно таблице 1, абсолютные объемы промышленного производства в Кунградском районе высоки, что объясняется наличием в районе крупных перерабатывающих предприятий нефтегазовой, газохимической и химической промышленности. В то же время объем промышленного производства на душу населения высок в Муйнакском районе, что свидетельствует о сравнительно более высокой социальной эффективности промышленного развития. Различия в темпах роста промышленного производства отражены на рисунке 1



Темпы роста промышленного производства в Кунградском и Муйнакском районах (индекс физического объема, %, 2025 г.).

Источник: Составлено на основе данных статистических органов Республики Каракалпакстан.

Согласно рисунку 1, в 2025 году физический объем промышленного производства составил 121,4 процента в Муйнакском районе и 109,4 процента в Кунградском районе. Высокие темпы роста в Муйнакском районе связаны с освоением новых минеральных и биологических ресурсов и активизацией низкокапитализационных направлений диверсификации. В Кунградском районе формирование крупных газохимических и химических предприятий привело к относительно стабильной модели промышленного роста.

Сравнительный анализ показывает, что промышленное развитие в Кунградском районе в основном основано на модели устойчивого роста, опирающейся на крупные перерабатывающие предприятия. В Муйнакском районе диверсификация промышленности происходит за счет направлений, формирующихся на основе новых минеральных и биологических ресурсов, низкокапитализационных, но имеющих высокие темпы роста.

В целом, данные таблицы и рисунка показывают, что единой универсальной модели промышленного развития для обоих районов не существует. В то время как для Кунградского района предпочтительнее развитие промышленных кластеров на основе крупных перерабатывающих предприятий, для Муйнакского района первостепенное значение имеет модель диверсификации, основанная на новых минеральных и биологических ресурсах, экологически устойчивая и направленная на развитие малых и средних предприятий.

Практические рекомендации

Анализ процессов промышленной диверсификации на основе минеральных и биологических ресурсов в Кунградском и Муйнакском районах показывает необходимость целенаправленной и дифференцированной политики, основанной на потенциале природных ресурсов, промышленной структуре и экологических характеристиках регионов. Поэтому политика промышленной диверсификации должна формироваться с учетом региональных различий, а не на едином универсальном подходе для обоих районов.

Приоритетным направлением промышленной диверсификации для Кунградского района является развитие газохимической и химической промышленности на основе глубокой переработки нефти и газа, соли и фосфатных ресурсов. В этом направлении большое значение имеют поддержка технологической модернизации, стимулирование производства продукции с высокой добавленной стоимостью и расширение экспортно-ориентированных производственных цепочек. Одновременно с этим, формирование промышленных кластеров вокруг крупных промышленных предприятий с участием малого и среднего бизнеса будет способствовать усилению мультипликативного эффекта в региональной экономике.

В Муйнакском районе политика промышленной диверсификации должна реализовываться в соответствии с принципами экологической устойчивости. Приоритетной задачей должно стать внедрение экологически безопасных и низкоэмиссионных технологий в использовании соли, фосфатов и биологических ресурсов, образующихся на дне Аральского моря, постоянный мониторинг воздействия на окружающую среду и минимизация негативного воздействия на природные экосистемы. Для промышленного развития этого района целесообразно опираться в основном на малые и средние предприятия, требующие небольших капиталовложений, но создающие высокую добавленную стоимость.

Важно также обеспечить активное участие частного сектора и хозяйствующих субъектов в процессе промышленной диверсификации. В Кунградском районе частные инвестиции могут быть направлены на организацию дополнительных перерабатывающих предприятий, а в Муйнакском районе — на развитие солепереработки, биоэкономики и биотехнологий на основе биологических ресурсов. Эти направления будут способствовать повышению местной предпринимательской активности и увеличению доходов населения.

Также укрепление интеграции научно-исследовательских и высших учебных заведений с промышленностью, внедрение научных разработок в области переработки минеральных ресурсов и биотехнологий, а также адаптация местной системы подготовки кадров к потребностям промышленности обеспечат долгосрочную эффективность процессов диверсификации.

В целом, политика промышленной диверсификации в Кунградском и Муйнакском районах должна осуществляться в соответствии с принципами экономической эффективности, социальной стабильности и экологической безопасности. Такой дифференцированный подход обеспечит устойчивое развитие региональной экономики и повысит ее устойчивость к рискам внешнего рынка.

Заключительный вывод

Анализ возможностей промышленной диверсификации на основе минерально-сырьевого и биологического ресурсного потенциала Кунградского и Муйнакского районов Республики Каракалпакстан. На основе официальных статистических данных за 2025 год была проведена оценка объемных, структурных и социально-эффективных показателей промышленного развития в регионах. Результаты анализа показали, что Кунградский район обладает прочной экономической базой для диверсификации промышленности на основе нефтяных, газовых, соляных и фосфоритовых ресурсов, а также сформированной промышленной инфраструктурой. Хотя в газохимической и химической промышленности сформировались высокодоходные сектора, возможности расширения производственных цепочек за счет широкого вовлечения малых и средних предприятий не были полностью реализованы.

В Муйнакском районе природная среда, сформировавшаяся в результате понижения уровня Аральского моря, создает уникальные возможности для промышленной диверсификации на основе соляных, фосфоритовых и биологических ресурсов. Эти ресурсы являются важной экономической основой для развития малозатратных, но высокодоходных отраслей химической промышленности, биоэкономики и биотехнологий. Эти процессы должны осуществляться со строгим соблюдением требований экологической устойчивости.

Результаты сравнительного анализа показали, что для обоих районов не существует единой универсальной модели промышленного развития, а необходим дифференцированный подход, основанный на потенциале природных ресурсов и социально-экономических характеристиках. Для Кунградского района целесообразно развитие промышленных кластеров на основе глубокой переработки сырья, а для Муйнакского района — развитие экологически устойчивой и инновационной малой промышленности на основе новых минеральных и биологических ресурсов.

В то же время развитие Кунградского и Муйнакского районов как не конкурирующих, а взаимодополняющих экономических пространств позволит усилить мультипликативный эффект в региональной экономике, расширить производственные цепочки и увеличить занятость.

В целом, промышленная диверсификация должна осуществляться по комплексной модели, основанной на цепочке «природные ресурсы → глубокая переработка → продукция с высокой добавленной стоимостью».

Научная новизна статьи: в статье научно обоснована дифференцированная модель промышленной диверсификации с учетом минерально-сырьевого и биологического ресурсного потенциала Кунградского и Муйнакского районов. Данная модель предполагает развитие промышленных кластеров на основе глубокой переработки сырья для Кунградского района, а для Муйнакского района — экологически устойчивых, малозатратных и высокодоходных малых и средних предприятий, использующих новые минеральные и биологические ресурсы. В результате были сформированы научные основы для развития регионов как взаимодополняющих экономических зон.

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ВЛИЯНИЕ ДОЗ МИНЕРАЛЬНЫХ УДОБРЕНИЙ И РЕЖИМОВ ОРОШЕНИЯ НА ВСХОЖЕСТЬ И ЖИЗНЕСПОСОБНОСТЬ ПРОРОСТКОВ ОЗИМОГО ЯЧМЕНЯ

***Аннотация:** В статье представлены результаты полевых опытов по изучению влияния режимов орошения на продолжительность вегетационного периода сортов озимого ячменя и нормы внесения минеральных удобрений.*

***Ключевые слова:** осенний ячмень, режим орошения, зерна, влажность почвы, минеральное удобрение, росток, фаза развития.*

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EFFECT OF MINERAL FERTILIZER DOSES AND IRRIGATION REGIMES ON THE GERMINATION AND VITALITY OF WINTER BARLEY SEEDLINGS

***Abstract:** The article presents the results of field experiments on the effect of irrigation regimes on the duration of the growing season of winter barley varieties and the rate of mineral fertilizer application.*

***Keywords:** autumn barley, irrigation regime, grains, soil moisture, mineral fertilizer, sprout, and development phase.*

Сегодня в мире большое значение придается получению качественного и обильного урожая за счет использования ресурсосберегающих технологий при возделывании ячменя. Как и зерновые, озимый ячмень высевают узкими рядами шириной 13-15 см, рядами, вдоль и поперек. Расстояние между рядами 7,5-8,0 см, расстояние между растениями 3-4 см. При посадке узкими рядами расстояние между рядами 13-15 см, а расстояние между растениями должно быть 1,5-2,0 см. Вместе с посадкой берут борозду шириной 70 см. После посадки семян, в случае недостаточного орошения, урожай будет очень низким. Норма высева на орошаемых площадях 3,0-3,5 млн штук или 150-160 кг плодородных семян. Если плодородие высаженных семян низкое, то норму высева увеличивают до 15-18 процентов.

Как видно из приведенных выше замечаний, озимый ячмень является культурой, несколько более устойчивой к стрессовым условиям внешних факторов по сравнению с другими зерновыми культурами.

В годы исследований (2016-2019 гг.) проводились наблюдения с целью выяснения влияния применяемых агротехнических мероприятий на

всхожесть изучаемых всходов озимого ячменя, выход из озимых и количество настоящих всходов в конце периода всхождения.

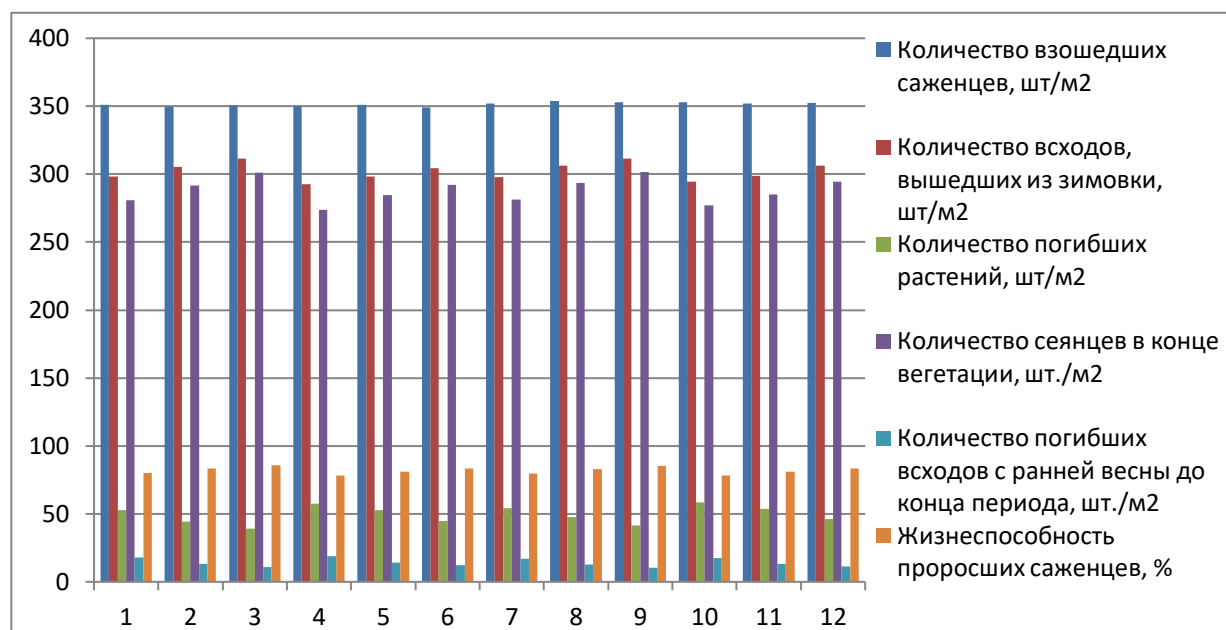
Согласно полученным результатам, при посеве сорта озимого ячменя «Болгали» и влажности почвы перед поливом в течение вегетационного периода 70-80-60% по сравнению с НВ, при определении толщины проростков в поливных вариантах, количество взошедших семян на 1-м варианте, где применялись нормы минеральных удобрений $N_{120}P_{85}K_{110}$ кг/га, составило 351,0 шт./м², на 2-м варианте, где применялись нормы минеральных удобрений $N_{150}P_{105}K_{135}$ кг/га, было 349,5. ед./м², а в варианте 3 при применении норм минеральных удобрений $N_{180}P_{126}K_{162}$ кг/га она составила 350,7 ед./м², прирост за период, когда влажность почвы перед поливом составила 60-70-60% по сравнению с НВ, при изучении толщины всходов на орошаемых вариантах количество взошедших семян составило 350,1 шт./м² на 4-м варианте, где применялись нормы минеральных удобрений $N_{120}P_{85}K_{110}$ кг/га, установлено, что в 5-м варианте, где применялись нормы $N_{150}P_{105}K_{135}$ кг/га минеральных удобрений, она составила 351,0 ед./м², а в 6-м варианте, когда применялись нормы $N_{180}P_{126}K_{162}$ кг/га минеральных удобрений, она составила 349,2 ед./м².

При высаживании сорт озимого ячменя «Ихтияр», и при влажности почвы перед поливом в течение вегетационного периода 70-80-60% по сравнению с НВ, при анализе толщины всходов в поливных вариантах количество проросших всходов в 7-й вариант, где применялись нормы минеральных удобрений $N_{120}P_{85}K_{110}$ кг/га, составил 352,2 шт./м², в варианте 8, где применялись нормы минеральных удобрений $N_{150}P_{105}K_{135}$ кг/га, эти показатели составили 353,7 шт./м², а в вариант 9, при применении норм минеральных удобрений $N_{180}P_{126}K_{162}$ кг/га, эти показатели составили 352,9 ед./м², период роста до полива, при влажности почвы 60-70-60% по сравнению с НВ, толщина всходов в на орошаемых вариантах составила 353,1 ед./м² в 10-м варианте, где вносились нормы минеральных удобрений $N_{120}P_{85}K_{110}$ кг/га, и 352 в 11-м варианте, когда вносились нормы минеральных удобрений $N_{150}P_{105}K_{135}$ кг/га, 0 ед./м², отмечено, что в 12-м варианте, где применялись нормы $N_{180}P_{126}K_{162}$ кг/га минеральных удобрений, она составила 352,5 ед./м².

Из полученных данных по всхожести семян из вариантов опыта видно, что, хотя вносимые в почву минеральные удобрения не оказали существенного влияния на всхожесть семян, было отмечено, что они оказали существенное влияние на зимовку семян и количество погибших за зиму семян.

Таблица 1

Всхожесть и толщина всходов озимого ячменя в опыте (2016-2017 гг.).



Анализ полученных результатов показывает, что сорт озимого ячменя «Болгали» высаживали и поливали в течение вегетационного периода при влажности почвы перед поливом 70-80-60% по сравнению с НВ и нормами минеральных удобрений $N_{120}P_{85}K_{110}$ кг/га использовали в варианте 1, когда изучали имеющуюся толщину семян в конце периода в среднем 280,6 шт./м², количество погибших с ранней весны до конца периода семян составило 17,7 шт./м², а жизнеспособность взошедших всходов составила 79,9%, поливали в этой системе полива минеральными удобрениями $N_{150}P_{105}K_{135}$ и $N_{180}P_{126}K_{162}$. К концу периода внесения во 2-3 вариантах с нормами кг/га анализировали фактическую толщину всходов в среднем 291,8-300,9 шт./м², а количество погибших всходов с ранней весны до конца периода применения составило 13,3-10,7 шт./м², жизнеспособность проросших всходов показала 83,5-85,8% соответственно, а по сравнению с 1-м вариантом, где вносились нормы минеральных удобрений $N_{120}P_{85}K_{110}$ кг/га, фактическая толщина всходов составила 11,2-20,3 шт./м², а погибла с ранней весны к концу периода применения наблюдалось, что количество проростков составляло 4,4-7,0 шт./м², а жизнеспособность проросших проростков была на 3,5-5,9% выше.

Ячмень озимый сорта Болгали высаживали и поливали в период вегетации при влажности почвы перед поливом 60-70-60% по сравнению с НВ и вносили нормы минеральных удобрений $N_{120}P_{85}K_{110}$ кг/га, 7 шт./м², количество семян, проросших с ранней весны до конца периода, составило 19,0 шт./м², а жизнеспособность проросших семян-78,2%. на 5-6 вариантах, которые поливали по распоряжению и вносили нормы минеральных

удобрений $N_{150}P_{105}K_{135}$ и $N_{180}P_{126}K_{162}$ кг/га, в конце периода эксплуатации, когда определяли фактическую толщину всходов, в среднем 284,4-292,1 шт./м², количество проростков, погибших с ранней весны до конца периода эксплуатации, составило 14, 0-12,4 шт./м², а жизнеспособность проросших семян равна 81,0-83,6%, по сравнению с 4-м вариантом, где применяются нормы минеральных удобрений $N_{120}P_{85}K_{110}$ кг/га, фактическая толщина всходов в конце периода эксплуатации 10,7-18,4 шт./м², количество всходов, погибших с ранней весны до конца периода составила 5,0-6,6 шт./м², а жизнеспособность проросших семян выше на 2,8-5,5 % соответственно.

При посадке сорта озимого ячменя «Ихтияр», отмечено, что информация, соответствующая вышеприведенной информации, получена с обслуживаемых вариантов, а в период вегетации поливы проводились при влажности почвы перед поливом 70-80-60%. по сравнению с НВ, а нормы минеральных удобрений $N_{120}P_{85}K_{110}$ кг/га применялись в 7-м варианте, срок годности с учетом толщины имеющихся всходов на конец, в среднем составил 281,1 шт./м², количество всходов, погибло с ранней весны до конца периода составляло 16,9 ед./м², а жизнеспособность проросших всходов 79,8%. периода эксплуатации изучена фактическая толщина семян в среднем 293,5-301,4 шт./м², количество погибших семян с ранней весны до конца периода эксплуатации 12,7-10,2 шт./м², жизнеспособность проросших всходов 83,0-85,4%, по сравнению с 7-м вариантом, где применены нормы минеральных удобрений $N_{120}P_{85}K_{110}$ кг/га кг/га, фактическая толщина всходов 12,4-20,3 шт./м², всходы, погибшие с ранней весны к концу периода отмечено, что численность составляла 4,2-6,7 шт./м², а жизнеспособность проросших семян была выше на 3,2-5,6%.

Сорт озимого ячменя «Ихтияр» высаживали и поливали в период вегетации при влажности почвы перед поливом 60-70-60% по сравнению с НВ, вносили нормы минеральных удобрений $N_{120}P_{85}K_{110}$ кг/га кг/га./м², количество жизнеспособных семян с ранней весны до конца периода составило 17,5 шт./м², а жизнеспособность взойшедших семян – 78,4%. /га В 12 вариантах при определении фактической толщины всходов средняя составила 285,2-294,6 шт./м², количество погибших всходов с ранней весны до конца периода эксплуатации – 13,3-11,5 шт./м², жизнеспособность проросших саженцев, показавших 81,0-83,6% соответственно, По сравнению с 10-м вариантом, где вносились нормы минеральных удобрений $N_{120}P_{85}K_{110}$ кг/га, фактическая толщина всходов составила 8,2-17,6 шт./м², количество погибших всходов с ранней весны до конца периода 4,2-6,0 шт./м², было установлено, что жизнеспособность семян была выше на 2,6-5,1%.

По результатам толщины семян в вариантах опыта видно, что нормы внесения минеральных удобрений и режимы полива оказывают существенное влияние на показатели гибели семян в зимний период и в период всхождения.

В результатах исследований, проведенных в 2017-2018 и 2018-2019 гг., были доказаны вышеизложенные закономерности, а высокие результаты отмечены в повышенных вариантах норм минеральных удобрений.

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БИОЭКОЛОГИЧЕСКАЯ ХАРАКТЕРИСТИКА МАЛЫХ ОЗЁР, РАСПОЛОЖЕННЫХ В ОКРЕСТНОСТЯХ ГОРОДА НУКУС

Аннотация: В статье представлена биоэкологическая характеристика малых озёр, расположенных в окрестностях города Нукус. Проведена комплексная оценка гидрологических, гидрохимических и биологических показателей водоёмов, включая анализ видового состава фитопланктона, зоопланктона и высшей водной растительности. Установлено, что озёра характеризуются слабощелочной реакцией среды и умеренной минерализацией, что способствует развитию разнообразных гидробионтов. Выявлена зависимость биоразнообразия от глубины и гидрологического режима водоёмов: более глубокие озёра отличаются большей устойчивостью экосистем. Определено значительное влияние антропогенных факторов на состояние озёрных экосистем.

Ключевые слова: малые озёра, биоэкология, гидробиология, биоразнообразие, гидрохимические показатели, антропогенное воздействие, Нукус.

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BIOECOLOGICAL CHARACTERISTICS OF SMALL LAKES LOCATED IN THE VICINITY OF NUKUS

Abstract: This article presents the bioecological characteristics of small lakes located in the vicinity of Nukus. A comprehensive assessment of the hydrological, hydrochemical, and biological parameters of the water bodies was conducted, including an analysis of the species composition of phytoplankton,

zooplankton, and higher aquatic vegetation. It was established that the lakes are characterized by a slightly alkaline pH and moderate mineralization, which facilitates the development of diverse aquatic organisms. A correlation between biodiversity and the depth and hydrological regime of the reservoirs was revealed: deeper lakes are characterized by greater ecosystem stability. A significant influence of anthropogenic factors on the state of lake ecosystems was determined.

Keywords: *small lakes, bioecology, hydrobiology, biodiversity, hydrochemical indicators, anthropogenic impact, Nukus.*

Введение

Малые озёра являются важными компонентами природной и городской среды, выполняя ключевую роль в поддержании биологического разнообразия, регулировании гидрологического режима и формировании микроклимата прилегающих территорий. В окрестностях города Нукус, где климат характеризуется жарким засушливым летом, мягкой зимой и низкой влажностью воздуха, такие водоёмы особенно значимы для обеспечения водных ресурсов флоры и фауны, а также для оздоровления городской среды.

Изучение биоэкологических характеристик малых озёр включает оценку физических, химических и биологических параметров воды, выявление состава и структуры растительного и животного сообщества, а также анализ их взаимосвязи с антропогенными факторами.

Цель исследования — охарактеризовать малые озёра в окрестностях города Нукус, оценить их гидрологическое состояние и биоразнообразие, а также разработать рекомендации по их охране и рациональному использованию. Особое внимание уделялось озеру Ашшыкуль, расположенного на территории СГМ «Жолшилар» города Нукуса, Республика Каракалпакстан. Озеро естественно сформировано, имеет площадь 36 га и получает воду из канала «Дослик». В 2011 году оно было передано на баланс управления эксплуатации дренажных систем, что позволило систематизировать его гидрологическое наблюдение и контролировать экологическое состояние.

Материалы и методы

Исследование проводилось на нескольких малых озёрах в радиусе 20–30 км от города Нукус, включая озеро Ашшыкуль, с целью оценки их биоэкологического состояния. Основное внимание уделялось взаимосвязи гидрологических, химических и биологических показателей воды с состоянием экосистем и биоразнообразием водоёмов. Для анализа использовались следующие методы. Гидрологический мониторинг включал измерение глубины, площади водной поверхности, температуры и прозрачности воды, а также сезонное отслеживание колебаний уровня воды. Химический анализ позволял определить pH, минерализацию и содержание основных питательных веществ (азот, фосфор), влияющих на развитие флоры и фауны. Биоэкологическая оценка включала идентификацию

фитопланктона, зоопланктона, донных организмов и водных растений, что давало представление о структуре и устойчивости водных сообществ.

Оценка антропогенного влияния проводилась через наблюдение за изменением береговой линии, хозяйственным использованием воды и воздействием сельского хозяйства на экосистему. Сбор данных проводился в течение года с сезонной периодичностью, что позволило выявить динамику биоэкологических показателей и определить связь между гидрохимическими условиями, видовым разнообразием и устойчивостью экосистем малых озёр.

Результаты и обсуждение

Малые озёра окрестностей города Нукус имеют различный гидрологический и химический состав, что определяет специфику их биоценозов. Глубина озёр колеблется от 0,5 до 2,5 м, а площадь водной поверхности составляет 1–15 га. Вода в большинстве озёр характеризуется слабощелочной реакцией (рН 7,5–8,3) и умеренной минерализацией (0,5–1,2 г/л), что создаёт условия для развития пресноводной флоры и фауны. Флора водоёмов представлена преимущественно гидрофитами и мезофитами: *Ruppia maritima*, *Potamogeton pectinatus*, *Typha latifolia* и *Phragmites australis*. Фитопланктон включает диатомовые и зелёные водоросли, а зообентос представлен червями, моллюсками и ракообразными. Зоопланктон включает коловраток, веслоногих рачков и дафний. Более крупные и глубинные озёра обладают более высоким видовым разнообразием флоры и фауны, тогда как мелкие, часто пересыхающие водоёмы имеют менее стабильные экосистемы. Наибольшее влияние на состояние озёр оказывают антропогенные факторы: выпас скота, хозяйственное использование воды и изменение береговой растительности.

Озеро Ашшы куль представляет собой естественно сформированный водоём с площадью 36 га и постоянным водоснабжением из канала «Дослик». Глубина колеблется от 0,5 до 2,5 м. Вода характеризуется слабощелочной реакцией (рН 7,5–8,2) и умеренной минерализацией (0,5–1,1 г/л), что создаёт благоприятные условия для пресноводных гидробионтов. Флора озера включает гидрофиты и мезофиты: *Ruppia maritima*, *Potamogeton pectinatus*, *Typha latifolia*, *Phragmites australis*. Зообентос представлен моллюсками, червями и ракообразными, а зоопланктон включает коловраток, веслоногих рачков и дафний.

Биоразнообразие озера напрямую связано с гидрологическими характеристиками: более глубокие участки демонстрируют стабильность экосистемы, в то время как мелкие прибрежные зоны более подвержены сезонным колебаниям уровня воды и антропогенному воздействию.

Малые озёра окрестностей города Нукус, включая озеро Ашшы куль, обладают высокой экологической значимостью. Они обеспечивают местообитания для водных и прибрежных видов, поддерживают гидрологический режим и биоразнообразие региона. Сочетание гидрологических и химических параметров воды создаёт условия для

существования гидробионтов, включая виды, устойчивые к сезонным колебаниям уровня воды и температур.

Антропогенные воздействия, такие как хозяйственное использование воды, выпас скота и нарушение прибрежной растительности, негативно сказываются на структуре биоценоза и видовом разнообразии. Для сохранения малых озёр рекомендуется контроль хозяйственной деятельности, восстановление прибрежной растительности, создание буферных зон и регулярный мониторинг химических и биологических показателей.

Заключение

Малые озёра окрестностей города Нукус, включая озеро Ашшы куль, являются важными гидробиологическими и экологическими объектами. Их биоэкологические характеристики — площадь, глубина, химический состав воды, разнообразие флоры и фауны — обеспечивают высокую экологическую ценность и поддерживают местное биоразнообразие. Сохранение экосистем требует контроля хозяйственного использования воды, восстановления прибрежной растительности и регулярного мониторинга. Рациональное управление водоёмами позволит поддерживать устойчивость экосистем, биоразнообразие и экологическое благополучие региона.

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РАЗРАБОТКА КОМПЛЕКСНЫХ МЕТОДОВ ОЦЕНКИ ТУРИСТИЧЕСКОГО И РЕКРЕАЦИОННОГО ПОТЕНЦИАЛА СЕВЕРО-ВОСТОЧНОГО ТУРИСТИЧЕСКОГО РАЙОНА

Аннотация: В данной статье рассматриваются вопросы разработки комплексных методов оценки туристического потенциала региона. Главная цель исследования – проведение научного анализа туристического потенциала региона, выявление территориальных характеристик туристических ресурсов и совершенствование методологии их комплексной оценки. В статье рассматриваются современные методы географического анализа, включая географические информационные системы (ГИС), SWOT-анализ, PESTEL-анализ, картографический анализ, статистические методы и методы многокритериальной оценки, при оценке туристических и рекреационных ресурсов. Эти методы позволяют определить территориальное распределение туристических ресурсов, оценить концентрацию туристических объектов и выявить зоны туристической привлекательности. Результаты исследования имеют важное научно-практическое значение для разработки региональных стратегий развития туризма, реализации туристического зонирования и обеспечения эффективного использования туристических ресурсов.

Ключевые слова: туризм, отдых, туристический потенциал, комплексная оценка, туристические ресурсы, географические информационные системы (ГИС), SWOT-анализ, PESTEL-анализ, региональный туризм, социологическое исследование.

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DEVELOPMENT OF COMPREHENSIVE METHODS FOR ASSESSING THE TOURIST AND RECREATIONAL POTENTIAL OF THE NORTH-EAST TOURIST REGION

Abstract: *This article examines the development of comprehensive methods for assessing a region's tourism potential. The primary objective of the study is to conduct a scientific analysis of the region's tourism potential, identify the territorial characteristics of tourism resources, and improve the methodology for their comprehensive assessment. The article examines modern methods of geographic analysis, including geographic information systems (GIS), SWOT analysis, PESTEL analysis, cartographic analysis, statistical methods, and multicriteria assessment methods, when assessing tourism and recreational resources. These methods allow us to determine the territorial distribution of tourism resources, assess the concentration of tourist attractions, and identify areas of tourist attraction. The results of the study have important scientific and practical implications for the development of regional tourism development strategies, the implementation of tourist zoning, and the efficient use of tourism resources.*

Keywords: *tourism, recreation, tourism potential, comprehensive assessment, tourism resources, geographic information systems (GIS), SWOT analysis, PESTEL analysis, regional tourism, sociological research.*

В современных условиях глобализации туризм, как один из наиболее быстрорастущих секторов мировой экономики, играет важную роль в социально-экономическом развитии стран и регионов. Туристический сектор вносит значительный вклад в стимулирование экономического роста, создание новых рабочих мест, развитие инфраструктуры, сохранение культурного наследия и повышение инвестиционной привлекательности регионов. Поэтому вопрос рационального и эффективного использования туристических ресурсов стал одним из приоритетных во многих странах.

В Узбекистане развитие туристического сектора в последние годы определено как одно из важных направлений государственной политики, и в этой области реализуется ряд реформ. В нашей стране проводятся

масштабные мероприятия по развитию туристической инфраструктуры, созданию новых туристических маршрутов, охране объектов исторического и культурного наследия и обеспечению их эффективного использования. В этих процессах важно выявлять туристические и рекреационные ресурсы регионов, оценивать их потенциал на научной основе и эффективно планировать региональный туризм.

В развитии туризма на районном уровне решающую роль играют такие факторы, как природные и географические условия, ландшафтные ресурсы, историко-культурные памятники, транспортная и сервисная инфраструктура, а также экологическая обстановка. Однако на практике оценка туристических ресурсов часто проводится на основе отдельных факторов и может не в полной мере отражать реальные туристические и рекреационные возможности региона. Поэтому существует необходимость в разработке методологии комплексной оценки туристического потенциала, объединяющей эти факторы. Использование современных географических методов исследования, включая географические информационные системы (ГИС), картографическое моделирование, статистический анализ и методы многокритериальной оценки, позволяет провести точную и научно обоснованную оценку туристического и рекреационного потенциала региона. Это способствует выявлению территориального распределения туристических ресурсов, уровня их концентрации и зон туристической привлекательности.

С этой точки зрения разработка комплексных методов оценки туристического и рекреационного потенциала региона, научный анализ территориальных характеристик туристических ресурсов и разработка научной основы для устойчивого развития туризма считаются неотложными научно-практическими задачами. Результаты этих исследований важны для принятия научно обоснованных решений в области регионального планирования туризма, развития туристической инфраструктуры, создания туристических маршрутов и эффективного использования туристических ресурсов.

Оценка туристического потенциала региона важна для стратегического планирования, эффективного использования ресурсов и устойчивого развития в сфере туризма и отдыха.

Туристический потенциал - это совокупность возможностей для региона или территории привлекать туристов, обеспечивать им осмысленное времяпрепровождение и эффективно организовывать туристическую деятельность.

Рекреационный потенциал - это способность населения отдыхать, улучшать здоровье и предоставлять рекреационные услуги на основе природных и социально-экономических ресурсов.

Комплексная оценка - это объективный, точный и всесторонний метод оценки, основанный на ряде данных, ресурсов и показателей. Она не ограничивается отдельными ресурсами (например, природными и

климатическими), но также учитывает историческое и культурное наследие, инфраструктуру, социальные услуги, экономические показатели. Эти показатели составляют основу для стратегии развития региона и формирования инвестиционных проектов.

По мнению И.Е.Поляковой и др., существующие методы оценки потенциала часто носят субъективный характер, содержат ограниченный набор факторов, не позволяющих провести достаточно всестороннюю оценку туристического и рекреационного потенциала. Поэтому при оценке объекта предлагается определять параметры оценки в блоках «природные условия и ресурсы», «культурно-исторические ресурсы», «обеспечение туристической инфраструктуры», «обеспечение туризма информацией», «ограничивающие факторы», давать экспертные оценки и объединять их в общую оценку [6].

По мнению Усмоновой А.Б. и Зокировой М.И., невозможно оценить туристический потенциал региона с помощью единого метода, поскольку каждый регион обладает своим собственным потенциалом и уникальными характеристиками, которые не встречаются ни в одном другом направлении, и поэтому для каждого региона должна существовать субъективная оценка [8].

Печинская Я.Б. проанализировала существующие подходы к оценке потенциала региона и предложила концептуальную модель формирования структуры инновационного и туристического потенциала региона, которая учитывает основные аспекты и взаимосвязи туристической и инновационной деятельности и определяет ресурсную базу [7].

Методология Богданова Е.И. (2005) для оценки объема и эффективности туристического потенциала включает такие показатели, как общий объем ресурсов туристического потенциала, уровень туристического потенциала и показатель реализации туристического потенциала [2].

По мнению К.Хомидова, потенциал региона отражает эффективность использования региональных ресурсов в идеальных условиях для организации определенной экономической деятельности с полным удовлетворением многочисленных потребностей общества. Рекреационный потенциал региона – это совокупность природных, культурных, исторических и социально-экономических условий для организации рекреационной деятельности на данной территории. При оценке туристического потенциала потенциал региональных туристических ресурсов для отдельных видов туризма (историко-культурный туризм, паломнический туризм, агрозкотуризм, этнографический туризм, горный экстремальный туризм, рекреационный туризм) рассматривается как значение интегральных показателей...[8].

Главная цель оценки туристического и рекреационного потенциала региона - выявление истинного потенциала региона, определение способов устойчивого использования ресурсов и разработка стратегии развития туризма. Задачи включают учет природных и антропогенных ресурсов,

оценку инфраструктуры (дорог, гостиниц, зон отдыха), анализ экономической эффективности, а также изучение воздействия на окружающую среду и социальную сферу.

При оценке туристического и рекреационного потенциала учитываются следующие основные компоненты:

1. Потенциал природных ресурсов:
 - Типы ландшафта (горы, пустыни, реки, озера, леса).
 - Климатические условия и природные ресурсы.
 - Флора и фауна (возможности для экотуризма).
2. Исторические и культурные ресурсы:
 - Исторические памятники, археологические и архитектурные памятники.
 - Местные традиции, ремесла.
 - Культурные мероприятия и фестивали.
3. Экономический и инфраструктурный потенциал:
 - Транспортные сети (дороги, аэропорты).
 - Туристические услуги (отели, кафе, зоны отдыха).
 - Финансовые и инвестиционные возможности.
4. Социальный и экологический потенциал:
 - Гостеприимство населения.
 - Экологическая устойчивость региона.
 - Условия управления и безопасности в регионе.

Для оценки туристического и рекреационного потенциала страны или региона можно использовать несколько методов (таблица 1).

Таблица-1.

**Методы оценки туристического и рекреационного
потенциала туристического района**

№	Методы оценки	Объект оценки	Основные критерии	Показатели оценки	Практическое значение
1	Метод экспертной оценки	Исторические и культурных памятников	Историческая значимость, редкость, степень сохранности.	Оценка (1-5), описательное резюме.	Определение туристической привлекательности и историко-культурных памятников.
2	Статистический анализ	Поток туристов.	Количество посетителей, темп роста.	В процентах, создать динамическую таблицу, диаграммы.	Выявление тенденций развития туризма
3	SWOT-анализ	региональной системы туризма	Сильные и слабые стороны, возможности, риски.	Стратегическая таблица.	Разработка стратегии развития
4	ГИС (пространст	Расположение	Высокая плотность	карты, туристические	Планирование туристических

	венный) анализ.	туристическ их объектов.	застройки, удобство транспортного сообщения	зоны.	зон
5	Индексный (балльный) метод	Туристическ ий потенциал.	Исторические, культурные, рекреационные и инфраструктурн ые факторы.	Интегральный индекс.	Рейтинг регионов
6	Социологич еское исследовани е	Туристы и местные жители.	Уровень удовлетвореннос ти туристическими ресурсами и качеством услуг.	Рейтинг, в процентах.	Улучшение туристических услуг
7	Анализ рекреацион ных ресурсов	Природные зоны отдыха.	Ландшафт, климат, сезонность.	Оценка и балл	Развитие зон отдыха
8	Анализ инфраструк туры	Гостиницы, предприятия общественно го питания, транспорт	Вместимость, качество обслуживания.	Количество, оценка качества.	Улучшение туристических услуг

Таблица составлена автором.

Изучение проблем, связанных с туристическими дестинациями, посредством социологических исследований оказывает практическую помощь в изучении отношения общества к туризму, его влияния на культуру, экономику и социальные структуры. Такие исследования важны не только для выявления проблем, но и для поиска путей их решения. Такой подход позволяет обеспечить устойчивое развитие туризма и сохранение исторического и культурного наследия.

В социологических исследованиях этот метод особенно широко используется для изучения социально-демографической ситуации населения. Для эффективного проведения исследования важно, чтобы анкеты были разработаны комплексно и основывались на конкретной цели. Это позволяет широко изучать взгляды, потребности и запросы различных сегментов населения [3]. В этом случае исследователь должен тщательно продумать способы обработки результатов анкетирования. Анкетирование осуществляется путем проведения открытого или закрытого (дистанционного) интервью с лицом, являющимся специалистом по изучаемому вопросу. В этом случае интервью с экспертами-респондентами и вытекающие из них мнения называются экспертными оценками, то есть экспертной оценкой является профессиональная позиция специалиста, эксперта по определенному вопросу [4]. Таким образом, может возникнуть проблема, связанная с привлечением профессионального эксперта.

По мнению Н.П.Кушева, «туризм как предмет социологического анализа изучает мотивы, цели, интересы и модели поведения людей, занятых в туризме, а также деятельность туристических организаций [5]». Результаты социологического исследования также могут выявить процесс развития туризма в каждом регионе.

Основные недостатки в развитии туризма в бассейне реки Китаб-Шахрисабз связаны с инфраструктурными, институциональными и маркетинговыми факторами. Несмотря на наличие достаточных природных и культурных ресурсов, механизм их эффективного экономического оборота еще не сформирован в полной мере.

Комплексный подход к оценке туристического и рекреационного потенциала страны или региона предполагает взаимосвязанный анализ природных, историко-культурных, социально-экономических и экологических факторов региона. В данном исследовании используется модель комплексной оценки, основанная на многокритериальной оценке.

Теоретической основой комплексной оценки являются следующие принципы:

- ✓ системность (рассматривание власти как единой территориальной системы);
- ✓ территориальная дифференциация;
- ✓ концепция устойчивого развития;
- ✓ рациональное использование ресурсов.

Комплексная оценка туристического потенциала региона была проведена на основе данных по 5 функциональным подразделений:

1. При оценке природных и рекреационных ресурсов ($W_1 = 0,25$) учитываются такие показатели, как привлекательность ландшафта, климатические условия, концентрация природных объектов и экологическое состояние (например, учитываются благоприятные климатические условия региона, разнообразие ландшафтов и значение гор Хонтахти, Эшакмайдон, Сумсар, Шертог, Бешнов, Осмонтарош, Эгарнам и Чакилкалон для туризма).

2. Оценка историко-культурных ресурсов ($W_2 = 0,25$) фокусируется на уровне сохранности архитектурных памятников, археологических объектов, культурных событий и объектов (например, дворец Оксарой в городе Шахрисабз, Дорут-Тилова, комплекс Дорут-Саодат, Хазрати Башир, Ильм Конаги и другие подобные места паломничества).

3. При оценке туристической инфраструктуры ($W_3 = 0,20$) учитываются такие показатели, как гостиничный фонд региона, транспортное сообщение, предприятия общественного питания и информационные услуги.

4. При оценке экономических факторов ($W_4 = 0,15$) учитываются такие показатели, как поток туристов, посещающих регион, доходы от туризма и уровень занятости местного населения.

5. При оценке экологической устойчивости ($W_5 = 0,15$) уделяется внимание охране окружающей среды, туристической нагрузке и системам управления отходами.

В рамках комплексной оценки туристического потенциала региона каждый показатель оценивался по 5-балльной шкале с использованием балльной системы: 1 - очень низкий, 2 - низкий, 3 - средний, 4 - высокий и 5 - очень высокий.

Метод SWOT-анализа используется для оценки внутреннего туристического потенциала региона. В нашей текущей исследовательской работе мы использовали метод SWOT-анализа для проведения всесторонней оценки туристического региона. В результате, с помощью SWOT-анализа были выявлены и обобщены сильные стороны (S), слабые стороны (W), возможности (O) и угрозы (T) этого региона (таблица 2).

Таблица 2.
Результаты SWOT-анализа при оценке
туристического потенциала района

Strengths (S) - Сильные стороны	Weaknesses (W) - Слабые стороны
1. Огромное количество объектов исторического и культурного наследия. 2. Разнообразие природных ландшафтов (горы, холмы, речные долины) и их привлекательность. 3. Национальные традиции и культурная среда. 4. Шахрисабз известен во всем мире как родина Амира Тимура. 5. Благодаря своему расположению на пересечении туристических потоков Самарканда и Кашкадарьи, здесь высок потенциал для транзитного туризма. 6. Здесь находятся такие архитектурные памятники, как комплекс Ак-Сарой, Дорус-Саодат, комплекс Дорус-Тиловат, святыни Хазрати Башира, Ильм-Конагий. 7. Исторический центр Шахрисабза включен в список Всемирного наследия ЮНЕСКО. 8. Здесь находится государственный геологический заповедник «Китаб» и палеонтологические памятники. 9. Национальный природный парк «Китаб» – привлекателен для научного туризма благодаря своим уникальным геологическим слоям. 10. Государственный заповедник Хисар и потенциал развития экотуризма на его территории высоки. 11. Существует высокая вероятность развития культурно-исторического туризма, экотуризма, геотуризма, научного туризма, агро- и этнотуризма. 12. Через город Шахрисабз проложены	1. Недостаточная инфраструктура 2. Низкий уровень цифровизации 3. Недостаточная маркетинговая деятельность. 4. Неэффективные административные реформы и система экологического мониторинга. 5. Низкое качество дорог, ведущих к природным и геологическим объектам, расположенным в сельской местности. 7. Отсутствие современных кемпингов, туристических центров и информационных павильонов. 8. Гостиничный бизнес в основном сосредоточен в городе Шахрисабз, возможности для расширения в других регионах ограничены. 9. Цифровой маркетинг, веб-платформы и международный PR недостаточно развиты. 10. Маркетинговые преимущества объектов ЮНЕСКО используются не в полной мере. 11. Количество специализированных гидов по геотуризму и научному туризму невелико. 12. Уровень владения иностранными языками ограничен. 13. Система подготовки местных специалистов в области управления туризмом и управления дестинациями недостаточна. 14. Ограниченное участие частного сектора. 15. Механизмы государственно-частного партнерства недостаточно активны. 16. Прямые иностранные инвестиции в туристическую инфраструктуру низки.

автомагистрали. 13. Самарканд-Шахрисабз интегрирован в туристические маршруты. 14. Постепенно развивается гостиничная и сервисная инфраструктура.	
Opportunities (O) - Возможности	Threats (T) - Угрозы
1. Реализация государственной политики в области туризма. 2. Инвестиционные программы в секторе. 3. Внедрение цифровых технологий в туристический сектор. 4. Реставрация исторических мест в рамках государственных программ. 5. Развитие экотуризма на основе природных ландшафтов. 6. Вывод национального бренда на международный рынок. 7. Превращение Шахрисабза в международный центр культурного туризма. 8. Создание туристического кластера на основе инвестиций. 9. Внедрение технологий «умного» туризма, электронного бронирования и создания виртуальных туров. 10. Геотуризм (на базе Национального природного геологического парка Кито́б). 11. Культурно-исторический туризм (Исторический центр Шахрисабза). 13. Развитие экотуризма, горного туризма, научно-образовательного туризма. 14. Агро- и этнотуризм (на базе деревень Варганза и Гелон). 15. Разработка концепции «Наследие Темурид и территория геологических чудес» на основе статуса ЮНЕСКО. 16. Создание глобального бренда, связанного с историей Амира Темура. 17. Формирование интегрированного туристического кольца Самарканд-Китоб-Шахрисабз. 18. Налоговые льготы и субсидии в туристическом секторе. 19. Строительство эко-отелей и туристических центров на основе государственно-частного партнерства (ГЧП).	1. Увеличение антропогенного давления и экологической нагрузки на природные объекты. 2. Эрозия почвы и деградация ландшафта. 3. Слабость системы управления отходами. 4. Влияние изменения климата (засуха, сокращение водных ресурсов). 5. Неконтролируемый туризм в Гиссарском государственном заповеднике и Национальном природном парке геологии Китаб может нанести ущерб геологическим пластам. 6. Риски для экономической стабильности и административные барьеры. 7. Угрозы культурному наследию, разрушение архитектурных памятников в результате высокого туристического потока. 8. Реставрационные работы не соответствуют научным требованиям. 9. Давление урбанизации может представлять угрозу для стабильности культурного наследия, которое перегружено в историческом центре Шахрисабза. 10. Усиление глобальной конкуренции на туристическом рынке. 11. Сокращение международных туристических потоков из-за политических или экономических кризисов. 12. Нестабильные инвестиции. 13. Стихийные бедствия (наводнения, оползни, землетрясения). 14. Перебои в транспортном сообщении в зимний сезон. 15. Ограниченное воздушное и железнодорожное сообщение. 16. Институциональные и управленческие риски.

Таблица составлена автором

С точки зрения SWOT-анализа данного туристического региона, если эти недостатки будут устранены:

- конкурентоспособность региона в сфере туризма повысится,
- средняя продолжительность пребывания туристов в регионе увеличится,
- регион перейдет к тенденции стабильного роста в динамике доходов.

Метод PESTEL также может быть использован для комплексной оценки туристического потенциала региона или туристической зоны. Метод PESTEL позволяет проводить систематический анализ внешних факторов, оказывающих положительное влияние на развитие туристического и рекреационного потенциала региона.

Этот метод использовался в рамках стратегического планирования и концепции устойчивого развития (таблица 3).

PESTEL включает следующие факторы:

P – Political (Политические).

E – Economic (Экономические).

S – Social (Социальные).

T – Technological (Технологические).

E – Environmental (Экологические).

L – Legal (Правовые).

3-жадвал.

P – Political (Siyosiy).	E – Economic (Iqtisodiy).	S – Social (Ijtimoiy).
T – Technological (Texnologik).	E – Environmental (Ekologik).	L – Legal (Qonunchilik).

1. Political - Политические факторы. Политическая стабильность и государственная политика являются основными условиями развития туризма. К основным факторам относятся государственная политика поддержки туризма, программы регионального развития, инвестиционный климат и международное сотрудничество. Развитие туристического сектора в Кашкадарьинской области осуществляется в рамках государственных программ. Сегодня политика восстановления объектов историко-культурного наследия в городах Шахрисабзского, Шахрисабзского, Китабского и Яккабагского районов повышает туристическую привлекательность. Результат положительный (имеется институциональная поддержка туризма).

2. Economic - Экономические факторы. Экономические условия определяют развитие туристической инфраструктуры и возможности привлечения инвестиций. Основными показателями являются инвестиции в туристический сектор, доходы населения, валютная политика и доходы от туризма. В Китабско-Шахрисабзском регионе формируется рынок туристических услуг, но потребность в инвестициях в инфраструктуру сохраняется. Результат умеренно позитивный, с высоким потенциалом развития.

3. Social - Социальные факторы. Демографический состав населения, культурные ценности и трудовые ресурсы влияют на качество

туристических услуг. Основные аспекты - традиции гостеприимства населения, подготовка кадров в туристическом секторе, уровень урбанизации и отношение общества к туристам. В Кашкадарьинской области привлекательными факторами для туристов являются национальные традиции и культурная среда. Результат положительный, но требуется повышение квалификации персонала.

4. **Technological** - Технологические факторы. Современные информационные технологии имеют большое значение в цифровизации и маркетинге туризма. Основными показателями являются системы онлайн-бронирования, ГИС-технологии, цифровой маркетинг и охват интернета. Картографирование туристических объектов на основе ГИС служит для уточнения территориального анализа, и на этапе развития этот результат обладает высоким потенциалом.

5. **Environmental** - Экологические факторы. Экологическая устойчивость обеспечивает долгосрочную эффективность туристической деятельности. Основные аспекты включают защиту природных ресурсов, уровень туристической нагрузки, управление отходами и климатические условия. Увеличение рекреационной нагрузки в предгорьях Гиссарских гор требует усиления экологического контроля, который, если его не контролировать, может иметь негативные последствия.

6. **Legal** - Правовые факторы. Правовая база в секторе туризма напрямую влияет на инвестиционную и предпринимательскую деятельность. Основные аспекты включают туристическое законодательство, стандарты охраны культурного наследия, земельные и имущественные отношения, а также процедуры лицензирования. Хотя законодательная база направлена на поддержку туризма, необходимо упростить существующие административные процессы. Результат положительный, но требуются институциональные улучшения (табл. 4).

Таблица 4.

PESTEL-анализ развития туризма в туристическом регионе

Факторы	Уровень влияния	Направление развития
P – Political (Политические).	Очень позитивный	Реализация государственных программ в сфере туризма
E – Economic (Экономические).	Средний	Привлечение международных и внутренних инвестиций
S – Social (Социальные).	Позитивный	Подготовка квалифицированных кадров в сфере туризма
T – Technological (Технологические).	Средний	Цифровизация туристического сектора
E – Environmental (Экологические).	Опасная зона	Устойчивый туризм
L – Legal (Правовые).	Позитивный	Внедрение административных реформ

Таблица составлена автором

Согласно результатам PESTEL-анализа, политические, социальные и экономические факторы создают благоприятные условия для развития туристического и рекреационного потенциала этого региона. Однако необходимо увеличить экономические инвестиции, технологическую модернизацию и усилить экологический контроль. Законодательная база существует, и ее эффективная реализация на практике имеет важное значение.

При определении туристического потенциала региона необходимо комплексно анализировать такие факторы, как природные ресурсы, историческое и культурное наследие, инфраструктура, транспорт, сектор услуг и экологические условия. Поэтому целесообразно использовать комплексную методологию, объединяющую географические, экономические и социальные показатели в процессе оценки. В развитии туризма стратегические направления разрабатываются на основе оценки сильных и слабых сторон, возможностей и рисков региона. Это важно для формирования туристической политики и привлечения инвестиций.

Наиболее эффективным методом оценки туристического и рекреационного потенциала региона является комплексный методологический подход, сочетающий систему показателей, интегральный индекс, картографический анализ ГИС, SWOT-анализ и методы многокритериальной оценки. Такой подход создает научную основу для точной оценки туристических ресурсов региона, их рационального использования и развития устойчивого туризма.

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ОСОБЕННОСТИ ПИЩЕВОГО ПОВЕДЕНИЯ И ПОТЕНЦИАЛЬНЫЕ ФАКТОРЫ РИСКА МЕТАБОЛИЧЕСКИХ НАРУШЕНИЙ У СТУДЕНТОВ МЕДИЦИНСКОГО ВУЗА

Аннотация: *Нарушения пищевого поведения относятся к ведущим модифицируемым факторам риска развития ожирения, метаболического синдрома, сахарного диабета 2 типа и сердечно-сосудистых заболеваний. По данным Всемирной организация здравоохранения, нерациональное питание существенно влияет на распространенность хронических неинфекционных заболеваний. Студенческий возраст является важным периодом формирования устойчивых привычек, включая структуру и режим питания, которые в дальнейшем определяют состояние здоровья.*

Ключевые слова: *Пищевое поведение, студенты, метаболические нарушения, гигиена питания, факторы риска, ожирение.*

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CHARACTERISTICS OF EATING BEHAVIOR AND POTENTIAL RISK FACTORS FOR METABOLIC DISORDERS AMONG MEDICAL UNIVERSITY STUDENTS

Annotation: Disorders of eating behavior are among the leading modifiable risk factors for the development of obesity, metabolic syndrome, type 2 diabetes mellitus, and cardiovascular diseases. According to the World Health Organization, unhealthy nutrition significantly contributes to the prevalence of chronic non-communicable diseases. Student age represents an important period for the formation of stable habits, including dietary structure and eating patterns, which subsequently determine health status.

Key words: Eating behavior, students, metabolic disorders, nutrition hygiene, risk factors, obesity.

Актуальность

Рациональное питание является важным фактором профилактики хронических неинфекционных заболеваний. По данным Всемирная организация здравоохранения, нерациональное питание способствует росту ожирения, сахарного диабета 2 типа и сердечно-сосудистых заболеваний. В студенческом возрасте из-за высокой учебной нагрузки и стресса часто формируется нерегулярный режим питания, что определяет актуальность изучения пищевого поведения студентов медицинских вузов.

Цель исследования

Оценить особенности пищевого поведения студентов медицинского вуза и выявить потенциальные факторы риска метаболических нарушений.

Методы исследования

Исследование носило одномоментный поперечный характер и включало 157 студентов Ташкентского государственного медицинского

университета. Для оценки пищевого поведения применялся опросник Adult Eating Behaviour Questionnaire (AEBQ), включающий вопросы о режиме питания, частоте потребления основных продуктов и субъективной оценке здоровья. Статистическая обработка проводилась методами описательной статистики с расчётом относительных величин (%).

Результаты исследования

Доля студентов, питающихся 1–2 раза в сутки, составила 35,7% (95% ДИ: 28,2–43,2%). Отклонение от условного референсного уровня 50% статистически значимо (χ^2 , $p = 0,0003$), что свидетельствует о высокой распространенности нерегулярного режима питания. Нерегулярный завтрак или его пропуск отмечены у 56,7% студентов (95% ДИ: 48,9–64,5%). Различия по сравнению с уровнем 50% статистически недостоверны ($p = 0,094$), однако наблюдается тенденция к превышению половины выборки. Редкое употребление овощей и фруктов выявлено у 17,2% респондентов (95% ДИ: 11,3–23,1%), что статистически значимо отличается от референсного уровня ($p < 0,001$). Ежедневное употребление фастфуда зарегистрировано у 8,3% студентов (95% ДИ: 4,0–12,6%; $p < 0,001$). Ежедневное употребление газированных напитков выявлено у 18,5% опрошенных (95% ДИ: 12,4–24,6%; $p < 0,001$). Несмотря на выявленные нарушения, 94,3% студентов оценили свое здоровье как хорошее или отличное.



Полученные данные свидетельствуют о распространенности факторов риска метаболических нарушений среди студентов. Нерегулярное питание и частое употребление фастфуда и сладких напитков повышают риск ожирения и инсулинорезистентности. Результаты подчеркивают необходимость профилактических мер по формированию культуры рационального питания среди студентов.

Вывод

У значительной части студентов выявлены нарушения режима и структуры питания. Основными факторами риска являются нерегулярное питание, недостаточное потребление овощей и фруктов, а также частое употребление фастфуда и газированных напитков. Полученные результаты

указывают на необходимость внедрения образовательных и профилактических программ в студенческой среде.

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ИГРА КАК ОСНОВНОЙ ВИД ДЕЯТЕЛЬНОСТИ (НА ПРИМЕРЕ ДОШКОЛЬНОГО ОБРАЗОВАНИЯ)

***Аннотация:** Игра приносит ребенку радость, отражает его положительные чувства и переживания, впечатления от жизни. В данной статье рассматриваются некоторые вопросы методики проведения игр как основной вид деятельности на примере дошкольного образования.*

***Ключевые слова:** дошкольное образование, проблемное обучение, интерактивные методы обучения, методы игры, педагогические задачи.*

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PLAY AS A PRIMARY ACTIVITY (BASED ON PRESCHOOL EDUCATION)

***Abstract:** Play brings joy to children and reflects their positive feelings, experiences, and impressions of life. This article examines some aspects of play methodology as a core activity, using preschool education as an example.*

***Key words:** preschool education, problem-based learning, interactive teaching methods, teacher-educator, pedagogical tasks.*

Игра как основной вид деятельности детей, играет важную роль в физическом и психическом развитии детей, в формировании их как личности, в формировании детского сообщества. Игра приносит ребенку радость, отражает его положительные чувства и переживания, впечатления от жизни. Содержание игры оказывает важное влияние на формирование личности ребенка, поэтому взрослые, направляя игру детей, должны пробуждать в них стремление отражать положительную сторону впечатлений, получаемых ими от окружающих. Ведя игру с детьми, воспитатель обогащает их знания об окружающей жизни (через это обогащается тема, содержание, сюжет игры), воспитывает у детей нравственные чувства, обоюдное позитивное отношение и привычки. Игра используется как форма организации жизни детей, в воспитании у детей чувства взаимной дружбы, дружбы, помощи друг другу. Предоставляются необходимые материалы для вовлечения детей в игру и работу, благодаря чему достигается гармония между детской игрой и работой. Воспитатель

организует для детей всевозможные сюжетно-картиночные игры, в том числе сюжетно-ролевые, конструкторские, театрализованные, игры с природными материалами. Учит детей играть, учит соблюдать принцип честности в отношениях со сверстниками. В то же время он поддерживает детское творчество, инициативу, активность и другие чувства. Творческие игры организуются во время утреннего приема, на прогулке в первой и второй половине дня, то есть во все времена, кроме дневного сна. Важную роль занимают дидактические и подвижные игры, проводимые во время обучения и вне его. Воспитатель реализует сенсорное развитие, умственное воспитание, познавательные процессы детей через дидактические игры. Необходимо создать хорошие условия для занятий физической активности детей в подвижных играх. Активные игры следует организовывать во время прогулок и проводить 1-2 раза в день всей группой или небольшой подгруппой. Различные спортивные игры проводятся в средних и старших группах. В обязанности воспитателя входит выделение в повестке дня времени для всех игр и предоставление необходимых материалов. Самостоятельная деятельность детей организуется несколько раз в течение дня: во время утреннего приема и во время прогулки. Дети играют в знакомые дидактические и подвижные игры, рисуют, что хотят, делают, что хотят (из пластилина), смотрят книги, картинки, слушают какие хотят художественные произведения. Самостоятельная деятельность детей является для них досугом, но одновременно способствует формированию у детей способности к самоорганизации, нравственной культуры, добровольческих качеств, формированию общественных отношений. Он предоставляет широкие возможности для развития уникального творчества детей в различных видах деятельности. Поэтому воспитателю необходимо руководить самостоятельной деятельностью детей: ведь советы воспитателя необходимы для того, чтобы создать им возможность делать то, что они хотят, помочь обеспечить их необходимыми материалами и оборудованием. В течение дня систематически организуя трудовую деятельность, знакомят детей с трудом взрослых. Эта работа осуществляется в мероприятиях, экскурсиях, целенаправленных прогулках, совместной работе детей со взрослыми. При этом основное внимание детей сосредоточено на пользе труда для людей, его многообразии, нравственных отношениях. Приготовление детей к еде, тренировкам, дежурству в уголке природы развивает у них чувство ответственности за задание, а вместе с тем формирует социальные чувства и отношения. Дежурство начинается во второй половине года - во второй подгруппе и продолжается во всех возрастных группах. Ежедневно в утренние часы, во время прогулок систематически организуются ручной труд, работа на природе и работа по дому детей старших и подготовительных к школе групп. Раз в неделю организуется детская коллективная работа с участием всей группы, в занятиях обучают новому виду ручного труда. В процессе работы совершенствуются трудовые навыки и умения детей, развивается их

наблюдательность, повышается их интерес, формируются нравственные качества, такие как трудолюбие, ответственность, чувство долга. Работа детей должна быть организована таким образом, чтобы повысить их физическую и умственную активность. Для этого необходимо обеспечить их всеми необходимыми материалами и инструментами. Самообслуживание является одной из форм организации детского труда. Начиная с младшей группы, детей учат самостоятельно одеваться и раздеваться. Дети старшей группы всегда должны вести себя прилично (внешний вид, прическа, одежда, обувь). Они убирают игрушки, книги, рабочие инструменты после игр и занятий. После утренних занятий, дневного сна каждый день организуется прогулка. На прогулке должны быть организованы всевозможные творческие игры, знакомые детям, и игры с новыми правилами. Важно направлять детские игры на творчество, работу и самостоятельную деятельность.

Таким образом, воспитатель создает условия для разнообразной самостоятельной деятельности детей: предоставляет необходимые материалы, оборудование, игрушки, готовит место для игр на детской площадке, в групповой комнате. Место, где проводятся игры и различные другие занятия, должно отвечать требованиям в плане гигиены (светлое, аккуратное, хорошо проветриваемое, температура воздуха нормальная).

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РАЗВИТИЕ ДОШКОЛЬНИКОВ НА ОСНОВЕ ПРОЕКТНОГО МЕТОДА

Аннотация: В статье рассматриваются педагогические возможности проектного метода в развитии дошкольников. Показано, что включение детей в доступную проектную деятельность способствует развитию познавательной активности, речи, самостоятельности, коммуникативных навыков и элементарного творческого мышления. Подчеркивается значение проектного метода как средства организации практико-ориентированного и лично значимого образовательного процесса в дошкольном возрасте.

Ключевые слова: проектный метод, дошкольное образование, развитие дошкольников, познавательная активность.

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PROJECT-BASED PRESCHOOL CHILDREN'S DEVELOPMENT

Abstract: This article examines the pedagogical potential of the project method in the development of preschool children. It shows that involving children in age-appropriate project activities contributes to the growth of cognitive activity, speech, independence, communication skills, and elementary creative thinking. The study emphasizes the importance of the project method as a means of organizing a practice-oriented and personally meaningful educational process in preschool education.

Keywords: project method, preschool education, preschool child development, cognitive activity, independence.

Введение

Современная система дошкольного образования ориентирована не только на передачу ребенку определенного объема знаний, но и на

всестороннее развитие его личности, формирование интереса к окружающему миру, навыков общения, самостоятельности и творческой инициативы. В условиях обновления содержания образования особую значимость приобретают такие педагогические подходы, которые позволяют ребенку выступать не пассивным слушателем, а активным участником образовательного процесса. Одним из таких подходов является проектный метод, который в последние годы все шире внедряется в практику дошкольных образовательных организаций.

Проектный метод представляет собой способ организации образовательной деятельности, при котором дети совместно с педагогом решают определенную практическую или познавательную задачу, связанную с их жизненным опытом, интересами и потребностями. Особенность этого метода заключается в том, что он строится вокруг конкретной проблемы, значимой для ребенка, и предполагает поиск решений через наблюдение, беседу, игру, экспериментирование, рисование, конструирование и другие виды активности. Благодаря этому обучение приобретает деятельностный и личностно ориентированный характер.

Дошкольный возраст является важнейшим этапом в становлении личности. Именно в этот период интенсивно развиваются речь, мышление, воображение, эмоционально-волевая сфера, а также формируются первоначальные социальные навыки. По этой причине выбор эффективных методов педагогического воздействия имеет принципиальное значение. Проектный метод позволяет создать условия, при которых ребенок учится задавать вопросы, выдвигать предположения, наблюдать, сравнивать, делать простые выводы и представлять результаты своей деятельности. Важно и то, что такая работа обычно осуществляется в сотрудничестве со сверстниками и взрослыми, что положительно влияет на социализацию ребенка.

Для системы дошкольного образования проектный метод ценен еще и тем, что объединяет обучение, воспитание и развитие в едином процессе. Он позволяет интегрировать различные образовательные области, связывать содержание занятий с реальной жизнью, делать образовательную деятельность более содержательной и эмоционально насыщенной. В педагогическом вузе изучение данной темы имеет особую актуальность, поскольку будущий воспитатель должен владеть современными технологиями работы с детьми, уметь проектировать развивающую среду и выбирать методы, соответствующие возрастным особенностям дошкольников. Поэтому анализ возможностей проектного метода в развитии детей дошкольного возраста представляет как теоретический, так и практический интерес.

Основная часть

Проектный метод в дошкольном образовании имеет ряд существенных преимуществ, которые делают его эффективным средством развития ребенка. Прежде всего он способствует активизации познавательной деятельности. Когда ребенок не просто получает готовую информацию, а

участвует в поиске ответа на интересующий его вопрос, у него формируется устойчивый познавательный интерес. Например, проекты, связанные с природой, семьей, временами года, профессиями или национальными традициями, побуждают детей наблюдать, задавать вопросы, сравнивать явления и делиться собственными впечатлениями. Это делает процесс обучения естественным и близким детскому опыту.

Важным результатом проектной деятельности является развитие речи. В ходе обсуждения темы, обмена мнениями, описания наблюдений и представления результатов дети учатся ясно выражать свои мысли, расширяют словарный запас, осваивают связную речь. Не менее значимо и влияние проектного метода на коммуникативные навыки. Совместная работа требует от дошкольников умения слушать друг друга, договариваться, распределять простые роли, проявлять уважение к мнению сверстников. Через такие формы взаимодействия дети постепенно осваивают основы коллективной деятельности.

Проектный метод также способствует развитию самостоятельности и ответственности. Даже простейшие задания, например выбрать материал для поделки, понаблюдать за растением, принести семейную фотографию или рассказать о домашнем животном, формируют у ребенка чувство причастности к общему делу. Он начинает понимать, что его вклад важен для достижения общего результата. Это особенно важно в условиях подготовки ребенка к дальнейшему обучению, где ценятся инициативность, организованность и способность доводить начатое до конца.

С педагогической точки зрения успешность проектного метода во многом зависит от профессиональной позиции воспитателя. Педагог должен не доминировать, а направлять детскую активность, создавать проблемные ситуации, поддерживать инициативу, помогать детям в поиске информации и организации совместной деятельности. В дошкольном возрасте проект не может строиться по модели взрослого исследования, поэтому он должен быть краткосрочным, наглядным, эмоционально привлекательным и тесно связанным с игрой. Именно сочетание игры, наблюдения, творчества и общения делает проектный метод доступным для дошкольников.

Особое значение имеет включение родителей в проектную деятельность. Семья может участвовать в сборе материалов, организации мини-исследований, изготовлении поделок, подготовке рассказов и презентации результатов. Такое сотрудничество укрепляет связь между дошкольной организацией и семьей, а также создает единое воспитательное пространство. В результате проектный метод выступает не только средством обучения, но и фактором комплексного развития дошкольника, охватывающим интеллектуальную, речевую, социальную и эмоциональную сферы.

Заключение

Таким образом, проектный метод занимает важное место в системе современных педагогических технологий дошкольного образования. Его

развивающий потенциал определяется тем, что ребенок включается в активную, осмысленную и эмоционально значимую деятельность, где знание не сообщается в готовом виде, а осваивается в процессе собственного опыта. Это особенно важно для дошкольного возраста, когда ведущими условиями развития выступают игра, общение, наглядность и практическая деятельность.

Применение проектного метода позволяет решать сразу несколько взаимосвязанных задач. С одной стороны, он расширяет кругозор ребенка, развивает его речь, мышление, наблюдательность и творческие способности. С другой стороны, он формирует личностные качества, необходимые для успешной социализации: инициативность, самостоятельность, уверенность, умение сотрудничать и доводить дело до результата. Благодаря этому проектная деятельность становится эффективным инструментом подготовки ребенка к следующему этапу образования без излишней академизации содержания дошкольного воспитания.

Для будущих специалистов в области дошкольного образования владение проектным методом имеет особую профессиональную значимость. Современный воспитатель должен уметь не только организовать занятие, но и создавать развивающие ситуации, побуждающие детей к поиску, взаимодействию и творчеству. При этом необходимо учитывать возрастные особенности дошкольников, индивидуальные различия, уровень речевого и познавательного развития, а также воспитательный потенциал семьи. Только в таком случае проектная деятельность будет действительно эффективной и педагогически оправданной.

Следовательно, развитие дошкольников на основе проектного метода следует рассматривать как перспективное направление совершенствования образовательного процесса. Этот подход обеспечивает целостность обучения, воспитания и развития, повышает качество педагогической работы и делает образовательную среду более гибкой, содержательной и ориентированной на ребенка. В условиях современного педагогического образования дальнейшее изучение и практическое освоение проектного метода представляет важную задачу подготовки квалифицированных специалистов для системы дошкольного образования.

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ИННОВАЦИОННЫЕ МЕТОДЫ В РАЗВИТИИ РЕЧИ ДЕТЕЙ ДОШКОЛЬНОГО ВОЗРАСТА

Аннотация: В статье рассматриваются инновационные методы развития речи детей дошкольного возраста в условиях современного образовательного процесса. Освещается значение игровых, интерактивных, цифровых, проектных и коммуникативно-ориентированных технологий в формировании словаря, связной речи, речевой активности и культуры общения дошкольников.

Ключевые слова: развитие речи, дошкольный возраст, инновационные методы, речевая активность, связная речь, коммуникативные навыки, игровая технология, цифровые средства, дошкольное образование.

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INNOVATIVE METHODS IN SPEECH DEVELOPMENT IN PRESCHOOL CHILDREN

Abstract: This article examines innovative methods for developing the speech of preschool children in the context of the modern educational process. The study highlights the significance of game-based, interactive, digital, project-based, and communicative approaches in the formation of vocabulary, coherent speech, verbal activity, and communication culture in preschoolers.

Keywords: speech development, preschool age, innovative methods, verbal activity, coherent speech, communication skills, game technology, digital tools, preschool education.

Введение

Развитие речи детей дошкольного возраста относится к числу важнейших направлений современного дошкольного образования, поскольку именно в ранние годы формируются основы мышления, общения, познавательной активности и социальной адаптации ребенка. Речь выступает не только средством передачи информации, но и механизмом усвоения культурных норм, выражения чувств, построения взаимоотношений со сверстниками и взрослыми. В связи с этим качество речевого развития ребенка в дошкольный период во многом определяет его дальнейшую готовность к школьному обучению, успешность в учебной деятельности и уровень коммуникативной компетентности.

Современные изменения в системе образования, обновление содержания дошкольного воспитания и внедрение новых педагогических подходов обусловили необходимость поиска более эффективных средств речевого развития детей. Традиционные методы, основанные преимущественно на повторении, пересказе и заучивании, уже не в полной мере отвечают потребностям ребенка, растущего в информационно насыщенной и технологически изменяющейся среде. Сегодня возрастает значение таких методов, которые активизируют самостоятельность ребенка, развивают его инициативность, стимулируют речевое творчество и побуждают к осмысленному использованию языка в различных ситуациях общения.

Особую актуальность приобретает применение инновационных методов, ориентированных на личностное развитие дошкольника. К таким методам относятся игровые технологии, интерактивные формы обучения, элементы театрализации, проектная деятельность, сторителлинг, использование мультимедийных ресурсов, сенсорных и визуальных опор, а также различные коммуникативные практики. Их ценность состоит в том, что они создают естественную речевую среду, в которой ребенок не просто воспроизводит слова и фразы, а учится понимать, анализировать, описывать, сравнивать, задавать вопросы и выражать собственное мнение.

Для педагогических вузов проблема инновационного развития речи детей дошкольного возраста имеет двойную значимость. С одной стороны, она связана с подготовкой будущих воспитателей, способных грамотно организовать речевую работу с детьми. С другой стороны, она требует формирования у студентов профессионального понимания современных методик, умения адаптировать их к возрастным особенностям дошкольников и учитывать специфику национальной образовательной среды. Именно поэтому исследование инновационных методов речевого развития детей дошкольного возраста представляет собой важную теоретическую и практическую задачу.

Основная часть

Инновационные методы в развитии речи детей дошкольного возраста направлены на активное включение ребенка в речевую деятельность через

интерес, взаимодействие, образность и практическое действие. Одним из наиболее результативных направлений является игровая технология. Игра выступает естественной формой деятельности дошкольника, поэтому в ее рамках дети легче осваивают новые слова, речевые конструкции, нормы диалогического общения и навыки связного высказывания. Речевые игры, сюжетно-ролевые ситуации, дидактические упражнения с проблемными заданиями способствуют развитию фонематического слуха, грамматического строя речи и коммуникативной уверенности.

Существенную роль играет метод сторителлинга, основанный на создании, пересказе и преобразовании историй. Данный подход помогает ребенку выстраивать логическую последовательность событий, активизирует воображение, расширяет словарный запас и формирует умение самостоятельно выражать мысли. Особенно эффективно использование наглядных опор, серий сюжетных картинок, тематических карточек, кубиков историй и театрализованных элементов. В процессе рассказывания ребенок не только говорит, но и учится понимать причинно-следственные связи, выделять главное и строить содержательное высказывание.

Не менее важны интерактивные методы, предполагающие совместную речевую деятельность детей и педагога. Работа в малых группах, обсуждение изображений, составление коллективных рассказов, вопросы открытого типа, речевые ситуации выбора и элементы проблемного обучения способствуют развитию инициативной речи. Ребенок начинает использовать речь как инструмент взаимодействия, аргументации и выражения отношения к происходящему. В этом аспекте инновационный подход принципиально отличается от репродуктивной модели, в которой доминирует пассивное воспроизведение готового материала.

В современных условиях возрастает значение цифровых средств. Применение аудиоматериалов, интерактивных презентаций, обучающих мультфильмов, электронных речевых игр и визуально-звуковых тренажеров усиливает мотивацию детей и делает процесс обучения более наглядным. Однако цифровые технологии эффективны лишь при педагогически обоснованном использовании. Они должны дополнять живое общение, а не заменять его. Главным условием остается организация полноценной речевой среды, в которой ребенок слышит образную, правильную, эмоционально насыщенную речь и имеет возможность сам активно говорить.

Перспективным направлением также является проектная деятельность. Небольшие тематические проекты, связанные с природой, семьей, профессиями, игрушками или временами года, побуждают детей наблюдать, обсуждать, задавать вопросы, описывать результаты и представлять их группе. В такой деятельности речь развивается как средство познания и социального взаимодействия. Следовательно, инновационные методы обеспечивают комплексное развитие речевой личности дошкольника, соединяя познавательный, эмоциональный и коммуникативный компоненты.

Заключение

Таким образом, инновационные методы развития речи детей дошкольного возраста представляют собой важное условие повышения качества дошкольного образования и совершенствования педагогической практики. Их внедрение связано с переходом от традиционного усвоения готовых речевых образцов к организации активной, мотивированной и содержательной речевой деятельности ребенка. Именно в таких условиях речь становится не механическим навыком, а полноценным средством мышления, общения, самовыражения и познания окружающего мира.

Проведенный анализ показывает, что наибольшую результативность демонстрируют методы, сочетающие игру, общение, наглядность, творчество и использование современных технологий. Игровые приемы, сторителлинг, театрализация, интерактивные задания, проектная деятельность и цифровые ресурсы способствуют обогащению словаря, развитию связной и диалогической речи, формированию способности логично излагать мысли и понимать собеседника. Важным является и то, что такие методы учитывают возрастные особенности дошкольников, их эмоциональную восприимчивость, потребность в движении, интерес к образам и стремление к совместной деятельности.

Для системы подготовки кадров в педагогическом вузе данная проблема имеет принципиальное значение. Будущий воспитатель должен владеть не только теоретическими представлениями о речевом развитии детей, но и практическими навыками применения инновационных методов в образовательном процессе. Это предполагает знание возрастной психологии, методики дошкольного обучения, основ цифровой педагогики и приемов организации развивающей речевой среды. Только при таком подходе возможно обеспечить высокий уровень профессиональной готовности специалистов к работе в современных дошкольных организациях.

Следовательно, инновационные методы в развитии речи детей дошкольного возраста необходимо рассматривать как стратегически значимый компонент современной педагогики. Их системное использование способствует формированию коммуникативно активной, познавательно развитой и социально адаптированной личности ребенка. В дальнейшем важно расширять методическую базу, совершенствовать подготовку педагогов и обеспечивать интеграцию традиционных и инновационных подходов в единую модель речевого развития дошкольников.

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ФОРМИРОВАНИЕ КУЛЬТУРЫ ЧТЕНИЯ У УЧАЩИХСЯ НАЧАЛЬНЫХ КЛАССОВ

Аннотация: В статье рассматриваются инновационные методы развития речи детей дошкольного возраста в условиях современного образовательного процесса. Освещается значение игровых, интерактивных, цифровых, проектных и коммуникативно-ориентированных технологий в формировании словаря, связной речи, речевой активности и культуры общения дошкольников.

Ключевые слова: развитие речи, дошкольный возраст, инновационные методы.

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DEVELOPING A READING CULTURE IN PRIMARY SCHOOL STUDENTS

Abstract: This article examines innovative methods for developing the speech of preschool children in the context of the modern educational process. The study highlights the significance of game-based, interactive, digital, project-based, and communicative approaches in the formation of vocabulary, coherent speech, verbal activity, and communication culture in preschoolers.

Keywords: speech development, preschool age, innovative methods, verbal activity, coherent speech, communication skills, game technology, digital tools, preschool education.

Введение

Развитие речи детей дошкольного возраста относится к числу важнейших направлений современного дошкольного образования, поскольку именно в ранние годы формируются основы мышления, общения, познавательной активности и социальной адаптации ребенка. Речь выступает

не только средством передачи информации, но и механизмом усвоения культурных норм, выражения чувств, построения взаимоотношений со сверстниками и взрослыми. В связи с этим качество речевого развития ребенка в дошкольный период во многом определяет его дальнейшую готовность к школьному обучению, успешность в учебной деятельности и уровень коммуникативной компетентности.

Современные изменения в системе образования, обновление содержания дошкольного воспитания и внедрение новых педагогических подходов обусловили необходимость поиска более эффективных средств речевого развития детей. Традиционные методы, основанные преимущественно на повторении, пересказе и заучивании, уже не в полной мере отвечают потребностям ребенка, растущего в информационно насыщенной и технологически изменяющейся среде. Сегодня возрастает значение таких методов, которые активизируют самостоятельность ребенка, развивают его инициативность, стимулируют речевое творчество и побуждают к осмысленному использованию языка в различных ситуациях общения.

Особую актуальность приобретает применение инновационных методов, ориентированных на личностное развитие дошкольника. К таким методам относятся игровые технологии, интерактивные формы обучения, элементы театрализации, проектная деятельность, сторителлинг, использование мультимедийных ресурсов, сенсорных и визуальных опор, а также различные коммуникативные практики. Их ценность состоит в том, что они создают естественную речевую среду, в которой ребенок не просто воспроизводит слова и фразы, а учится понимать, анализировать, описывать, сравнивать, задавать вопросы и выражать собственное мнение.

Для педагогических вузов проблема инновационного развития речи детей дошкольного возраста имеет двойную значимость. С одной стороны, она связана с подготовкой будущих воспитателей, способных грамотно организовать речевую работу с детьми. С другой стороны, она требует формирования у студентов профессионального понимания современных методик, умения адаптировать их к возрастным особенностям дошкольников и учитывать специфику национальной образовательной среды. Именно поэтому исследование инновационных методов речевого развития детей дошкольного возраста представляет собой важную теоретическую и практическую задачу.

Основная часть

Инновационные методы в развитии речи детей дошкольного возраста направлены на активное включение ребенка в речевую деятельность через интерес, взаимодействие, образность и практическое действие. Одним из наиболее результативных направлений является игровая технология. Игра выступает естественной формой деятельности дошкольника, поэтому в ее рамках дети легче осваивают новые слова, речевые конструкции, нормы диалогического общения и навыки связного высказывания. Речевые игры,

сюжетно-ролевые ситуации, дидактические упражнения с проблемными заданиями способствуют развитию фонематического слуха, грамматического строя речи и коммуникативной уверенности.

Существенную роль играет метод сторителлинга, основанный на создании, пересказе и преобразовании историй. Данный подход помогает ребенку выстраивать логическую последовательность событий, активизирует воображение, расширяет словарный запас и формирует умение самостоятельно выражать мысли. Особенно эффективно использование наглядных опор, серий сюжетных картинок, тематических карточек, кубиков историй и театрализованных элементов. В процессе рассказывания ребенок не только говорит, но и учится понимать причинно-следственные связи, выделять главное и строить содержательное высказывание.

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РЕИНЖИНИРИНГ БИЗНЕС-ПРОЦЕССОВ В КОММЕРЧЕСКИХ ОРГАНИЗАЦИЯХ КАК ФАКТОР РОСТА ВЫРУЧКИ

Аннотация: В статье рассматривается реинжиниринг бизнес-процессов в коммерческих организациях как один из значимых факторов роста выручки в условиях высокой конкуренции и возрастающих требований к скорости и качеству обслуживания клиентов. Раскрывается сущность реинжиниринга как подхода, ориентированного на радикальное переосмысление и глубокую перестройку ключевых процессов организации с целью достижения существенных улучшений в показателях деятельности. Особое внимание уделяется взаимосвязи между внутренней процессной эффективностью и коммерческими результатами компании. Анализируются основные направления реинжиниринга, способствующие росту выручки, включая устранение *bottlenecks*, сокращение длительности *sales cycle*, перераспределение функций между подразделениями, повышение прозрачности процессов и снижение потерь клиентов на переходах между этапами взаимодействия. Отмечаются преимущества данного подхода, связанные с повышением конверсии, ускорением операций, улучшением клиентского пути и ростом управляемости коммерческой деятельности. Одновременно рассматриваются ограничения и риски, связанные со сложностью внедрения, сопротивлением персонала, необходимостью точной диагностики проблем и затратностью организационных преобразований. Делается вывод о том, что реинжиниринг бизнес-процессов следует рассматривать не только как средство внутренней оптимизации, но и как инструмент формирования устойчивой модели роста выручки в современных коммерческих организациях.

Ключевые слова: реинжиниринг бизнес-процессов, коммерческие организации, рост выручки, бизнес-процессы, *sales cycle*, *bottlenecks*, оптимизация процессов, коммерческая эффективность

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BUSINESS PROCESS REENGINEERING IN COMMERCIAL ORGANIZATIONS AS A REVENUE GROWTH FACTOR

Abstract: The article examines business process reengineering in commercial organizations as one of the significant factors of revenue growth in

conditions of high competition and increasing demands for speed and quality of customer service. The essence of reengineering is revealed as an approach focused on radical rethinking and profound restructuring of the organization's key processes in order to achieve substantial improvements in performance indicators. Special attention is paid to the relationship between internal process efficiency and the commercial results of a company. The paper analyzes the main directions of reengineering that contribute to revenue growth, including the elimination of bottlenecks, reduction of sales cycle duration, redistribution of functions between departments, increased process transparency, and reduction of customer loss at transition points between stages of interaction. The advantages of this approach are noted, including higher conversion, accelerated operations, improved customer journey, and increased manageability of commercial activities. At the same time, the article considers limitations and risks associated with implementation complexity, employee resistance, the need for accurate diagnostics of existing problems, and the cost of organizational transformation. It is concluded that business process reengineering should be regarded not only as a means of internal optimization, but also as a tool for building a sustainable revenue growth model in modern commercial organizations.

Keywords: business process reengineering, commercial organizations, revenue growth, business processes, sales cycle, bottlenecks, process optimization, commercial efficiency

Введение

В современных условиях хозяйствования коммерческие организации функционируют в среде высокой конкуренции, ускоряющихся рыночных изменений и возрастающих требований со стороны клиентов к скорости, качеству и предсказуемости обслуживания. В такой ситуации рост выручки определяется не только активностью продаж или расширением клиентской базы, но и эффективностью внутренних процессов, обеспечивающих движение информации, принятие решений и прохождение клиента по всем этапам взаимодействия с компанией. Наличие избыточных процедур, дублирования функций, неравномерной загрузки подразделений и организационных задержек снижает способность бизнеса своевременно реагировать на запросы рынка и приводит к потерям потенциальной выручки.

В связи с этим особую значимость приобретает реинжиниринг бизнес-процессов как инструмент глубокой перестройки деятельности организации, направленной на достижение существенных улучшений по ключевым показателям результативности. В отличие от локальной оптимизации, реинжиниринг предполагает пересмотр самой логики выполнения процессов, устранение bottlenecks, сокращение временных потерь и повышение согласованности между подразделениями. Для коммерческих организаций это особенно важно, поскольку скорость обработки запроса, прозрачность этапов сделки и отсутствие сбоев на переходах между

функциями напрямую влияют на конверсию, длительность sales cycle и итоговый объем выручки [2].

Актуальность темы обусловлена тем, что во многих компаниях потенциал роста выручки сдерживается не рыночными ограничениями, а внутренней неэффективностью: затянутыми согласованиями, недостаточной координацией между отделами, неоптимальным распределением ролей и отсутствием единой процессной логики. В этих условиях реинжиниринг бизнес-процессов выступает не только как средство организационного обновления, но и как фактор повышения коммерческой результативности, позволяющий ускорить обслуживание клиентов, снизить потери на промежуточных этапах и создать условия для масштабирования продаж.

Целью данной статьи является рассмотрение реинжиниринга бизнес-процессов в коммерческих организациях как фактора роста выручки. Для достижения поставленной цели необходимо раскрыть сущность реинжиниринга бизнес-процессов, определить его значение для коммерческой деятельности, проанализировать основные направления процессной перестройки, влияющие на финансовый результат, а также выявить преимущества и ограничения данного подхода в практике современных организаций.

Сущность реинжиниринга бизнес-процессов и его значение для коммерческой организации

Реинжиниринг бизнес-процессов представляет собой подход к управлению организацией, основанный на радикальном переосмыслении и глубокой перестройке ключевых процессов с целью достижения существенных улучшений в показателях деятельности. Его сущность заключается не в частичном совершенствовании отдельных операций, а в пересмотре всей логики выполнения работы, распределения функций, движения информации и взаимодействия между подразделениями. Такой подход ориентирован на устранение устаревших схем, организационных разрывов и процедур, которые препятствуют достижению более высокой результативности [1].

В коммерческой организации значение реинжиниринга особенно велико, поскольку ее финансовый результат напрямую зависит от того, насколько быстро и согласованно внутренние процессы преобразуют клиентский интерес в заключенную сделку и последующую выручку. Даже при наличии устойчивого спроса компания может терять значительную часть дохода из-за затянутых согласований, нечеткого распределения ответственности, дублирования функций и задержек на этапах передачи информации между отделами. В подобных условиях проблема заключается не столько в недостатке рыночных возможностей, сколько в ограниченной способности самой организации эффективно использовать имеющийся коммерческий потенциал.

Реинжиниринг позволяет рассматривать деятельность компании как систему взаимосвязанных процессов, каждый из которых влияет на скорость

обслуживания клиента, качество взаимодействия и итоговую конверсию. Это особенно важно для коммерческой сферы, где любое замедление на этапе обработки лида, подготовки предложения, согласования условий или закрытия сделки увеличивает длительность sales cycle и повышает риск потери клиента. Следовательно, реинжиниринг бизнес-процессов выступает не только как инструмент организационного преобразования, но и как способ формирования более устойчивой модели роста выручки за счет устранения внутренних барьеров и повышения общей управляемости коммерческой деятельности.

Основные направления реинжиниринга бизнес-процессов как фактора роста выручки

Влияние реинжиниринга бизнес-процессов на рост выручки проявляется прежде всего через перестройку тех участков деятельности, которые непосредственно связаны с движением клиента, скоростью принятия решений и способностью организации доводить коммерческое взаимодействие до результата. Одним из важнейших направлений такой перестройки является выявление и устранение bottlenecks, то есть узких мест, замедляющих прохождение процессов и создающих потери времени на критически значимых этапах. В коммерческих организациях подобные ограничения нередко возникают при передаче клиента между отделами, на стадии согласования коммерческих условий, при подготовке документов или в процессе внутреннего утверждения решений. Их устранение позволяет не только ускорить операции, но и сократить число клиентов, теряющихся до завершения сделки [3].

Существенным направлением реинжиниринга выступает сокращение длительности sales cycle. Чем больше времени проходит между первичным обращением клиента и заключением сделки, тем выше вероятность снижения интереса, ухода к конкурентам или потери актуальности предложения. Поэтому перестройка процессов в сторону большей скорости, прозрачности и согласованности создает прямые предпосылки для роста выручки. Это может достигаться за счет сокращения числа промежуточных этапов, упрощения внутренних согласований, перераспределения полномочий и внедрения более четких регламентов взаимодействия между подразделениями. В результате организация получает возможность быстрее реагировать на запросы рынка и увеличивать оборачиваемость коммерческих операций.

Еще одним значимым направлением является перераспределение функций и ответственности между подразделениями. Во многих коммерческих организациях именно нечеткость ролей становится причиной дублирования действий, управленческой перегрузки и снижения качества клиентского пути. Реинжиниринг позволяет выстроить более логичную процессную архитектуру, при которой каждый этап имеет понятного исполнителя, измеримый результат и ясную связь с последующей стадией. Это особенно важно в тех случаях, когда рост выручки зависит не только от

усилий отдела продаж, но и от согласованной работы маркетинга, клиентского сервиса, операционного блока, аналитики и руководства.

Немаловажное значение имеет повышение прозрачности процессов и снижение потерь клиентов на переходах между этапами взаимодействия. Если компания не контролирует, где именно замедляется движение сделки, на каком этапе клиент прекращает коммуникацию или почему заявка не доходит до финального результата, она фактически теряет часть выручки из-за отсутствия управляемости. Реинжиниринг в данном случае создает основу для более точного контроля, стандартизации и измерения ключевых этапов коммерческой деятельности. Тем самым рост выручки становится следствием не только увеличения рыночной активности, но и внутренней способности организации быстрее, точнее и стабильнее преобразовывать коммерческие возможности в финансовый результат.

Преимущества и ограничения реинжиниринга бизнес-процессов в коммерческих организациях

Реинжиниринг бизнес-процессов обладает значительным потенциалом как инструмент повышения коммерческой эффективности и роста выручки. Его основное преимущество заключается в возможности добиться не локальных, а системных улучшений, затрагивающих всю логику работы организации. За счет устранения избыточных операций, сокращения временных потерь, более четкого распределения функций и согласования действий между подразделениями компания получает возможность ускорить обслуживание клиентов, повысить конверсию и сократить потери на промежуточных этапах взаимодействия. В результате рост выручки становится следствием не только внешней рыночной активности, но и внутреннего повышения результативности бизнеса.

Важным преимуществом реинжиниринга является также повышение управляемости коммерческих процессов. При наличии прозрачной процессной структуры организация получает возможность точнее контролировать движение клиента, выявлять проблемные участки sales cycle, оценивать нагрузку на подразделения и быстрее принимать корректирующие решения. Это способствует не только увеличению текущей выручки, но и формирует условия для дальнейшего масштабирования бизнеса. Кроме того, реинжиниринг способствует улучшению качества клиентского пути, поскольку уменьшает количество сбоев, задержек и противоречий во взаимодействии с компанией, что положительно влияет на лояльность клиентов и вероятность повторных продаж.

Вместе с тем внедрение реинжиниринга связано с рядом ограничений и рисков. Прежде всего, глубокая перестройка процессов требует высокой управленческой готовности, точной диагностики существующих проблем и способности организации проводить изменения последовательно и системно. При недостаточном понимании причин низкой эффективности существует риск сосредоточиться на внешних проявлениях проблем, не устраняя их источники. Дополнительной сложностью является сопротивление персонала,

которое может возникать вследствие изменения привычных ролей, перераспределения ответственности и усиления контроля над результатами деятельности [4].

Кроме того, реинжиниринг требует временных, организационных и нередко финансовых затрат, что делает его реализацию особенно чувствительной для компаний с ограниченными ресурсами. Ошибки на этапе проектирования новых процессов способны привести не к ускорению, а к дополнительной дезорганизации работы, временной потере управляемости и снижению качества обслуживания клиентов. Таким образом, реинжиниринг бизнес-процессов в коммерческих организациях следует рассматривать как перспективный, но сложный инструмент, эффективность которого определяется не только масштабом изменений, но и качеством их подготовки, внедрения и последующего сопровождения.

Заключение

Реинжиниринг бизнес-процессов в коммерческих организациях представляет собой важный фактор роста выручки, поскольку позволяет устранить внутренние ограничения, замедляющие движение клиента и снижающие результативность коммерческой деятельности. Проведенный анализ показывает, что рост выручки во многом зависит не только от объема спроса и активности продаж, но и от способности организации быстро, последовательно и без потерь преобразовывать коммерческие возможности в финансовый результат.

Особое значение реинжиниринг приобретает в условиях, когда развитие компании сдерживается bottlenecks, затянутыми согласованиями, неэффективным распределением функций и недостаточной прозрачностью sales cycle. Перестройка бизнес-процессов в таких условиях создает предпосылки для повышения конверсии, ускорения операций, улучшения клиентского пути и более рационального использования внутренних ресурсов. Тем самым реинжиниринг выступает не только как средство организационного обновления, но и как инструмент формирования более устойчивой и масштабируемой модели коммерческого роста.

В целом можно сделать вывод, что наибольший эффект реинжиниринг бизнес-процессов дает тогда, когда он затрагивает не отдельные элементы деятельности, а целостную систему взаимодействия подразделений, информации и клиента внутри организации. Именно такой подход позволяет рассматривать процессные преобразования как один из ключевых факторов повышения выручки в современных коммерческих организациях.

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СОЗДАНИЕ ЛОР-ТЕРМИНОВ В ФОРМЕ ПАРНЫХ СЛОВ КОМПОЗИЦИОННЫМ МЕТОДОМ (В АНГЛИЙСКОМ И УЗБЕКСКОМ ЯЗЫКАХ)

***Аннотация.** В данной статье мы рассмотрим образование ЛОР-терминов в форме парных слов композиционным способом. В английском языке парные ЛОР-термины в основном являются простыми, широкими и активно используемыми отраслевыми терминами, а двусоставные лексемы в большинстве случаев используются без сокращений. Парнословные ЛОР-термины также образуются из равной связи двух компонентов, представляющих самостоятельное лексическое значение, которые разделяются дефисом и выражают значения обобщения, суммирования. Также они проявляются в произношении как одна лексема посредством единого лексического ударения.*

***Ключевые слова:** отоларингология, компонент, лексема, парное слово, термин, композиционный метод, греческий, стандартизация, заболевания, функция, лексическое ударение.*

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COMPOSITIONAL FORMATION OF ENT TERMS IN PAIRED WORD FORMS (IN ENGLISH AND UZBEK)

***Abstract.** In this article, we will consider the compositional formation of LOR terms in the form of paired words. In the English language, paired LOR terms are mainly simple and widely and actively used field terms, and they are used without abbreviation in most cases of two-component lexemes. LOR terms with paired words are also formed from the equal connection of two components with independent lexical meanings, which are separated by a hyphen and express the meanings of generalization and aggregation. Also, they are manifested in their pronunciation as a single lexeme through a single lexical stress.*

***Keywords:** otolaryngology, component, lexeme, paired word, term, compositional method, Greek, standardization, diseases, function, lexical stress.*

ВВЕДЕНИЕ

В лингвистике лексические единицы могут быть образованы различными способами. Одним из них является создание слов или терминов композиционным способом. Под терминообразованием композиционным способом понимается сочетание двух или более слов, имеющих

самостоятельное значение. Другими словами, подразумеваются сложные лексические единицы, образованные в результате взаимной комбинации двух или более лексических единиц со свободной формой. При этом создаются сложные и составные слова с новым значением. Слова и термины, образованные этим методом, выражают новое понятие, предмет или реальность через свои компоненты.

Научное изучение ЛОР-терминов в сопоставляемых языках показывает, что сложные термины, соединенные между собой методом композиции, как и корневые слова, то есть термины, состоящие из отдельной морфемы, количественно не преобладают. С точки зрения их малочисленности, можно сказать, что сложные ЛОР-термины занимают второе место после основных ЛОР-терминов.

АНАЛИЗ ЛИТЕРАТУРЫ И МЕТОДЫ

До сегодняшнего дня вопрос образования слов в лингвистике композиционным методом был одним из объектов исследования ряда лингвистов. Процесс словообразования посредством композиционного метода является одним из основных средств создания новых слов в языках, и различные лингвистические школы и ученые высказали свои научно-теоретические мнения по этому вопросу.

Результаты анализа источников, относящихся к исследованию, показывают, что первые научно-теоретические идеи о словообразовании посредством композиционного метода были высказаны лингвистами античного периода. Например, Аристотель и Платон, рассуждая о словах в языке и процессах их образования, показали различные способы словообразования в языке. В этот период основное внимание уделялось морфологическим и синтаксическим процессам, а словообразование и его различные стили изучались в рамках общего языкознания [1, 284].

Как правильно отметил П.М.Каршук, серьезные исследования по композиционному словообразованию в современной лингвистике появились в XIX-XX веках. В частности, немецкие лингвисты Юлий Курциус и Август Шлайхер высказывали различные мнения о морфологических процессах композиционного словообразования. По их мнению, композиционные слова образуются путем соединения двух или более различных слов, и их значение также обновляется на основе значений двух основных слов [2, 93]. По мнению ученого, Юлий Курциус, размышляя о роли морфем в образовании композиционных слов и их вхождении в различные структуры, разработал специфические научно-теоретические правила этого процесса. Согласно ему, главная особенность композиционных слов заключается в том, что эти слова проявляют свое первоначальное и конечное значение в неразрывной связи со значениями своих компонентов [2, 93].

Также, по признанию другого русского лингвиста О.Д.Мешкова, Хомский показывает взаимосвязь синтаксиса и морфологии в лингвистике и подчеркивает, что композиционные слова формируются в зависимости от синтаксических теоретических правил. По его мнению, композиционные

слова являются одной из универсальных особенностей языка, и они соответствуют общим структурным правилам языка [3, 215]. Кроме того, А.В.Чанчина, один из ученых, изучавших процессы словообразования в языке с структурно-функциональной точки зрения, выдвигает следующие идеи в своей научной статье. "Основная функция языка - выполнение коммуникативно-прагматической функции, и композиционные слова также играют важную роль в выполнении этой функции. Функция и значение лексических единиц, образованных композиционным способом, их семантическое окружение объясняются в связи с различными коммуникативными процессами в языке" [4, 269]. Продолжая свое выступление, ученый подчеркивает, что в процессе образования композиционных слов существует несколько важных принципов и критериев.

В узбекском языке мы также можем видеть парные ЛОР-термины. Они отличаются тем, что представляют различные органы, болезни и процессы в медицине. Например: ear - infection - quloq infeksiyasi; nasal - polyps - burun poliplari; sinus - headache - sinusli bosh og'rig'i; throat - cancer - tomoq saratoni; tonsil - stones - bodomsimon bez toshlari; ear - drum - nog'ora parda; sinus - infection - sinus infeksiyasi; nasal - congestion - burun bitishi; throat - infection - tomoq infeksiyasi; ear - canal - quloq kanali; nasal - passage - burun yo'llari; throat-irritation - tomoq qichishi; vocal - cords - ovoz boylamlari; ear - wax - quloq moyi (sir); tonsil - infection - bodom.

ВЫВОДЫ

В качестве примеров в узбекском языке можно привести следующие. Например: quloq - pardasi (орган слуха, важная часть уха); quloq - yo'li (слуховой проход); quloq - infeksiyasi (Инфекционное заболевание уха); quloq - suvoqi (внутриушной жир); burun - tiqilishi (закрытие носовых ходов, затрудненное дыхание); burun - poliplari (возникновение опухолей в носу); sinus - infeksiyasi (воспаление синусовых пазух); sinus - og'rig'i (головная или лицевая боль, обусловленная воспалением пазух); tomoq - bodomchasi (орган горла с защитной функцией); tomoq - infeksiyasi (инфекционное состояние горла); tomoq - og'rig'i (боль в горле, вызванная воспалением или инфекцией); tovush - raylari (голосовые связки); bodomcha - yallig'lanishi (воспалительное состояние миндалин горла); burun - yo'laklari (носовые дыхательные пути); quloq - shovqini (выслушивание внутренних шумов или звуков в ухе); tomoq - raki (опухоль горла); burun - qon ketishi (состояние носового кровотечения); sinus - bosh og'rig'i (головная боль, связанная с синусами) singari juft so'zli terminlar shular qatoridan o'rin egallashi mumkin.

На приведенных выше примерах можно понять, какие заболевания или состояния, связанные с органами тела человека, обозначают такие парные термины, используемые в области ЛОР (отоларингологии). Термины во многих случаях семантически совпадают друг с другом в обоих языках. Они служат для выражения концептуальной сущности основных понятий, используемых в области медицины. Одна из основных причин этого

заключается в том, что большинство медицинских терминов заимствованы из латинского и греческого языков и обобщены на международном уровне.

Следует особо отметить, что отраслевые термины, присутствующие в ЛОР-лексике сопоставляемых языков, представлены парными словами, что во многом неразрывно связано с их функцией четкого и точного описания предмета, реальности, органов человеческого тела. То есть, по сравнению с однокомпонентными терминами в ЛОР-лексике, термины с парными словами имеют адекватное значение, и через них появляется возможность более полно объяснить и выразить определенный орган тела, состояние или болезнь.

Конечно, аксиомой, не требующей доказательств, является то, что медицинские, в частности ЛОР-лексические единицы, объединяющие два или более элемента посредством парных терминов, служат для правильного выражения взаимосвязи сложных или нескольких частей тела или состояний. Этот процесс, конечно, объясняется тем, что он восходит к лексикологическому и морфологическому уровням языка.

ОБСУЖДЕНИЕ

В процессе исследования мы попытались найти ответ на вопрос: какова цель создания медицинских терминов композиционным способом и каково их значение? и предоставить подробную информацию по этому поводу:

1. Обеспечение ясности и понятности в рамках отраслевого диалога.

Следует отметить, что точность и понятность имеют большое значение в общении в медицине, особенно в ЛОР-сфере. Большинство проблем в области ЛОР часто затрагивают несколько органов тела пациента одновременно или возникают при их взаимодействии. Поэтому при объяснении этих частей и состояний тела необходимо использовать парные слова. Например: ушная инфекция определяет, в какой именно части ушной инфекции находится ухо. Под этим словом понимают данное состояние как общую инфекцию уха. Также носовая непроходимость представляет собой непроходимость носовых ходов или проблему с дыханием. В данном случае одно слово "закупорка" может обозначать не только нос, но и другие части тела. Например, в медицине подразумевается "пробка тромбов в кровеносные сосуды" или пробка чего-либо в горло/ухо человека. По этой причине использование в данной ситуации парных слов "нос - заложенность" обеспечивает большей точности в процессе общения.

2. Описание комплексных явлений в ЛОР-зоне.

Следует особо отметить, что большинство случаев или заболеваний в ЛОР-зоне затрагивают несколько органов тела одновременно. Парные слова лучше описывают широкий семантико-функциональный охват таких случаев. Например: sinus - инфекция - объясняет состояние инфекции в синусах. Обычно лексема "инфекция" чрезвычайно общая и может обозначать любую инфекцию. Когда он используется вместе с термином "синус," он служит для определения инфекции в определенном органе тела.

Также "миндалина горла" - этот термин обозначает определенную часть горла, ткани, связанные с иммунной системой. Парные слова помогают отличить этот орган от других частей тела в процессе общения.

3. Упрощение уровня сложности значений языковых единиц в ЛОР-области общения.

В большинстве случаев термины в форме парных слов служат для дальнейшего уточнения, расширения значений лексических единиц и объединения различных значений в одном слове. Например: ухо - штукатурка - это жирное вещество, выделяющееся из уха, и с помощью парных терминов уточняется, как и в каком органе образуется это вещество. Также одним из наиболее активно используемых терминов в области ЛОР является терминологическая единица "носовые полипы," которая используется для точного объяснения и описания образования опухолей в носу.

4. В целях обеспечения стандартизации медицинской, в частности ЛОР-терминологии.

В области медицины одной из важнейших задач является доведение специфической информации до пациента в понятной и стандартизированной форме. Парные слова способствуют единообразному пониманию, выражению и использованию терминов в медицинской лексике. Например, такие парные термины, как "quloq - infeksiyasi" или "tomoq - og'rig'i," "quloq - og'rig'i," "halqum - o'smasi," позволяют передавать одинаковую информацию, одинаково понимать и использовать. Потому что они описывают отдельные медицинские состояния с помощью четких и стандартных понятий.

5. В целях определения общих понятий в области ЛОР:

Следует отметить, что с помощью сложных слов или парных слов создается возможность уточнения общих понятий, связанных с заболеваниями в деятельности ЛОР-зоны в узком кругу. Например: боль в горле - это общее понятие, а слово "болезнь/sore, ache" - одна из самых широких лексем. Однако сочетание терминов "томоқ - throat" и "оғриқ-ache" четко выражает боль в горле. Также заложенность носа означает не только затруднение дыхания, но и неловкое положение в носу. В этом смысле можно сказать, что термины с парными словами, широко используемые в деятельности ЛОР-сферы, конечно, позволяют широко объяснять и интерпретировать состояния, связанные с определенными органами, заболеваниями или функциями.

6. В целях обеспечения соответствия международной терминологии в области медицины, в частности в области ЛОР:

Следует отметить, что медицинская лексика в разносистемных языках в большинстве случаев лексико-семантически схожа, а международные термины могут выражать одинаковые значения с одинаковыми парными словами. Многие ЛОР-термины, представленные через парные слова, понимаются одинаково на международном уровне, поскольку они основаны на общих медицинских знаниях и терминах. Например: throat infection (в

английском) - tomoq infeksiyasi (в узбекском); nasal congestion (в английском) - burun tiqilishi (в узбекском). Эти случаи помогают правильно понимать и осмысливать термины, относящиеся к данной области, в межкультурной коммуникации. Таким образом, тот факт, что некоторые термины в деятельности ЛОР-сферы представлены через парные слова, важен для обеспечения точности, конкретного описания и правильной передачи информации в общении. Кроме того, сложные отраслевые термины, выраженные с помощью парных слов, служат эффективным средством выражения понятий, связанных с несколькими частями тела человека, болезнями или состояниями. Парные термины в медицинской области более удобны для более широкого и конкретного объяснения заболеваний, органов и их состояний, поэтому они широко используются в практике отрасли.

ЗАКЛЮЧЕНИЕ

Выше мы подробно проанализировали и исследовали ЛОР-термины в форме сложных слов, ЛОР-термины в форме парных слов с научно-теоретической точки зрения и осуществили их тематическое описание. В заключение можно сказать, что ЛОР-термины в форме парных слов обеспечивают точность и простоту в процессе взаимодействия. Через них можно легко объяснить заболевания и медицинские ситуации как членам общества, так и специалистам. Термины, образованные другими способами, более активно используются среди специалистов.

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**ПРОГНОСТИЧЕСКОЕ МОДЕЛИРОВАНИЕ РЕГЕНЕРАТОРНОГО
ПОТЕНЦИАЛА ДЕРМЫ РАЗЛИЧНЫХ МОРФОТИПОВ ПОСЛЕ
ПРОВЕДЕНИЯ ИНЪЕКЦИОННОЙ КОРРЕКЦИИ С ПРИМЕНЕНИЕМ
АЛГОРИТМОВ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА**

Аннотация: В статье рассматриваются вопросы персонализированного подхода в инъекционной косметологии на основе гистологических и морфометрических параметров кожи. Представлены результаты разработки прогностической модели, использующей сверточные нейронные сети (CNN) для оценки регенераторного ответа дермы на введение препаратов гиалуроновой кислоты у пациентов с различными морфотипами старения.

Ключевые слова: Морфология кожи, дерма, инъекционная коррекция, искусственный интеллект, глубокое обучение, регенерация, Узбекистан.

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PREDICTIVE MODELING OF DERMAL REGENERATIVE POTENTIAL ACROSS VARIOUS MORPHOTYPES FOLLOWING INJECTABLE CORRECTION USING ARTIFICIAL INTELLIGENCE ALGORITHMS

Annotation: *The article explores personalized approaches in injectable cosmetology based on the histological and morphometric parameters of the skin. It presents the development of a predictive model utilizing convolutional neural networks (CNN) to evaluate the dermal regenerative response to hyaluronic acid injections in patients with various aging morphotypes.*

Key words: *Skin morphology, Dermis, Injectable correction, Artificial intelligence, Deep learning, Regeneration, Uzbekistan.*

Актуальность

Актуальность исследования обусловлена внедрением цифровых технологий в клиническую морфологию и эстетическую медицину. В условиях высокой инсоляции Узбекистана процессы фотостарения усиливаются, тогда как оценка эффективности инъекционной коррекции часто остаётся субъективной. Использование систем поддержки принятия решений и искусственного интеллекта позволяет прогнозировать терапевтический ответ и оптимизировать выбор препаратов с учётом индивидуальных морфотипов старения.

Цель исследования

Определить ключевые морфологические особенности мезентериальных лимфатических узлов в норме и при различных патологических состояниях, а также выявить структурные изменения, отражающие характер иммунного ответа.

Методы исследования

Исследование включало 120 женщин 35–55 лет с различными морфотипами старения. Проведён анализ цифровых гистологических изображений биоптатов кожи с применением Python и нейросети U-Net. Регенераторный потенциал оценивали по интегральному индексу, учитывающему плотность коллагена, васкуляризацию и коэффициент биологического возраста.

Результаты исследования

Нами была обучена модель на наборе из 5000 аннотированных цифровых микропрепаратов.

Морфометрические показатели до коррекции:

При деформационном морфотипе отмечено снижение плотности коллагена при сохранной васкуляризации, тогда как при мелкоморщинистом морфотипе выявлен выраженный эластоз.

Таблица 1.
Сравнительные морфометрические параметры
дермы по морфотипам
(данные ИИ-анализа)

Морфотип	Индекс васкуляризации (%)	Плотность коллагена (мкм ²)	Уровень гидратации матрикса
Усталый	12.4 ± 0.5	68.2 ± 3.1	Средний
Мелкоморщинистый	8.2 ± 0.9	45.6 ± 2.8	Низкий
Деформационный	14.1 ± 1.2	55.4 ± 4.2	Высокий (отечный)

Прогностическое моделирование:

Алгоритм ИИ показал наибольший регенераторный ответ при усталом морфотипе (25–30% увеличения синтеза коллагена). Для деформационного морфотипа рекомендована комбинированная терапия; точность модели составила 94,2% и подтверждена контрольными биопсиями через 6 месяцев.

Обсуждение

Алгоритмы глубокого обучения выявляют скрытые морфологические паттерны: ориентация коллагеновых волокон относительно сосудов микроциркуляции является более значимым предиктором регенерации, чем толщина дермы. Разработанная модель может применяться для «виртуальной биопсии» на основе данных дерматоскопии и высокочастотного УЗИ кожи.

Вывод

Искусственный интеллект обеспечивает объективную количественную оценку состояния дермы. Регенераторный потенциал зависит от морфотипа старения, что требует дифференцированного подхода к коррекции. Прогностическая модель снижает риск неэффективности процедур и способствует развитию персонализированной косметологии.

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**СПОРТЧИЛАР ЮРАГИ МОРФОЛОГИЯСИ ВА УЗОҚ МУДДАТЛИ
ЭКГ-ХОЛТЕР МОНИТОРИНГИДА СУНЪИЙ ИНТЕЛЛЕКТДАН
ФОЙДАЛАНИШ: ФИЗИОЛОГИК ВА ПАТОЛОГИК ЎЗГАРИШЛАР
ДИФФ-ДИАГНОСТИКАСИ**

***Аннотация:** Мақолада спорт билан мунтазам шугулланувчи шахсларда юрак миокардининг морфологик ремоделланиши ва унинг ЭКГ-кўрсаткичларига таъсири таҳлил қилинади. Сунъий интеллект (AI) алгоритмлари ёрдамида Холтер мониторинги маълумотларини қайта ишлаш орқали физиологик «спортчи юраги» ва хавфли патологик ҳолатларни (гипертрофик кардиомиопатия) дифференциал диагностика қилишининг янги истиқболлари ёритилган.*

***Калит сўзлар:** Спортчи юраги, миокард морфологияси, ЭКГ-Холтер, сунъий интеллект, рақамли тиббиёт, Ўзбекистон.*

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MORPHOLOGY OF THE ATHLETE'S HEART AND THE USE OF ARTIFICIAL INTELLIGENCE IN LONG-TERM HOLTER ECG MONITORING: DIFFERENTIAL DIAGNOSIS OF PHYSIOLOGICAL AND PATHOLOGICAL CHANGES

Annotation: This article analyzes the morphological remodeling of the myocardium in individuals engaged in systematic athletic training and its impact on ECG parameters. It highlights new perspectives in the differential diagnosis of physiological 'athlete's heart' versus life-threatening pathological conditions, such as hypertrophic cardiomyopathy, through the processing of Holter monitoring data using artificial intelligence (AI) algorithms.

Key words: Athlete's heart, Myocardial morphology, Holter ECG monitoring, Digital medicine

Кириш

Ўзбекистонда спортни оммалаштириш ва тиббиётни рақамлаштириш («Рақамли Ўзбекистон – 2030») давлат сиёсатининг муҳим йўналишларидан ҳисобланади. Юқори малакали спортчиларда «спортчи юраги» физиологик гипертрофия билан намоён бўлади, аммо у айрим кардиомиопатиялар билан ўхшаш ЭКГ белгиларига эга. ЭКГ-Холтер мониторингига сунъий интеллектни жорий этиш микроўзгаришларни аниқлаш ва ташхис аниқлигини оширишга хизмат қилади.

Миокарднинг морфологик ремоделланиши: гистологик жиҳатлар. Спортчиларда миокард ремоделланиши юклама турига боғлиқ ҳолда эксцентрик ва концентрик гипертрофия шаклларида намоён бўлади: динамик юкламаларда юрак бўшлиқларининг дилатацияси ва кардиомиоцитларнинг узунасига ўсиши, статик юкламаларда эса миокард деворининг қалинлашиши кузатилади. Физиологик гипертрофия гистологик жиҳатдан капиллярлар зичлигининг сақланиши ва интерстициал фибрознинг йўқлиги билан тавсифланса, патологик ҳолатларда кардиомиоцитлар дисарраги ва фиброз ривожланиши электр импульслари ўтказилишига салбий таъсир кўрсатади. Замонавий ЭКГ-Холтер мониторинги катта ҳажмдаги юрак фаолияти маълумотларини қайд этади, шунинг учун сунъий интеллект алгоритмларидан фойдаланиш уларни аниқ таҳлил қилиш имконини беради. Хусусан, deep learning асосидаги конволюцион нейротармоқлар ЭКГ сигналининг морфологиясини таҳлил қилиб, физиологик ва патологик ўзгаришларни фарқлашга хизмат қилади, big data ёндашуви эса популяцияга хос электрофизиологик хусусиятларни ҳисобга олиш имконини яратади.

Тадқиқот натижалари ва таҳлил (адабиётлар шарҳи асосида)

Сўнгги йиллардаги тадқиқотлар шуни кўрсатадики, AI ёрдамида ЭКГ ни таҳлил қилиш «кулранг зона» (12-15 мм қалинликдаги миокард девори) муаммосини ҳал қилишда самаралидир.

Жадвал 1

**Физиологик ва патологик ўзгаришларнинг
АІ-диагностика мезонлари**

Кўрсаткич	Спортчи юраги (Физиологик)	Кардиомиопатия (Патологик)	АІ хулосаси
QRS вольтаж	Баланд (ишчи гипертрофия)	Юқори ёки паст	Спектрал таҳлил
ST-сегменти	Эрта реполяризация	Депрессия	Морфологик сегментация
T-тиши	Конкорд инверсия (V1-V3)	Чуқур инверсия (V4-V6)	Классификация (CNN)
QTc интервали	Меъёрда ёки чегарада	Узайган	Автоматлаштирилган ўлчов

Ўзбекистонлик олимлар (Ризаев Ж.А. ва бошқ., 2023) таъкидлашича, спортчиларда тиш ва интервалларнинг ўзгариши кўпинча вегетатив нерв тизимининг қайта қурилиши билан боғлиқ бўлиб, АІ буни патологиядан ажратишда 92,4% аниқлик кўрсатмоқда.

Муҳокама ва Ўзбекистонда рақамли тиббиёт истиқболлари

Тиббиётнинг рақамлашиши шароитида ЭКГ-Холтер маълумотлари «булутли технологиялар» (Cloud computing) орқали марказлаштирилган таҳлил тизимларига юборилади. Бу айниқса чекка ҳудудлардаги спорт мактабларида юқори малакали кардиолог етишмаслиги муаммосини ҳал қилади.

АІ тизими "спортчи юраги" морфологиясини таҳлил қилар экан, у нафақат жорий ҳолатни, балки келажакдаги хавфларни ҳам прогноз қила олади. Бу эса спортчиларни тайёрлаш жараёнини индивидуаллаштириш ва уларнинг саломатлигини сақлашда инқилобий қадамдир.

Хулоса

Спортчиларда миокарднинг физиологик ремоделланиши ЭКГ сигналларида ўзига хос ўзгаришларни келтириб чиқаради, шунинг учун уларни патологиядан аниқ фарқлаш муҳимдир. Холтер мониторинги маълумотларини сунъий интеллект орқали таҳлил қилиш тўсатдан юрак ўлими хавфини эрта баҳолаш имконини беради ва спорт тиббиёти самарадорлигини оширади.

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**КОСМЕТИКА ВОСИТАЛАРИ ТАРКИБИДАГИ КИМЁВИЙ
ИНГРЕДИЕНТЛАРНИНГ ЭПИДЕРМИС БАРЬЕР ФУНКЦИЯСИГА
ТАЪСИРИНИ НЕЙРОТАРМОҚЛИ МОРФОМЕТРИЯ ЁРДАМИДА
ГИГИЕНИК БАҲОЛАШ**

Аннотация: Мақолада замонавий косметика воситалари таркибидаги синтетик ингредиентларнинг (парабенлар, сульфатлар, фталатлар) эпидермиснинг шох қавати ва барьер функциясига таъсири ўрганилган. Тадқиқотда нейротармоқли морфометрия усули қўлланилиб, тўқималардаги микроструктуравий ўзгаришларни автоматлаштирилган ҳолда баҳолаш имкониятлари таҳлил қилинган. Олинган натижалар косметика воситаларининг гигиеник хавфсизлигини таъминлашда рақамли морфологиянинг ўрнини белгилаб беради.

Калит сўзлар: Эпидермис, барьер функцияси, косметика, гигиена, нейротармоқ, морфометрия, рақамли тиббиёт.

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HYGIENIC ASSESSMENT OF THE EFFECTS OF CHEMICAL INGREDIENTS IN COSMETIC PRODUCTS ON THE EPIDERMAL BARRIER FUNCTION USING NEURAL NETWORK–BASED MORPHOMETRY

Annotation: *The article investigates the effects of synthetic ingredients commonly found in modern cosmetic products (parabens, sulfates, and phthalates) on the stratum corneum and the barrier function of the epidermis. The study employs a neural network–based morphometric approach, enabling automated assessment of microstructural changes in tissues. The obtained results highlight the role of digital morphology in ensuring the hygienic safety of cosmetic products.*

Key words: *Epidermis, barrier function, cosmetics, hygiene, neural networks, morphometry, digital medicine.*

Кириш

Глобаллашув ва кимё саноатининг ривожланиши косметика воситаларининг тури ва таркибини мураккаблаштириб, уларнинг гигиеник хавфсизлигини назорат қилишнинг янги усуллари талаб этмоқда. Ўзбекистонда маҳаллий ва импорт маҳсулотлар сони ортиши бу масалани янада долзарб қилади, «Рақамли Ўзбекистон – 2030» дастури эса тиббий экспертиза ва гигиеник назоратни автоматлаштиришни устувор вазифа сифатида белгилайди. Эпидермис ташқи муҳит билан биринчи ҳимоя баръери бўлиб, кимёвий моддаларнинг сурункали таъсири унинг бузилишига ва турли патологик, жумладан тизимли токсик таъсирларга олиб келиши мумкин. Шу боис, субъективликдан холи бўлган нейротармоқли морфометрия усуллари жорий этиш муҳим аҳамиятга эга.

Эпидермиснинг морфофункционал баръери ва кимёвий таъсир

Эпидермиснинг ҳимоя функцияси асосан шох қават (stratum corneum) ва хужайралараро липид матрикси билан таъминланади. Косметика таркибидаги сирт-фаол моддалар (SLS/SLES) ва консервантлар (парабенлар) кератиноцитлар ўртасидаги десмосомал алоқаларни кучсизлантириши ва липид қаватини эритиб юбориши аниқланган.

Гистологик даражада бу қуйидагича намоён бўлади:

1. Акантоз: Тикансимон қаватнинг патологик қалинлашиши.
2. Паракератоз: Шох қаватда ядроларнинг сақланиб қолиши, бу баръернинг етишмовчилигидан далолат беради.
3. Спонгиоз: Хужайралараро шиш ва контактларнинг бузилиши.

Нейротармоқли морфометрия: методологик ёндашув

Тадқиқотда гистологик препаратларнинг рақамли нусхаларини таҳлил қилиш учун конволюцион нейротармоқлар (CNN) асосида алгоритм ишлаб чиқилди; у Python муҳитида TensorFlow ва PyTorch кутубхоналарида амалга оширилиб, U-Net архитектураси орқали эпидермис қаватлари автоматик сегментация қилинди. Морфометрия доирасида шох қават қалинлиги (hsc),

донадор қават зичлиги ва кератиноцитлар деформация коэффиценти миқдорий баҳоланди. Нейротармоқ текстуралӣ ўзгаришлар, яъни барьер дисфункциясининг рақамли маркерларини аниқлашга мослаштирилди. Олинган ёндашув асосида Ўзбекистонда кенг қўлланиладиган 5 турдаги юз ювиш воситалари ва кремларининг таъсири морфологик жиҳатдан баҳоланди.

Жадвал 1

Кимёвий таъсирдан кейинги эпидермис морфометрик кўрсаткичлари (АІ таҳлили)

Ингредиентлар гуруҳи	Шох қават қалинлиги (мкм)	Барьер зичлиги индекси (0-1)	Микро-яллиғланиш коэффиценти
Назорат гуруҳи	15.4 ± 0.8	0.94	Паст
Сульфатлар (SLS)	10.2 ± 1.2	0.62	Юқори
Парабенлар	18.6 ± 2.1*	0.75	Ўртача
Фталатлар	14.1 ± 1.5	0.68	Юқори

**Парабенлар гуруҳида гиперкератоз ҳисобига қалинлик ортган бўлса-да, барьер сифати пасайган.*

Нейротармоқли таҳлил натижалари шуни кўрсатдики, сульфатлар таъсирида эпидермиснинг барьер функцияси 32% гача пасаяди. Бу эса ташқи муҳитдаги токсинлар ва патогенларнинг тери ичига кириши учун "дарвоза" очади.

Муҳокама ва рақамли экспертизанинг аҳамияти

Тиббиётнинг рақамлашуви гигиеник экспертиза жараёнларини тезлаштириб, ҳолисликни таъминлайди. Хусусан, Ўзбекистонда ишлаб чиқарилаётган косметика воситаларини сертификатлашда нейротармоқли морфометрияни жорий этиш инсон омили билан боғлиқ хатоликларни камайтиради. Автоматлаштирилган гистологик тасвирлар таҳлили мавжуд зарарларни аниқлаш билан бирга, сурункали таъсир оқибатида юзага келиши мумкин бўлган дерматит ва бошқа асоратларни прогноз қилиш имконини беради, бу эса превентив тиббиёт ва жамоат саломатлиги учун муҳим аҳамиятга эга.

Хулоса

Косметика воситалари таркибидаги агрессив кимёвий моддалар эпидермиснинг микроструктуравий яхлитлигини бузиб, барьер функциясининг пасайишига олиб келади. Нейротармоқли морфометрия эса эпидермисдаги патологик ўзгаришларни, жумладан акантоз ва паракератозни, юқори аниқликда аниқлаш ва миқдорий баҳолаш имконини беради. Ўзбекистон косметика саноатида гигиеник назоратни рақамлаштириш аҳоли саломатлигини муҳофаза қилиш ҳамда сифатли маҳсулотлар истеъмолини таъминлашнинг муҳим шарти ҳисобланади.

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ПРОБЛЕМА ОТХОДОВ В ОБЛАСТИ ОХРАНЫ ОКРУЖАЮЩЕЙ СРЕДЫ И ПРЕВЕНТИВНЫХ МЕР

Аннотация: В данной статье освещаются приоритетные вопросы, связанные с проблемой отходов в нашей стране. В ней рассматривается Закон Республики Узбекистан «Об отходах», предотвращение вредного воздействия отходов на окружающую среду на основе целей и задач стратегии реализации работ, связанных с твердыми бытовыми отходами в Республике Узбекистан в период 2019-2028 годов. Разъясняются такие вопросы, как получение, сокращение образования отходов и регулирование отношений их рационального использования в хозяйственной деятельности.

Ключевые слова: Отход, окружающую среду, подземных вод, экологические аспекты

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THE PROBLEM OF WASTE IN ENVIRONMENTAL PROTECTION AND PREVENTIVE MEASURES

Abstract: This article highlights priority issues related to waste management in our country. Based on the goals and objectives of the Strategy for the Implementation of Solid Household Waste Management in the Republic of Uzbekistan for 2019–2028, it examines the Law of the Republic of Uzbekistan “On Waste” and issues concerning the prevention of the harmful impact of waste on the environment. The article also considers matters such as waste collection, waste reduction, and the regulation of waste management practices in economic activities.

Keywords: Waste, environment, groundwater, environmental aspects

Введение

Проблема отходов становится одной из самых актуальных экологических проблем в мире, в том числе и в Узбекистане. Она связана с проблемами охраны окружающей среды на этапах производства и потребления, пищевых и медицинских отходов, рационального и

комплексного использования природных ресурсов, а также внедрения экологически чистых технологий и ресурсов.

Проблема отходов в нашей республике является одним из приоритетных вопросов, требующих первоочередного решения. В Узбекистане, в условиях жаркого климата, отходы представляют серьезную угрозу для здоровья населения, являются источником загрязнения воздуха, поверхностных и подземных вод, а также плодородия почвы, и разработка решений в этом отношении является одной из неотложных проблем современности.

Закон Республики Узбекистан «Об отходах» устанавливает правила осуществления деятельности, связанной с отходами, на территории Республики Узбекистан, предотвращения вредного воздействия отходов на жизнь и здоровье граждан и окружающую среду, сокращения образования отходов и рационального использования отходов в хозяйственной деятельности.

В Узбекистане захоронение твердых бытовых отходов на полигонах получило широкое распространение. Отход строй материалов хранятся на 165 зарегистрированных полигонах (свалках), занимающих площадь более 1445 гектаров. По состоянию на 2022 год на этих полигонах накопилось более 33 533 тысяч тонн отходов. Не считая неконтролируемых свалок, полигоны.

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Для организации выделено около 1445 гектаров земли. Несмотря на проведение природоохранного контроля, сегодня сброс твердых бытовых отходов населением приводит к появлению незаконных свалок в населенных пунктах, вдоль автомагистралей, в полях и на берегах водохранилищ. В последние годы увеличилось количество административных нарушений, связанных с несанкционированным сбросом отходов гражданами. В 2020 году это было 28,9 тыс., в 2021 году — 18,7 тыс., а в 2021 году — более 20,3 тыс. Ежегодно образуется около 115 миллионов тонн промышленных отходов. Наибольший объем промышленных отходов образуется на горно-перерабатывающих предприятиях, расположенных в Навоийской, Ташкентской и Ферганской областях. Объем отходов, собранных на 20 полигонах промышленных отходов общей площадью 286,3 гектара, составляет 40 879,4 тыс. тонн, на 21 полигоне площадью 985,1 гектара — 256 831,5 тыс. тонн, а на 15 полигонах пищевых отходов площадью 7 751,0 гектара — 2 953 788,0 тыс. тонн.

Основная часть отходов хранится на полигонах и полигонах для захоронения пищевых отходов, небольшая часть промышленных отходов используется в качестве вторичного сырья.

Существуют различные виды медицинских отходов в зависимости от уровня эпидемиологической, токсикологической и радиологической опасности, а также негативного воздействия на окружающую среду. 7950 медицинских учреждений страны производят в среднем 42 411 тонн медицинских отходов в год, из которых 1668 тонн составляют опасные медицинские отходы.

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Медицинские учреждения не оборудованы специальными контейнерами для надлежащего хранения этих отходов. В случае разлива инфицированные медицинские отходы стерилизуются в автоклавах при температуре 132°C в течение 20 минут. Также распространены случаи утилизации медицинских отходов вместе с бытовыми отходами.

Стратегия реализации управления твердыми отходами в Республике Узбекистан на период 2019-2028 гг. (ПК-4291, 2019 г.) выявляет недостаточное обеспечение услугами по сбору и утилизации твердых отходов в сельской местности, неудовлетворительное состояние инфраструктуры в области управления твердыми отходами, а также указывает на то, что существующие полигоны твердых отходов не соответствуют санитарно-гигиеническим требованиям и экологическим стандартам.

В нашей республике наблюдается рост количества отходов на душу населения и общего объема образования отходов. Сбор твердых бытовых отходов (охват населения услугами по сбору и вывозу отходов) увеличился на 85 процентов. Однако большая часть отходов отправляется на свалки. Возможности переработки и нейтрализации различных видов отходов, включая промышленные, медицинские и электронные отходы, крайне ограничены.

Согласно стратегии внедрения системы управления твердыми отходами, прогнозируемый годовой объем образования твердых отходов в настоящее время составляет около 14-14,5 миллионов тонн, и предполагается, что к 2028 году эта цифра увеличится до 16-16,7 миллионов тонн.

Стратегию планируется реализовывать поэтапно, первый этап (2019-2021 гг.) – совершенствование механизмов выполнения работ, связанных с твердыми отходами, обеспечение эффективной организации услуг по сбору и утилизации твердых отходов. Второй этап (2022-2028 гг.) – развитие инфраструктуры для сортировки и переработки твердых бытовых отходов, оптимизация полигонов, строительство предприятий по переработке отходов, совершенствование их деятельности, 100% охват населения услугами по сбору и утилизации твердых бытовых отходов, переработка не менее 60% твердых бытовых отходов и создание отдельного завода по переработке твердых бытовых отходов (включая ртутьсодержащие отходы, автомобили, батарейки, использованные батарейки, упаковочные отходы) на 25 процентов, сокращение объема твердых бытовых отходов, отправляемых на полигоны, на 60 процентов и увеличение использования альтернативных источников энергии на 35 процентов. Ввиду разнообразного состава отходов, их использование, секторы, группы, экономическая эффективность и экологические аспекты также разнообразны.

Трудно оценить общую экономическую значимость отходов, поэтому имеет смысл высказывать мнение об эффективности только после определения их состава. Например, наличие в отходах алюминия, стеклянной тары, стали, бумаги, пластика и оборванных кабелей повышает эффективность их повторного использования. Фактически, отходы — это результат использования любого сырья, материала или продукта, а также удаления и утилизации ненужных его частей. Однако захоронение всех образующихся отходов на свалках — нецелесообразный способ их утилизации.

Результаты: Главная проблема заключается в использовании отходов в качестве вторичного сырья.

Существует два основных способа утилизации бытовых отходов:

1. Утилизация отходов вдали от густонаселенных районов путем захоронения на свалках.

2. Утилизация в специализированных мусоро перерабатывающих предприятиях.

Первый способ — это падение уровня воды, но отходы могут попасть в грунтовые воды, что приведет к их разрушению. Второй способ требует строительства крупных очистных сооружений большой мощности. В развитых странах большая часть отходов перерабатывается на таких предприятиях, благодаря чему производится дешевая энергия. В Японии насчитывается 1850 мусороперерабатывающих заводов, которые обрабатывают около 80 процентов всех бытовых отходов.

Таким образом, в республике предпринимаются многочисленные позитивные шаги для совершенствования механизма реализации Закона Республики Узбекистан «Об отходах».

Как известно, в каждом домохозяйстве потребляются различные продукты питания, и от этих продуктов образуется определенное количество

отходов (остатки, семена и т. д.). В сельской местности, особенно в домах, где содержатся животные (животные, птица и т. д.), эти отходы не выбрасываются, а скармливаются животным в качестве корма.

Во-первых, это способствует сохранению окружающей среды, во-вторых, заботе об этих животных, и в-третьих, приносит дополнительный доход в семейный бюджет. К сожалению, в густонаселенных районах с многоэтажными зданиями эти отходы выбрасываются населением на общественные свалки. Кроме того, для улучшения этой негативной ситуации и изменения ее на позитивную в густонаселенных районах можно реализовать следующие меры:

Если взять в качестве примера частный дом, то у компании будет около 20 пристроенных к нему многоэтажных домов. В каждом доме будет в среднем от 40 до 60 квартир, таким образом, у компании будет от 800 до 1200 квартир. В каждой квартире будет проживать в среднем 3 семьи. Эта семья потребляет в среднем 2 кг картофеля, 2 кг моркови, 1 кг лука и других продуктов питания (гранат, фрукты и т. д.) в неделю.

Пищевые отходы помещаются в специальные контейнеры, которые компания выдает каждой семье, и доставляются в «Центр сбора пищевых отходов». Представитель этого центра регулярно проводит работу по приему пищевых отходов. Кроме того, на территории компании выделяется необходимое количество земли под корма, где можно засеять люцерной и кукурузой, а также заготовить определенное количество сена и травы.

Заключение

Эффективное использование отходов высотных зданий способствует защите жизни и здоровья людей от всех видов отходов, улучшению состояния окружающей среды, предотвращению образования отходов, рациональному использованию отходов в хозяйственной деятельности, достижению экономической эффективности и, что наиболее важно, повышению духовного, экономического и экологического образования нашего народа.

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ЭМОЦИОНАЛЬНОЕ ВЫГОРАНИЕ И ЕГО ПРОФИЛАКТИКА У СЛЕДОВАТЕЛЕЙ

Аннотация: актуальность исследования эмоционального выгорания у следователей и определения концептуального подхода к профессиональному психологическому сопровождению деятельности сотрудников правоохранительных органов определена несколькими основаниями: во-первых, психологически напряженной деятельностью сотрудника правоохранительной структуры вне зависимости от специфики деятельности (феноменологически для каждой правоохранительной структуры); во-вторых, для большинства сотрудников данная профессиональная деятельность сопряжена как с опасностью для жизни, так и с трудово-голической аддикцией; в-третьих, сама профессиональная деятельность, специфичная в своем многообразии, требует знания психологических особенностей объектов правоохранительной деятельности; в-четвертых, большинство сотрудников правоохранительных органов сталкиваются с семейными проблемами, конфликтами и кризисами, имеющими в базисе именно профессиональные и временные особенности выполняемой деятельности; в-пятых, физиологические, психологические, эмоциональные, гормональные и иные перегрузки однозначно отрицательно сказываются на соматическом, клиническом, психологическом самочувствии, требуя грамотного подхода к нивелированию отрицательного влияния вышеперечисленных перегрузок.

Ключевые слова: эмоциональное и профессиональное выгорание, профилактика.

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EMOTIONAL BURNOUT AND ITS PREVENTION IN INVESTIGATORS

Abstract: The relevance of the study of emotional burnout among investigators and the definition of a conceptual approach to the professional psychological support of law enforcement officers is determined by several factors: first, the psychologically stressful nature of law enforcement work,

regardless of the specific nature of the activity (phenomenologically for each law enforcement agency); second, for most law enforcement officers, this professional activity is associated with both life-threatening situations and workaholic addiction; third, the specific nature of law enforcement work requires knowledge of the psychological characteristics of the subjects of law enforcement activities; fourthly, most law enforcement officers face family problems, conflicts, and crises that are based on the professional and temporal characteristics of their work. Fifthly, physiological, psychological, emotional, hormonal, and other stressors have a negative impact on physical, clinical, and psychological well-being, requiring a comprehensive approach to managing these stressors.

Keywords: *emotional and professional burnout, prevention.*

В современной психологической практике оказание консультативной помощи лицам с синдромом эмоционального выгорания базируется на четырех ключевых подходах, определяющих его первопричины [1]: организационный подход, интерперсональный подход, индивидуально-психологический подход и интегративный подход.

Индивидуально-психологический подход объясняет генезис эмоционального выгорания через призму действия разнообразных внутренних, личностных детерминант.

В рамках данного направления феномен изучался через анализ объективно-личностных и социально-демографических характеристик, таких как пол, возраст, профессиональный стаж, уровень образования и др. Исследователями была выявлена следующая закономерность: повышенной склонностью к выгоранию обладают как молодые специалисты (до 25 лет), так и сотрудники со значительным стажем (40-50 лет). Для первой группы это объясняется «эмоциональным шоком» от столкновения с профессиональной реальностью после обучения, для второй – кумулятивным эффектом длительного воздействия хронических стресс-факторов [2].

Эмпирические данные в рамках этого подхода свидетельствуют, что у медицинских работников признаки выгорания могут манифестировать уже на втором году работы, у юристов – спустя два года, а у социальных работников – в среднем через три-четыре года.

Взаимосвязь стажа и выгорания неоднозначна. К примеру, исследование С.А. Гараниной демонстрирует уязвимость педагогов со стажем более 30 лет, в то время как другие работы показывают отрицательную корреляцию. Аналогичные противоречия существуют и в отношении гендерного фактора: часть исследователей доказывает большую подверженность мужчин, другая – женщин.

Несмотря на недостаточную разработанность, данный подход признает высокую практическую значимость дальнейшего изучения роли поло-

ролевой ориентации, семейного и социального статуса, образования, а также специфики возраста и пола.

Что касается индивидуально-личностных особенностей, то здесь накоплен обширный эмпирический материал о их связи с риском развития выгорания. Х.Дж. Фрейденбергер указывает, что наиболее уязвимы мягкие, гуманные, идеалистичные и легко увлекающиеся интроверты с неустойчивой психикой [6]. К группе риска он относит: гиперответственных лиц, берущих на себя чрезмерные обязательства; трудоголиков, ставящих работу выше личной жизни; авторитарных сотрудников, опирающихся на власть; и администраторов, сконцентрированных на себе [3].

Э. Мэхер, в свою очередь, пишет о том, что развитию синдрома способствуют авторитаризм и сниженный уровень эмпатии, хотя ряд ученых, напротив, считают фактором риска именно высокую эмпатию.

Также высокой вероятности выгорания подвержены лица с склонностью к агрессии и тревожности. Ярким примером являются сотрудники спасательных служб, чья уверенность и оптимизм, подкрепленные низким эмпатическим откликом, сильно повышают риск СЭВ. Многие психологи отмечают, что дополнительным стрессором выступает социальное требование к постоянной выносливости, активности и контролю. У таких людей может быть менее выражено эмоциональное истощение, но сильно развиты деперсонализация и редукция профессиональных достижений. Существует также тесная связь с локусом контроля – направленностью внимания на контроль ситуации. Немаловажную роль играет рассогласование между мотивационной сферой, профессиональными ожиданиями и реальностью.

Следовательно, консультативная помощь в рамках этого подхода фокусируется на своевременном выявлении личностных характеристик, провоцирующих выгорание, и на смягчении конфликта между ожиданиями и действительностью.

А. Пайнс в рамках индивидуально-психологического подхода развивает экзистенциальное направление, связывая выгорание с трудовой мотивацией: уровнем оплаты, уверенностью в себе, карьерными перспективами, автономией, ответственностью и иными факторами [6]. Этот взгляд разделяется и отечественными учеными: Н.В. Гришиной, Н.Е. Водопьяновой, Е.С. Старченковой, которые выявили корреляцию между фрустрацией ожиданий и дезадаптивными реакциями выгорания. Е.С. Старченкова также отмечает взаимосвязь выгорания с качеством жизни и возможностями самореализации.

На сегодняшний день зарубежная и отечественная наука в значительной степени ориентируется на индивидуально-психологический подход, в рамках которого накоплен большой практический опыт по соотносению личностных и социальных характеристик профессионала с риском развития выгорания. Консультативная помощь здесь

преимущественно нацелена на разрешение противоречий между ожиданиями и реальностью.

Также популярен интегративный подход. Интегративный подход представляет собой попытку синтеза вышеописанных моделей и рассматривает выгорание как результат совокупного влияния объективных (внешних) и субъективных (внутренних) факторов.

К. Кондо объединяет эти влияния в три группы [6]: индивидуальные факторы, социальные факторы и организационные факторы.

В данной парадигме выгорание трактуется как следствие индивидуальной неприспособленности к рабочим сложностям, несоответствия ожиданий, межличностных конфликтов внутри организации и воздействия внешних организационных условий. Согласно этой теории, в группе наибольшего риска находятся профессионалы с низкой стрессоустойчивостью и неадекватными копинг-стратегиями. Этой позиции придерживаются такие исследователи, как S.L. Dolan, S. Renaude, P.J. Mazur, M.D. Lynch.

Отечественный ученый В.В. Бойко выделяет две группы предпосылок для возникновения синдрома [4].

Внешние (организационные) предпосылки:

1. Хроническое психоэмоциональное напряжение, обусловленное характером деятельности;
2. Организационная неопределенность, размытость обязанностей, дестабилизирующая рабочую среду;
3. Повышенная ответственность за принимаемые решения, особенно затрагивающие благополучие других людей;
4. Неблагоприятный психологический климат в коллективе (горизонтальные и вертикальные конфликты);
5. Сложности во взаимодействии с клиентами (для врачей – смерть, общение с родственниками; для социальных работников – группы риска; для следователей – криминальный элемент; для педагогов – «трудные» дети и дети с ОВЗ; для менеджеров – манипулятивные клиенты).

Внутренние (индивидуальные) предпосылки:

1. Эмоциональная ригидность;
2. Интенсивная интериоризация переживаний;
3. Низкая мотивация при высокой ответственности и/или автономии;
4. Наличие морально-нравственных деформаций и личностных дезориентаций.

В.В. Бойко и М.В. Агапова рассматривают внешние факторы как необходимые условия, а внутренние — как обязательные. То есть, организационные факторы без внутренней предрасположенности не приведут к выгоранию, так же как и внутренняя предрасположенность без попадания в неблагоприятные внешние условия [5].

Консультативная помощь при интегративном подходе носит системный характер, пытаясь охватить все потенциальные факторы деформации личности профессионала. Многие авторы в рамках этого подхода используют также системный анализ, выделяя не только «катализаторы» (провокаторы), но и «ингибиторы» выгорания – психическую стабильность, навыки разрешения конфликтов и пр.

Таким образом, интегративный подход, будучи весьма объемным и сложным как для исследования, так и для применения, только начинает свое полноценное развитие, однако потенциально является наиболее перспективным для понимания генезиса и, что особенно важно, профилактики феномена эмоционального выгорания.

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ПРИНЦИПЫ РАСШИРЕНИЯ ЦЕЛЕВОГО НАЗНАЧЕНИЯ СТОИМОСТНОЙ ОЦЕНКИ АКТИВОВ

***Аннотация:** Рассмотрены вопросы целевого назначения стоимостной оценки активов. Показаны пути вовлечением в гражданско-правовой оборот новых видов активов. Сформулированы особенности оценки активов, отличающихся специфическими особенностями. Показана взаимосвязь хозяйствующих субъектов, вовлеченных в решение организационно-хозяйственных и производственных задач на основе стоимостной оценки активов. Дан анализ первоочередных активов, участвующие в гражданско-правовом обороте, подлежащие вовлечению в оценочный процесс.*

***Ключевые слова:** оценочная деятельность, рынок активов, стоимостная оценка активов, развитие предпринимательства, внедрение новых форм создания и использования разнообразных активов, материальные и нематериальные активы, назначение оценки, гражданско-правовой оборот активов, реструктуризация производств.*

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PRINCIPLES FOR EXPANDING THE TARGET PURPOSE OF ASSET VALUATION

Abstract: *This article examines the intended purpose of asset valuation. Paths for introducing new types of assets into civil law circulation are demonstrated. The specific features of asset valuation, distinguished by their specific characteristics, are outlined. The relationship between economic entities involved in solving organizational, economic, and production problems based on asset valuation is demonstrated. An analysis of priority assets involved in civil law circulation and subject to inclusion in the valuation process is provided.*

Key words: *appraisal activities, asset market, asset valuation, development of entrepreneurship, introduction of new forms of creation and use of various assets, tangible and intangible assets, purpose of appraisal, civil turnover of assets, restructuring of production.*

Главным принципом расширения целевого назначения стоимостной оценки активов, как в период реформирования экономики, так и в период ее развития и функционирования, является обеспечение в комплексе с другими мерами возможностей принятия решений многообразных организационно-хозяйственных задач конкретным хозяйствующим субъектом с использованием стоимостной оценки активов.

Хозяйственная самостоятельность собственников активов, развитие предпринимательства, внедрение новых форм создания и использования разнообразных активов и т.д. объективно определяют расширение участия стоимостной оценки в различных сферах экономики в решении многоплановых задач создания, организации производства и потребления разнообразной продукции.

Углубление процессов реформирования экономики и развитие рыночных механизмов хозяйствования объективно сопровождаются вовлечением в гражданско-правовой оборот новых видов активов. Все новые сферы экономики вовлекаются в рыночные реформы и все новые активы нуждаются в их стоимостной оценке для различного назначения. При этом их стоимостная оценка зачастую носит не только экономический, но социальный характер и требует разработки и применения нестандартных методов ее определения. Особо следует отметить, что расширение объектов оценки, отличающихся специфическими особенностями, объективно определяет необходимость развития наряду с массовой и индивидуальной стоимостной оценки активов, учитывающей эти особенности. При стоимостной оценке этих активов необходимо учитывать:

- состояние и специфику рынка этих активов (в том числе и международного);
- возможность применения специальных методов и механизмов определения стоимостной оценки специфических по видам и характеру активов;

- ограниченность объективного использования во многих случаях доходного и сравнительного подходов в оценки активов, созданных для решения в первую очередь социальных программ.

В этих условиях возникает необходимость при оценочных работах использования опосредованных показателей и нормативов. Таким образом одним из основополагающих принципов расширения целевого назначения стоимостной оценки активов является ее развитие адекватное вовлечению новых активов в гражданско-правовой оборот.

Не менее важно обеспечить развитие стоимостной оценки активов во взаимосвязи с расширением взаимодействия и регулирования отношений хозяйствующих субъектов – собственников активов с другими субъектами в процессе создания и пользования активов. Стоимостная оценка активов все в большей степени используется теми хозяйствующими субъектами, от которых зависит решение организационно-хозяйственных и производственных задач конкретных собственников активов. В этой связи важным принципом расширения целевого назначения стоимостной оценки активов является обеспечение в процессе ее проведения соблюдения требований к ней всех взаимодействующих субъектов, вовлеченных в решение конкретной задачи. Из этого принципа объективно следует, что дальнейшее совершенствование стоимостной оценки должно осуществляться в тесной взаимосвязи с совершенствованием законодательно-правовой базы и механизмов налогообложения, кредитования, судебного изъятия активов и т.д. Принципиальная схема такого взаимодействия отображена на рисунке 1.

Важным принципом расширения целевого назначения стоимостной оценки активов является непереносное ее участие во всех операциях с этими активами. Следует подчеркнуть, что в настоящее время стоимостная оценка еще в полном объеме не выступает опосредованным рычагом регулирования отношений собственников активов.

Для подтверждения этого достаточно рассмотреть механизмы продвижения активов от продавца к покупателю на рынке автотранспорта, рынке жилья и др. Таким образом, одним из важнейших принципов совершенствования стоимостной оценки активов является дальнейшее расширение ее обязательного участия в регулировании отношений собственников активов между собой и государством по разрешенным государством операциям с активами, а по активам, которые в настоящее время косвенно участвуют в сделках (земельные участки) должен быть рассмотрен вопрос об их вовлечении в гражданско-правовой оборот на основе соответствующей законодательно-правовой базы.

Основные виды активов, которые должны быть охвачены этой работой приводятся в таблице 1.

**Взаимосвязь хозяйствующих субъектов, вовлеченных в решение
организационно-хозяйственных и производственных задач на основе
стоимостной оценки активов**

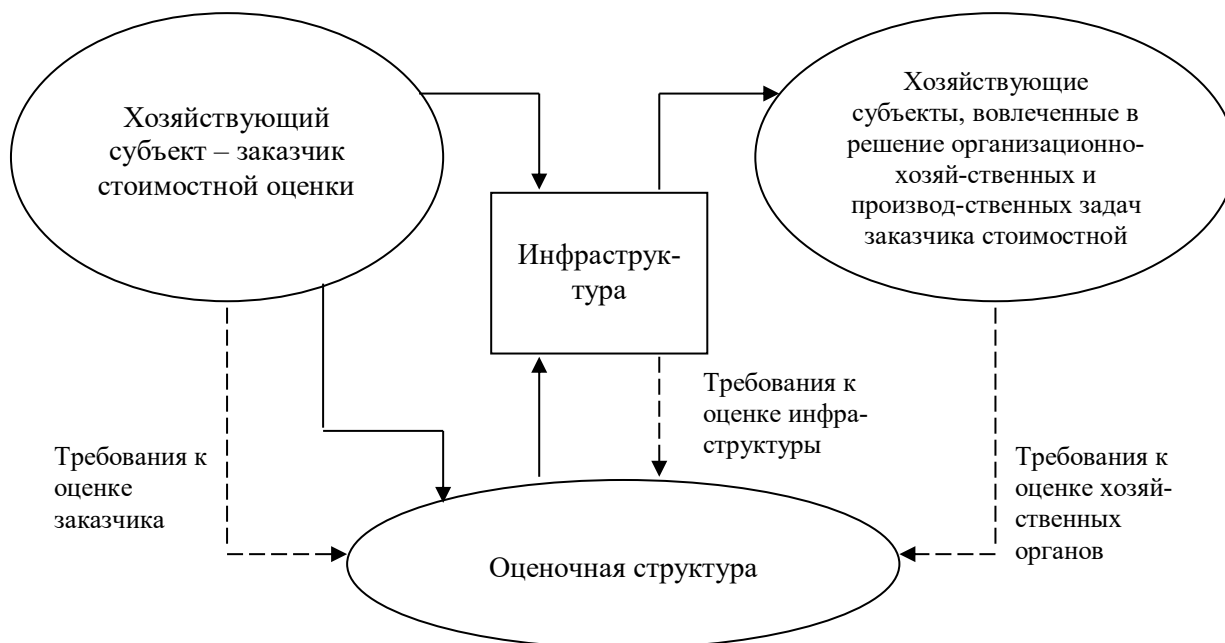


Рис. 1.

Вовлечение приведенных активов, участвующих в гражданско-правовом обороте, в оценочный процесс будет способствовать защите интересов государства при осуществлении различных сделок с этими активами, а госбюджет получит дополнительные финансовые средства.

Поэтапное реформирование экономики привело к расширению участия на рынке не только отдельных активов, но и их комплексов в виде конкретных видов бизнеса. В гражданско-правовой оборот все в больших объемах вовлекаются малые и средние предприятия, что является следствием формирования рыночной среды, развития конкуренции и т.д.

На рынок активов стали часто выставляться целые предприятия (бизнес), собственники которых руководствуясь рыночными механизмами хозяйствования, отказываются от дальнейшего использования одних и приобретают другие, более выгодные производства. Кроме того, конкурентная среда все чаще приводит к банкротству предприятий с неэффективным производством.

Таблица 1.

**Первоочередные активы, участвующие в гражданско-
правовом обороте, подлежащие вовлечению в оценочный процесс**

Рынки	Виды активов	Первоочередные меры по вовлечению активов в оценочный процесс
Жилые помещения	Жилые дома, квартиры	Усиление взаимосвязи органов, осуществляющих регистрацию сделок с рынком и оценочными структурами
Автотранспорт	Автомобили	То же
Индивидуальное строительство с земельными участками	Строение с земельным участком	Внесение изменений в земельное законодательство
Садовые домики с земельными участками в садово-виноградарческих товариществах	Строение с земельным участком	То же
Право пользования земельными участками сельскохозяйственного назначения	Права пользования земельными участками	То же
Рынок проектов, идей	Стартапы	Внесение дополнений в Единый национальный стандарт оценки
Культурные ценности	Исторические и культурные объекты	То же
Драгоценные металлы и ювелирные изделия	Оценки стоимости драгметаллов и изделий из них	То же
Недра	Оценки стоимости полезных ископаемых	То же
Рынок кредитов под залог прав пользования земельными участками, стоимость кредиторской задолженности и др.	Права пользования земельными участками	Внесение изменений в земельное законодательство и разработка соответствующих положений

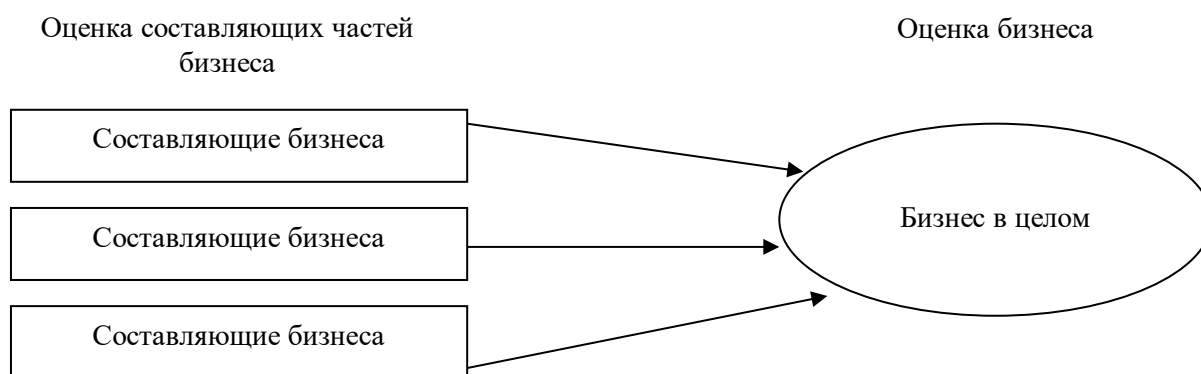
В этих условиях увеличивается потребность в проведении стоимостной оценки не отдельных активов, а их комплекса, объединенного в конкретное производство. Стоимостная оценка таких комплексов охватывает не только чистую оценку имеющихся активов, но и оценку многих факторов влияющих как на производство, так и на организацию его управлением, сбытом готовой продукции и других компонентов бизнеса (торговая марка, оценка поставщиков, оценка покупателей и др.).

В этой связи дальнейшее развитие стоимостной оценки бизнеса должно исходить из принципа его оценки с учетом всех его составляющих,

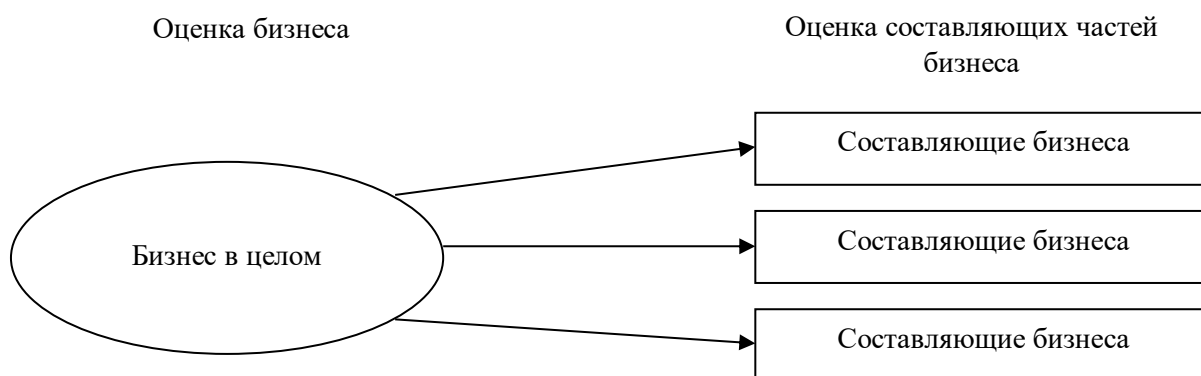
т.е. от «частного» к «общему». Следуя этому принципу, в оценочном процессе бизнеса должны участвовать не только активы, но и другие элементы бизнеса (уровень управления, уровень связей с поставщиками сырья, реализации продукции и т.д.). Отсюда возникает необходимость разработки и использования при этом механизмов определения влияния этих составляющих на определяемую стоимость этого бизнеса.

Принципиальные схемы развития оценочного процесса при стоимостной оценке бизнеса в целом и отдельных его частей приводятся на рисунке 2.

Принципиальная схема оценочного процесса при стоимостной оценке бизнеса и его составных частей



А. Схема оценочного процесса оценки бизнеса в целом.



Б. Схема оценочного процесса оценки части бизнеса.

Рис.2.

Развитие рыночных реформ, реструктуризация производств и др. вызывают необходимость оценки неэффективных частей бизнеса и изыскания более эффективных способов и методов замены этих составляющих бизнеса. В этой связи в производственно-хозяйственной практике в увеличивающихся объемах возникает потребность проведения стоимостной оценки отдельных частей бизнеса. Весьма важно при проведении оценочных работ в этом случае исходить не только из тщательного анализа этой части бизнеса, но и тщательно исследовать

взаимосвязь и взаимодействие этой части материальных и нематериальных активов на развитие рассматриваемого бизнеса в целом.

Отсюда одним из важных направлений дальнейшего развития стоимостной оценки части бизнеса при его реструктуризации является соблюдение принципа оценки этой части с учетом оценки бизнеса в целом, т.е. от «общей» оценки к «частной». Следуя этому принципу в оценочном процессе части бизнеса должна участвовать оценка бизнеса в целом.

При этом следует отметить, что предложенные схемы оценочного процесса позволяют учесть особенности формирования стоимостной оценки бизнеса, которая в абсолютном большинстве случаев не представляет собой простую арифметическую сумму оценок, входящих в него составных частей.

Дальнейшее развитие стоимостной оценки активов тесным образом связано с расширением ее назначения. Особое место должно быть отведено расширению участия стоимостной оценки в управлении бизнесом и активами, оценке инвестиционных проектов, природоохранной деятельности и др. Основные принципиальные направления расширения целевого назначения стоимостной оценки бизнеса и активов и достижения конечных целей, которые оно призвано обеспечить, приводятся в таблице 2.

Таблица 2.

Основные принципиальные направления расширения целевого назначения стоимостной оценки бизнеса и активов

Целевое назначение стоимостной оценки	Объекты оценки	Область применения оценки	Конечная цель
Совершенствование управления бизнесом и активами	Предприятия, их структурные подразделения, активы	Принятие решений по реструктуризации производства, улучшению управления производством и активами	Повышение эффективности производства и использования активов
Повышение эффективности инвестиционных проектов	Инвестиционные проекты и обязательства. Оценка стоимости стартапов	Реализация проектов	Повышение эффективности производства и стоимости активов
Расширение залоговой базы для кредитования фермерских и дехканских хозяйств	Имущественные и неимущественные права фермерских и дехканских хозяйств	Залоговое обеспечение	Расширение кредитования производства
Совершенствование природоохранной деятельности	Земельные участки, в том числе сельскохозяйственного назначения	Разработка и реализация природоохранных мероприятий	Снижение издержек производства, сохранение активов
Восстановление ущерба нанесенного активам	Утерянные активы, ущерб нанесенный активам	Взыскание ущерба в установленном законодательством порядке	Восстановление бизнеса и активов

Расширение целевого назначения стоимостной оценки бизнеса и активов в приведенных основных направлениях позволит существенно повысить экономическую обоснованность оборота и использования активов, выявлять и принимать действенные меры по решению актуальных вопросов увеличения доходности активов и эффективного распоряжения ими.

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РАЗВИТИЕ МЕТОДОВ ДИНАМИЧЕСКОГО АНАЛИЗА И МОДЕЛИРОВАНИЯ ТРАНСПОРТНЫХ СИСТЕМ В УСЛОВИЯХ ЦИФРОВИЗАЦИИ

Аннотация: В данной работе рассматривается процесс трансформации транспортной инфраструктуры Узбекистана в рамках глобальной цифровизации и внедрения интеллектуальных систем управления. Анализируется эффективность применения методов динамического анализа для оптимизации городских пассажирских и грузовых потоков, что позволяет существенно повысить пропускную способность существующих магистралей. Особое внимание уделяется интеграции цифровых двойников дорожной сети, которые выступают ключевым инструментом предиктивного моделирования в крупнейших агломерациях республики. В статье предоставляется обзор современных методологических подходов к имитационному микромоделированию, базирующихся на отечественном и зарубежном опыте. Изучаются технические аспекты и социально-экономические факторы, влияющие на развитие транспортных систем в условиях реализации национальной стратегии «Цифровой Узбекистан — 2030».

Ключевые слова: цифровизация, транспорт, моделирование, трафик, система, поток, динамика, оптимизация, инфраструктура

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DEVELOPMENT OF METHODS OF DYNAMIC ANALYSIS AND MODELING OF TRANSPORT SYSTEMS IN THE CONTEXT OF DIGITALIZATION

Abstract: *This paper examines the transformation of Uzbekistan's transport infrastructure within the context of global digitalization and the implementation of intelligent control systems. It analyzes the effectiveness of dynamic analysis methods for optimizing urban passenger and freight flows, which can significantly increase the capacity of existing highways. Particular attention is paid to the integration of digital twins of the road network, which are a key tool for predictive modeling in the country's largest metropolitan areas. The article provides an overview of modern methodological approaches to simulation micromodeling, based on domestic and international experience. It examines the technical aspects and socioeconomic factors influencing the development of transport systems within the context of the implementation of the national strategy "Digital Uzbekistan 2030."*

Keywords: *digitalization, transport, modeling, traffic, system, flow, dynamics, optimization, infrastructure*

Введение

Современный этап развития транспортной инфраструктуры Узбекистана неразрывно связан с реализацией государственной стратегии «Цифровой Узбекистан — 2030», которая диктует необходимость внедрения интеллектуальных транспортных систем (ИТС) в крупнейших агломерациях республики. В Ташкенте и областных центрах активно внедряются системы автоматизированного управления дорожным движением, требующие применения точных методов динамического анализа для оптимизации трафика и снижения экологической нагрузки. Статистические данные подтверждают, что использование цифровых двойников дорожных сетей позволяет сократить время задержки транспорта на ключевых узлах до 20 % и повысить пропускную способность магистралей без расширения дорожного полотна.

Методика имитационного микромоделирования транспортных потоков в среде мультиагентных систем. Для детального анализа динамики городских систем в Узбекистане применяется методика микроскопического имитационного моделирования, обоснованная в исследованиях А. С. Гринчука и А. К. Расулова. Подход базируется на воссоздании поведения каждого индивидуального участника движения (автомобилей, пешеходов, общественного транспорта) в цифровой среде с учетом алгоритмов следования за лидером и смены полосы движения. Данная методика позволяет прогнозировать возникновение заторов на сложных развязках Ташкента при изменении фаз светофорного регулирования, обеспечивая высокую точность оценки пропускной способности инфраструктуры до начала ее физической реконструкции.

Результат

Реализация имитационного микромоделирования на тестовом участке магистральной сети Ташкента показала, что оптимизация алгоритмов светофорного регулирования позволяет сократить среднее время ожидания транспорта на 22 % в часы пик. В ходе исследования установлено, что интеграция адаптивных систем управления движением снижает плотность заторов на 15 %, при этом пропускная способность узловых развязок увеличивается на 18 % без изменения геометрии дорожного полотна. Полученные данные подтверждают высокую корреляцию между цифровыми прогнозами и реальными показателями интенсивности потоков, что свидетельствует об эффективности внедрения интеллектуальных транспортных систем для разгрузки дорожной сети в условиях растущей автомобилизации республики.

Таблица 1.
Технические и программные средства
динамического анализа транспортных систем

Наименование средства	Функциональное назначение	Ключевые параметры
ПО PTV Vissim	Микроскопическое моделирование потоков	Анализ поведения отдельных транспортных единиц и пешеходов в 3D-среде
GPS-трекеры и датчики	Сбор первичных данных о трафике	Фиксация скорости и плотности потока в режиме реального времени на участках сети
Серверная платформа ИТС	Обработка и хранение массивов данных	Интеграция алгоритмов машинного обучения для предиктивного управления движением

Заключение

Цифровая трансформация транспортных артерий Узбекистана превращает традиционную дорожную сеть в интеллектуальную экосистему, способную гибко реагировать на динамику современного мегаполиса. Внедрение передовых методов моделирования открывает путь к созданию «умных» городов, где технологический прогресс служит основой для комфортного и безопасного движения в ритме обновляющейся республики.

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ИСТОРИЯ ВОЗНИКНОВЕНИЯ И РАЗВИТИЯ АРТ-ТЕРАПИИ

***Аннотация:** В системе образования арт-терапия является актуальным методом и видом для психологической поддержки и эмоциональной мотивации личности. В данной статье рассматриваются некоторые вопросы истории возникновения и развития арт-терапии как науки.*

***Ключевые слова:** Арт-терапия, атрибуты арт-терапии, виды арт-терапии, сакральное искусство, дидактический, эстетический компоненты, терапевтическое воздействие.*

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HISTORY OF THE EMERGENCE AND DEVELOPMENT OF ART THERAPY

***Abstract:** In the education system, art therapy is a relevant method and method for providing psychological support and emotional motivation to individuals. This article examines some of the historical aspects of the emergence and development of art therapy as a discipline.*

***Keywords:** Art therapy, attributes of art therapy, types of art therapy, sacred art, didactic and aesthetic components, therapeutic impact.*

Арт-терапия имеет древнее происхождение. В определенном смысле ее прототипом являются различные виды сакрального искусства, нередко используемого с лечебной целью и включающего в себя суггестивно-магический, дидактический, эстетический и иные компоненты терапевтического воздействия. Утратив атрибуты сакральности в эпоху господства ньютоно-картезианской научной парадигмы, так называемая терапия впечатлениями или терапия занятостью через различные формы творческой активности пациентов была довольно популярной разновидностью гуманной клинической психотерапии еще до середины прошлого века. Однако, в последующем, в связи с дифференциацией психотерапевтических подходов, она была оттеснена на задний план.

Термин «арт-терапия» ввел в употребление в 1938 г. Адриан Хилл. Пионеры арт-терапии опирались на идею Фрейда о том, что внутреннее «Я»

человека проявляется в визуальной форме всякий раз, когда он рисует и лепит, а также на мысли Юнга о персональных и универсальных символах. Центральная фигура в арт-терапевтическом процессе – не пациент (как больной человек), а личность, стремящаяся к саморазвитию и расширению диапазона своих возможностей.

Арт-терапия стала активно применяться с 30-х годов 20 века. Первый урок применения арттерапии относится к попыткам коррекции эмоционально-личностных проблем детей, эмигрировавших в США из Германии во время второй мировой войны. Арттерапевтические методы были применены в работе с детьми, испытывавшими стресс в фашистских лагерях и вывезенными в США. С тех пор арттерапия получила широкое распространение и используется как самостоятельный метод и как метод, дополняющий другие техники.

Примерно с середины 20-го века арттерапия стала все более широко использоваться в качестве разновидности терапии занятостью преимущественно в психиатрических и общесоматических госпиталях. За исключением отдельных случаев, она рассматривалась как фактор вторичной психопрофилактики и психотерапии, позволяющий преодолевать последствия социальной изоляции больных. При этом арт-терапия находилась под большим влиянием биомедицинских представлений. Специалисты, проводящие арт-терапевтическую работу такого рода, как правило, не имели серьезной академической подготовки и были неспособны играть какую-либо активную роль в лечении больных. Их основная задача заключалась в том, чтобы предоставить больным возможность относительно свободно заниматься простейшими видами изобразительной деятельности, в процессе которой они могли бы отвлекаться от связанных с болезнью отрицательных переживаний.

Исключение составляли психодинамические подходы, представленные последователями Фрейда и, особенно, Юнга, которые использовали материал изобразительной деятельности своих клиентов для анализа отраженных в нем различных содержаний бессознательного. В нашей стране арт-терапия до последнего времени использовалась, в основном, в работе с психически больными и находилась под большим влиянием клинического мышления. Реорганизация западной психиатрической службы в 50-60 годы, связанная с закрытием многих психиатрических клиник и с расширением сети амбулаторных и полустационарных услуг, привела к тому, что арт-терапевты стали работать в более тесном контакте с психотерапевтами, социальными работниками, педагогами и другими специалистами, а также с религиозными объединениями и населением. Это оказало большое влияние на развитие теории и практики арт-терапии, обогатив ее новыми представлениями в духе экзистенциально-гуманистического подхода, одного из наиболее влиятельных в психологии, психотерапии и педагогике того времени. Арт-терапия значительно расширила диапазон своих эмпирических возможностей, удачно сочетаясь с характерными для названного подхода

установками на развитие человеческого потенциала, самоактуализацию личности и интеграцию различных аспектов психической деятельности.

В 1960 г. в Америке была создана Американская арттерапевтическая ассоциация. Подобные ассоциации возникли также в Англии, Японии, Голландии. Несколько сотен профессиональных арттерапевтов работают в психиатрических и общесоматических больницах, клиниках, центрах, школах, тюрьмах, университетах.

В последние два-три десятилетия арт-терапия, синтезировав в себе достижения большинства психотерапевтических подходов, начинает оформляться в самостоятельный метод с собственной методологией и разнообразным, высокодифференцированным инструментарием.

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ОСОБЕННОСТИ ОЦЕНКИ ЭФФЕКТИВНОСТИ УПРАВЛЕНЧЕСКОГО КОНТРОЛЯ НАЛОГОВЫХ РАСЧЕТОВ В СИСТЕМЕ УПРАВЛЕНИЯ ОРГАНИЗАЦИЕЙ

***Аннотация.** В статье обосновывается необходимость разработки методического подхода к оценке эффективности управленческого контроля налоговых расчетов и обязательств. На основе анализа позиций отечественных и зарубежных ученых выявлены ключевые противоречия между потребностью внутренних пользователей в качественной информации о результативности контроля и отсутствием единых критериев такой оценки. Представлена авторская методика, базирующаяся на двух критериях – надежности и результативности, раскрываемых через систему качественных и количественных показателей. Результаты апробации предложенного инструментария позволяют сформулировать обоснованное суждение об уровне налоговой безопасности организации.*

***Ключевые слова:** управленческий контроль, налоговые расчеты, оценка эффективности, надежность контроля, результативность контроля, налоговые риски.*

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ASSESSING THE EFFECTIVENESS OF MANAGEMENT CONTROL OVER TAX CALCULATIONS IN THE ORGANIZATION'S MANAGEMENT SYSTEM

***Abstract.** The article substantiates the need to develop a methodological approach to assessing the effectiveness of management control over tax calculations and liabilities. Based on the analysis of the positions of domestic and foreign scholars, the key contradictions between the need of internal users for high-quality information on the effectiveness of control and the absence of unified criteria for such assessment are identified. The author's methodology based on two criteria – reliability and effectiveness – is presented, which are disclosed through a system of qualitative and quantitative indicators. The results of testing*

the proposed tools allow forming a reasonable judgment about the level of tax security of the organization.

Keywords: *management control, tax calculations, efficiency assessment, reliability of control, effectiveness of control, tax risks.*

В современных условиях управленческий контроль налоговых расчетов и обязательств приобретает особую значимость в системе управления организацией. Увеличение объемов обрабатываемой информации, ужесточение налогового законодательства и рост требований к прозрачности финансово-хозяйственной деятельности обуславливают необходимость не только организации эффективного контроля, но и разработки инструментов оценки его результативности. Наиболее остро эта проблема дает о себе знать именно в сфере стратегического управления, когда внутренним пользователям нужна не просто констатация уже свершившихся фактов, а достоверная информация о том, насколько качественно проводятся контрольные мероприятия.

Если обратиться к научной литературе, то можно выделить несколько основных позиций, которые сегодня во многом определяют взгляд на управленческий контроль налоговых расчетов. Так, М.В. Мельник и Л.С. Пантелеев подчеркивают: контроль по своей сути — это одна из ключевых функций управления, без него невозможно получить обратную связь и скорректировать принятые решения. Исследователи полагают, что эффективность контроля напрямую зависит от того, насколько четко сформулированы его цели и задачи. В свою очередь, В.А. Пискунов в своих работах обосновывает, что при оценке управленческого контроля имеет смысл опираться на два базовых критерия — результативность и затраты на проведение контрольных мероприятий [1].

Данный подход позволяет сбалансировать затраты на контрольные процедуры с достигаемым экономическим эффектом.

В исследованиях В.А. Маняевой и А.А. Фадеевой акцент сделан на результативности как основном критерии, позволяющем судить о степени достижения поставленных целей [2]. М.А. Азарская предлагает дифференцировать оценку на две составляющие: эффективность дизайна системы контроля и ее операционную эффективность [3]. Т.Ю. Серебрякова, в свою очередь, вводит в научный оборот понятие «действенность» наряду с результативностью, раскрывая их через совокупность качественных и количественных индикаторов [4]. Зарубежные исследователи рассматривают управленческий контроль в контексте организационной эффективности, подчеркивая его роль в достижении стратегических ориентиров.

Обобщая позиции указанных авторов, можно сделать вывод, что в научной среде сложилось понимание многокомпонентности оценки эффективности управленческого контроля. Однако, как справедливо отмечают исследователи, отсутствует единый методический подход, позволяющий интегрировать как качественные характеристики организации

контроля, так и количественные параметры его результативности. Существующие разработки не дают исчерпывающего ответа на вопрос о том, каким образом оценить вклад контрольных процедур в снижение налоговых рисков и обеспечение налоговой безопасности организации.

Исходя из тех противоречий, которые были обозначены выше, авторы пришли к выводу, что систему оценки управленческого контроля налоговых расчетов и обязательств необходимо строить на двух основных критериях – надежности и результативности. В отличие от традиционных подходов, где акцент сделан главным образом на анализе уже прошедших периодов, здесь предлагается оценивать контроль не только по тому, что уже случилось, но и с учетом информации, имеющей значение для будущего, что особенно важно при принятии стратегических решений.

Что касается надежности, то под ней в данном случае понимается то, насколько в целом организован процесс контроля налоговых расчетов и обязательств, как он осуществляется и в какой мере применяемые процедуры соответствуют тем целям и задачам, для которых они создавались. Результативность же рассматривается как тот положительный эффект, который достигается в результате применения контрольных процедур к объекту контроля.

Оценка надежности реализуется через систему качественных показателей, включающих тестирование трех ключевых сфер: контрольной среды управленческого контроля; учета налоговых расчетов и обязательств; контрольных процедур. Для каждой сферы разработаны критерии оценки и установлены весовые коэффициенты, отражающие значимость конкретных показателей. По результатам тестирования рассчитываются оценочные коэффициенты, а затем интегральный коэффициент надежности, значение которого, приближающееся к единице, свидетельствует о высокой надежности системы контроля. Оценка результативности управленческого контроля производится на основе сопоставления фактических показателей с бюджетными (плановыми) значениями, а также анализа динамики уровня налогового риска. Количественная составляющая результативности выражается через точность исполнения бюджетных показателей по налоговым обязательствам в целом по организации и в разрезе отдельных договоров. Качественная составляющая раскрывается через изменение уровня налогового риска, рассчитываемого с учетом вероятности возникновения и степени воздействия налоговых рисков.

Апробация предложенной методики проведена на базе нескольких коммерческих организаций различных отраслевых принадлежностей. В ходе экспериментального применения установлено, что использование разработанного инструментария позволяет не только дать обоснованную оценку существующей системы управленческого контроля налоговых расчетов, но и выявить зоны повышенного внимания, требующие корректировки контрольных процедур. Результаты апробации показывают, что использование интегрального коэффициента надежности наряду с

интегральным коэффициентом результативности, которые рассчитываются по предложенным формулам, позволяет получить достаточно полную картину того, насколько эффективно работает контроль, причем эти показатели можно сопоставлять как в динамике, так и между разными организациями.

Таким образом, разработанная методика оценки управленческого контроля налоговых расчетов и обязательств помогает закрыть сложившийся в теории и на практике пробел. При ее применении удастся сформировать объективное мнение о том, насколько качественно организованы контрольные процедуры и как они реально выполняются. Кроме того, появляется возможность увидеть, за счет чего можно повысить результативность контроля, и опираться на эти данные при подготовке управленческих решений, нацеленных на налоговую безопасность организации.

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ТЕОРЕТИЧЕСКИЕ ОСНОВЫ ЭКСПОРТНОГО ПОТЕНЦИАЛА АГРАРНОЙ СФЕРЫ

***Аннотация:** в статье исследованы научно-теоретические основы, компоненты и факторы повышения экспортного потенциала сельскохозяйственной продукции, а также разработаны предложения и рекомендации по его совершенствованию.*

***Ключевые слова:** экспортный потенциал, внутренняя и внешняя среда, компоненты, экспортные контракты, система экспорта, государственная поддержка, маркетинг, логистика, рентабельность.*

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THEORETICAL FOUNDATIONS OF THE EXPORT POTENTIAL OF THE AGRICULTURAL SECTOR

***Abstract:** The article examines the scientific and theoretical foundations, components, and factors of increasing the export potential of agricultural products, and develops proposals and recommendations for its improvement.*

***Keywords:** export potential, internal and external environment, components, export contracts, export system, government support, marketing, logistics, profitability.*

Введение

В Стратегии развития Нового Узбекистана расширение экспортного потенциала сельскохозяйственной продукции и дальнейшее совершенствование его системы определены как одно из приоритетных направлений развития страны. В программе предусмотрено, что за счёт научно обоснованного интенсивного развития сельского хозяйства доходы дехканских и фермерских хозяйств будут увеличены как минимум в 2 раза, а

ежегодный рост сельского хозяйства будет доведён не менее чем до 5 процентов. Путём выращивания экспортно-ориентированной продукции, развития плодоовощеводства, увеличения площади интенсивных садов в 3 раза и тепличных хозяйств в 2 раза планируется значительно расширить экспортный потенциал отрасли. «В то время, когда в глобальной торговой системе меняются “правила игры”, мы в этом году увеличим наш экспорт на 23 процента и доведём его до 33,4 миллиарда долларов» [1].

Постановка научной проблемы

Проблемы совершенствования системы экспорта сельскохозяйственной продукции исследовались рядом зарубежных учёных, среди которых можно отметить А. Алчиана, Е. Бём-Баверка, Дж. Гэлбрейта, М. Дженсена, М. Джонстона, Р. Лукаса, А. Маслоу, У. Меклинга, Дж. Милля, Дж. Хикса, Й. Шумпетера, К. Эрроу и других.

Научно-практические исследования по вопросам совершенствования системы экспорта сельскохозяйственной продукции также проводились российскими учёными, такими как С. Б. Авдашев, А. В. Арискина, Е. В. Афанасьева, А. П. Балашова, Н. Ф. Вернигор, С. А. Грибовский, М. П. Гриценко, В. П. Зотова, А. И. Сучкова, В. П. Теплова, А. Я. Троцкий, В. А. Чертова и другие.

В Республике Узбекистан научно-теоретические и практические аспекты совершенствования системы экспорта сельскохозяйственной продукции исследовались рядом отечественных учёных. К ним можно отнести научные работы Б.Т. Салимова, А.С. Юсупова, Н. Хушматова, Я. Алиева, Ф.А. Иномжоновой, Х.С. Хушвактова, Ш.Т. Хасанова, К.И. Сирождидинова, Р. Сиддикова, Ч. Муродова, М. Исамиддинова и других, посвящённые данной сфере.

По мнению экономиста Ж.Сакс, «экономический успех любого государства мира проявляется во внешней торговле. До настоящего времени ни одной стране не удалось сформировать здоровую экономику, находясь в изоляции от мировой экономической системы» [2].

По мнению российского учёного А. Серков, «рынок сельскохозяйственной продукции является достаточно широким понятием. Он объединяет рынок продовольствия, материально-технических ресурсов, земли и капитала, труда, а также рынок научно-технической продукции. Все эти рынки взаимосвязаны между собой, однако каждый из них имеет свои специфические особенности» [3].

Согласно выводам отечественного учёного Я.Алиев, на рынке сельскохозяйственной продукции из-за проблем в системе доставки продукции потребителям наблюдаются потери выращенного урожая, а также снижение конкурентоспособности продукции [4].

Методология исследования

В статье использованы диалектический, системный, интегральный и синергетический подходы, а также экономические и логические методы исследования. Применены методы научной абстракции, анализа и синтеза,

индукции и дедукции, сравнительного анализа, обобщения, группировки и табличного представления данных.

Анализ и результаты

Одной из традиционных и наиболее широко развитых форм международных экономических отношений является внешняя торговля. В мировой экономике на долю внешней торговли приходится около 75–80 % общего объёма международных экономических отношений. Для стран мира роль внешней торговли имеет большое значение.

По мнению экономиста Ж.Сакс, «экономический успех любого государства мира проявляется во внешней торговле. До настоящего времени ни одной стране не удалось сформировать здоровую экономику, находясь в изоляции от мировой экономической системы» [5].

В международной торговле она выступает одной из форм связей между товаропроизводителями различных государств, возникающих на основе международного разделения труда, и отражает их взаимную экономическую взаимозависимость [6].

Проблемы экспорта сельскохозяйственной продукции требуют обоснования понятия «экспортный потенциал». В экономической науке исследование данного понятия началось в 1990-е годы XX века, то есть в период, когда внешнеторговая деятельность предприятий стала самостоятельной и независимой сферой деятельности.

Под экспортным потенциалом, прежде всего, понимается уровень конкурентоспособности продукции на мировом рынке. В более широком смысле это понятие выражает возможности страны по экспорту имеющихся или произведённых ресурсов и продукции.

По мнению М. Сейфуллаев и В. Капитсин, «экспортный потенциал страны представляет собой ресурсную базу и общее состояние экономического развития, обеспечивающие научно-техническое, технологическое, промышленное и социально-экономическое развитие национальной экономики».

Согласно выводам М. Сейфуллаев, «экспортный потенциал — это реальные возможности, возникающие в процессе рационального использования экспортных ресурсов, которые в существующих и прогнозируемых рыночных условиях позволяют формировать и максимально удовлетворять потребности отечественных и зарубежных покупателей в товарах и услугах» [7].

По выводам Д.А. Фокина и Г.Я.Беляков, экспортный потенциал понимается как «совокупность объективно существующих возможностей и ресурсов для производства продукции и её реализации на внешнем рынке под воздействием внутренней и внешней среды» [8].

По словам В.В. Рогов, экспортный потенциал национальной экономики выражает способность отраслей экономики, её секторов, предприятий и компаний производить конкурентоспособную продукцию на мировом рынке, эффективно используя как существующие сравнительные

преимущества (природно-климатические условия, почвы, ресурсы, благоприятное географическое положение, инфраструктурные факторы), так и новые конкурентные преимущества, основанные на новейших достижениях науки и техники [9].

Профессор Н.В. Климова оценивает экспортный потенциал сельскохозяйственной продукции как способность национальной экономики производить продукцию, конкурентоспособную на международном рынке, и экспортировать её в достаточном объёме по установленным мировым ценам [10].

По мнению Л.А. Лобанова, «уровень развития экспортного потенциала напрямую зависит от эффективности функционирования всего агропромышленного комплекса» [11].

Экспортный потенциал необходимо рассматривать исходя из трёх основных компонентов:

1. Объём совокупных ресурсов в сельскохозяйственной отрасли;
2. Способность отрасли производить продукцию, востребованную на мировом рынке;
3. Возможности реализации произведённой продукции с учётом достигнутого уровня экономического и социально-политического развития, уровня развития внешнеторговой инфраструктуры, а также системы государственной поддержки экспорта.

К факторам, стимулирующим участие в экспорте сельскохозяйственной продукции в национальной экономике, относятся:

- повышение эффективности использования природных ресурсов и распределения труда;
- снижение уровня безработицы;
- повышение уровня конкурентоспособности отраслей АПК;
- увеличение инвестиционной привлекательности отраслевой структуры для отечественных и зарубежных инвесторов;
- совершенствование структурной организации национальной экономики и формирование драйверов экономического роста;
- улучшение платёжного баланса государства [12].

Экспортный потенциал сельскохозяйственной продукции страны формируется под влиянием множества внутренних и внешних факторов. К внутренним факторам относятся:

1. Уровень экономического развития государства;
2. Экономико-географическое положение национального хозяйства (наличие морских портов, удалённость от основных магистральных дорог, границы с другими государствами);
3. Природно-климатические условия национального хозяйства (наличие плодородных земель, количество осадков и др.);
4. Материально-технические возможности (наличие и использование новейших инновационных технологий, современная материально-техническая база и др.);

5. Кадровый потенциал (высококвалифицированные менеджеры и специалисты, обладающие компетенциями для работы в современном бизнесе и навыками работы на международном рынке);

6. Интеллектуальный потенциал (механизмы воспроизводства интеллектуального капитала в АПК);

7. Логистическая и транспортная инфраструктура (морские порты, дороги и транспорт для перевозки продукции).

К внешним факторам относятся социально-экономические, политические и организационные отношения, которые обеспечивают возможность продажи сельскохозяйственной продукции национальной экономики на международном рынке. Они возникают вне экономической системы. К ним относятся:

1. Тенденции, состояние и ёмкость мирового рынка сельскохозяйственной продукции (наличие барьеров для выхода на рынок, конкуренты, спрос и др.);

2. Амортизационная, налоговая, финансовая, кредитная и инвестиционная политика государства;

3. Административное регулирование (законы, стратегии, программы государственной поддержки экспорта);

4. Государственная система сертификации и стандартизации сельскохозяйственной продукции;

5. Деятельность международных альянсов, союзов и других объединений.



Рис. 1. Компоненты экспортного потенциала сельского хозяйства [13]

Кроме того, развитие экспортного потенциала государства можно определить через два вида факторов: а) **статические** – сравнительные преимущества природного характера; б) **динамические** – конкурентные преимущества, связанные с научно-техническим прогрессом и инновациями.

Если в стране объединяются сравнительные и технологические конкурентные преимущества, это позволяет усиливать конкурентоспособность производимой продукции на мировом рынке, увеличивать экспортный потенциал и стимулировать экономическое развитие.

Таким образом, экспортные возможности АПК страны включают совокупность организационного, экономического, кадрового, природно-ресурсного, биоклиматического, инновационного, производственного, маркетингового и инвестиционного потенциала. В силу таких особенностей, как зависимость результатов производства в сельскохозяйственном секторе от природно-климатических условий, при разработке государственной экспортной стратегии особое значение имеют природно-ресурсный и биоклиматический потенциал. Именно исходя из их характеристик формируются структура и объём экспорта сельскохозяйственной продукции.

Способы увеличения экспортного потенциала сельскохозяйственной продукции в национальной экономике включают:

- создание условий, стимулирующих сельскохозяйственных производителей к выпуску продукции для экспорта;
- установление паритета цен для обеспечения рентабельности сельскохозяйственного производства;
- целенаправленную государственную поддержку экспортеров;
- инновационное развитие сельского хозяйства, внедрение новейших технологий, необходимых для производства качественной и конкурентоспособной продукции;
- развитие маркетинговой деятельности в сельском хозяйстве;
- содействие строительству новых производственных мощностей в отрасли (включая оптовые торговые центры и др.), а также реконструкции и модернизации существующих;
- совершенствование системы управления экспортом сельскохозяйственной продукции.

Особенность экспортного потенциала сельскохозяйственной продукции в Узбекистане заключается не только в значительных различиях природно-климатических условий, но и в его внутреннем расположении в стране, границах прямого доступа и уникальном территориальном положении.

Повышение экспортного потенциала сельского хозяйства Узбекистана прежде всего возможно за счёт существенных инвестиций в систему инфраструктуры и укрепления материально-технической базы. Вложение в новые технологии, сельскохозяйственную технику и оборудование позволяет отрасли производить конкурентоспособную продукцию.

Увеличение экспортного потенциала требует значительных инвестиций в инфраструктуру (рынки, логистика, производство, переработка), что подчёркивает актуальность государственной поддержки отрасли. Всесторонняя поддержка экспорта и использование широкого спектра инструментов для повышения его потенциала являются приоритетным направлением развития экономики всей страны.

В период либерализации экономики нашей республики вопросы формирования и управления рынком фруктов, овощей и винограда, а также повышения его эффективности рассматривались в теоретическом и

практическом аспектах в исследованиях Х.С.Хушвақтов. В его работах была разработана система точных показателей для статистического анализа сложных экономических связей в аграрных процессах, определения вероятностей на конкретных уровнях, прогнозирования и планирования уровня развития сельского хозяйства на будущее [14].

В исследованиях У.С.Мухитдинова изучались вопросы развития рынка фруктов, овощей и винограда, а также совершенствования маркетинговой системы [15]. Кроме того, теоретико-методологические основы функционирования системы переработки фруктово-овощной продукции, торговли на внутреннем и внешнем рынках, а также взаимодействия участников маркетинговых каналов были изучены в научных работах Я.Алиев.

Специалисты отрасли М.Х. Саидов и И.Б. Рустамов в учебном пособии Маркетинговые исследования на рынках сбыта новых и переработанных продуктов рассматривают значение экспорта фруктов и овощей в Узбекистане, позицию страны на мировом рынке, нормативно-правовые основы экспорта, влияющие факторы, логистические подходы в сельском хозяйстве, а также сущность и значение стандарта GLOBALGAP и меры по его внедрению. [16].

Другие авторы, ориентируясь на потребителя, дают определения рынку сельскохозяйственной продукции, отмечая необходимость определения каналов сбыта, а также рассматривают биологические потребности и ограничивающие факторы эффективного спроса. Подчёркивается важность распределения функций для удовлетворения спроса и формирования новых потребностей [16].

В заключение можно отметить, что рынок сельскохозяйственной продукции является достаточно широким понятием, объединяющим рынок продовольствия, рынок материально-технических ресурсов, земли и капитала, труд и продукцию научно-технической сферы. Его особенностью является относительно низкая гибкость спроса и предложения, что проявляется в низкой ценовой эластичности сельскохозяйственной продукции.

Обеспечение эффективной системы движения сельскохозяйственной продукции от производителя до конечного потребителя является одной из наиболее актуальных задач в развитии структуры рынка сельскохозяйственной продукции. Одной из стратегических задач государства является развитие экспорта, которое включает повышение доли продукции с высокой добавленной стоимостью и уровня конкурентоспособности отечественной продукции на мировых рынках.

В стране экспортный потенциал сельского хозяйства определяется числом отраслевых структур, способных в течение определённого периода производить и реализовывать конкурентоспособную продукцию на внешних рынках. Повышение экспортного потенциала требует значительных инвестиций в инфраструктуру (рынки, логистика, производство,

переработка), что подчёркивает актуальность государственной поддержки отрасли. Всесторонняя поддержка экспорта и использование широкого спектра инструментов для повышения его потенциала также являются приоритетным направлением развития экономики всей страны.

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ЛАБОРАТОРНАЯ ДИАГНОСТИКА ИНТРАЭПИТЕЛИАЛЬНЫХ И ИНВАЗИВНЫХ РАКОВ ШЕЙКИ МАТКИ

***Аннотация.** Для выявления ранних форм рака шейки матки и особенно доклинических стадий профилактические осмотры женщин, проводимые только врачом-гинекологом или онкологом, недостаточны. При обычном визуальном обследовании с помощью зеркал и пальпации надвлагалищной части шейки матки невозможно обнаружить начальных, клинически не проявляющихся бессимптомных поражений шейки матки. В этой работе мы стремились оценить на практике достоинства и недостатки люминесцентно-цитологического метода при профилактических осмотрах женщин и сопоставить результаты исследования, полученные люминесцентно-цитологическим методом и основным методом окраски мазка.*

***Ключевые слова:** рак шейки матки, интраэпителиальный, инвазивный рак, надвлагалищной части шейки матки, люминесцентно-цитологический метод.*

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LABORATORY DIAGNOSTICS OF INTRAEPITHELIAL AND INVASIVE CERVICAL CANCERS

Summary: Preventive examinations of women by a gynecologist or oncologist alone are not sufficient to detect early forms of cervical cancer and especially preclinical stages. Routine visual examination with mirrors and palpation of the supravaginal part of the cervix cannot detect initial, clinically asymptomatic cervical lesions. In this work, we sought to evaluate in practice the advantages and disadvantages of the luminescence-cytological method in preventive examinations of women and to compare the results obtained by the luminescence-cytological method and the basic smear staining method.

Key words: cervical cancer, intraepithelial, invasive cancer, supravaginal part of the cervix, fluorescent cytological method.

Введение

Цитологическая диагностика как метод отбора онкологических больных при профилактических осмотрах пользуется известным признанием. Однако ее роль как вспомогательного метода при обследовании уже отобранных по клинической картине больных обычно недооценивают. В то же время правильное решение этого вопроса имеет большое организационно-методическое значение.

Цель и методы исследования

Для выяснения ценности цитологических исследований в диагностике рака шейки матки были сопоставлены результаты первичных цитологических и гистологических диагнозов у 132 женщин, обследованных в Самаркандской многопрофильной больнице. За окончательный диагноз принимали тот, который ставили после тщательного обследования в поликлинике, а при необходимости и в условиях стационара. Кроме того, этот диагноз проверяли последующим наблюдением за больной в течение одного года. По возрасту больные распределялись следующим образом: до 30 лет было 29 человек, от 31 года до 40 лет - 35 и старше 41 года - 68.

У этих больных произведено 160 цитологических исследований методом люминесцентной микроскопии. Из 132 больных у 19 диагностирован интраэпителиальный и у 11- инвазивный рак, т. е. злокачественные процессы у женщин, до применения у них хирургического и лучевого лечения, выявлены у 15,4 % (табл. 1).

Табл. 1.

**Анализ цитологических диагнозов интраэпителиальных
и инвазивных раках шейки матки**

Окончательный диагноз	Общее число случаев	Правильные цитологические диагнозы			Ложноотрица- тельные цитологичес- кие диагнозы		Общее число гистологических первично-отрицательных диагнозов	Правильные диагнозы при использовании гистологических и цитологических исследований
		из общего числа	при отрицательных гистологических данных	при отрицательных гистологических и клинических данных	из общего числа	при отрицательных гистологических данных		
Интраэпителиальные раки Число случаев (абс.) (%)	19	16 84,2	4 21,0	2 10,5	3 15,7	4 10,5	6 31,6	18 94,7
Инвазивные раки Число случаев (абс.) (%)	11	11 100,0	2 18,1	1 0,9	0 0	0 0	2 18,1	11 100,0
Всего число случаев (абс.) (%)	30	27 90,0	6 20,0	2 6,7	2 6,7	1 3,3	7 23,3	29 96,6

Цитологически правильный диагноз поставлен в 91,5 % случаев, в том числе при интраэпителиальном раке в 84,2 % и при инвазивном в 100 % случаев. Первично ложноотрицательные цитологические диагнозы отмечены в 7 случаях интраэпителиального рака (8,5 %). Из них в 4 случаях гистологический диагноз также был ложноотрицательным на том или ином этапе обследования. Мы проанализировали причины ошибочных диагнозов. У 3 больных, у которых даже при повторных биопсиях не получено положительных результатов, оказался интраэпителиальный рак

преимущественно цервикального канала. В то же время содержимое заднего свода влагалища и шеечного канала у этих женщин не исследовали. В другом случае интраэпителиального рака с отрицательными результатами исследования конуса после диатермоэксцизии также следует думать о дефекте взятия материала, тем более что препарат был крайне беден клеточными элементами. У остальных 3 женщин цитологический диагноз был первоначально сомнительно отрицательным и при повторном исследовании у 2 из них, больных интраэпителиальным раком, на фоне лейкоплакии найдены атипические клетки (у 3-й больной, у которой первоначально обнаружили неясные клетки и подозревали молочницу исследования не повторяли).

Таким образом, у 4 из 7 больных ложноотрицательные цитологические диагнозы можно объяснить дефектом взятия материала и лишь в отношении 3 можно думать, что врач-цитолог недооценил имеющиеся данные.

Гистологические данные в связи с недостаточно прицельным взятием материала оказались первоначально ложноотрицательными в 24,4 % случаев, в том числе при интраэпителиальном раке в 31,6 % и при инвазивном в 17,7 % случаев.

Из 9 случаев, в которых цитологически обнаружили несомненные признаки злокачественного заболевания или подозревали его при первоначально отрицательных гистологических данных, в 4 (47,2 %) оказался интраэпителиальный или инвазивный рак.

Из 4 больных этой группы у одного был интраэпителиальный или инвазивный рак шеечного канала, а цитологический диагноз ставили по материалу, взятому с эктоцервикса. Например, у больной, поступившей с подозрением на рак шейки матки, трижды производили биопсию и ни разу элементы опухоли не обнаруживали. Одновременно цитологически дважды выявили несомненные признаки злокачественного процесса. После выскабливания цервикального канала установлен интраэпителиальный рак, который подтвержден и после удаления матки.

У одного больного этой группы и клинически установлены доброкачественные заболевания (псевдоэрозия или кольпит), сначала подтвержденные при биопсии. Ввиду того что в цитологических препаратах имелись признаки злокачественного процесса, продолжали тщательные исследования и при прицельной биопсии с помощью кольпоскопа обнаружили интраэпителиальный рак. Клинически не выявленный инвазивный рак оказался у одной больной с явлениями кольпита. Цитологически в этом случае дважды обнаружены несомненные признаки рака при отрицательных результатах первоначальной биопсии.

У остальных 5 больных положительные цитологические данные гистологически не подтвердились. Это составляет 4,2 % всех женщин, у которых отвергнуто злокачественное заболевание шейки матки. У одной из них был трихомонадный кольпит, который, по-видимому, явился причиной неправильной или неточной диагностики. Из этих 5 больных только у одной

цитологически обнаружены атипичные клетки. У остальных 4 женщин отмечали лишь подозрительные на атипичные клетки. При повторных исследованиях в среднем через 27 дней подозрение на карциному не оправдалось. Эти данные указывают на необходимость повторных цитологических исследований для наблюдения патологического процесса в динамике в тех случаях, когда возникают трудности при диагностике.

У одной больной клинически ставили диагноз рака шейки матки, в то время как результаты цитологического и гистологического исследования были отрицательными, что позволило исключить этот диагноз.

Подводя итог, можно сказать, что на каждые 100 женщин, с заболеванием шейки матки неясного характера, у одной больной цитологически обнаружены атипичные клетки, несмотря на первоначально отрицательные гистологические данные (табл. 2).

Табл. 2

Распределение интраэпителиальных и инвазивных раков шейки матки среди обследованных женщин

Окончательный диагноз	Среди обследованных больных женщин выявлено		
	с помощью гистологических и цитологических исследований	только с помощью цитологических исследований при отрицательных гистологических данных	с помощью цитологических исследований при отрицательных клинических и гистологических данных
Интраэпителиальные раки			
Число случаев (абс.)	38	9	4
(%)	7,3	1,7	0,75
Инвазивные раки			
Число случаев (абс.)	44	8	1
(%)	8,5	1,5	0,19
Всего число случаев			
(абс.)	82	17	5
(%)	15,4	3,2	0,94

У одной больной не было и клинических признаков, которые бы позволили подозревать злокачественный процесс. Это соответствует среднему проценту первично выявленных раков шейки матки при профилактических осмотрах с применением цитологических исследований.

К сожалению, нет единого мнения о подсчете показателей, характеризующих тот или иной метод. Например, процент ложноотрицательных диагнозов вычисляют по отношению к числу больных раком, сумме больных раком и больных с ложноположительными цитологическими диагнозами, общему числу обследованных [3, 4].

Поэтому мы сделали попытку оценить в битах количество информации, получаемой с помощью цитологического метода, и сравнить его с гистологическим. В каждом методе оценивали самое важное, самое характерное, то, что может быть в принципе определено во всех случаях. С этих позиций информацию, получаемую при цитологическом исследовании о наличии или отсутствии инвазии, не учитывали, так как при массовых обследованиях инвазивный и преинвазивный рак цитологически обычно не дифференцируется, а в условиях онкологического диспансера, куда больные в ряде случаев поступают со вторичными изменениями слизистой оболочки после биопсий и поверхностных соскобов с шейки матки, произведенных в районных онкологических пунктах, по цитологическим данным особенно часто нельзя ответить на этот вопрос даже при наличии явных признаков злокачественного процесса [6, 7, 8]. Из полученных данных видно, что на вопрос, есть ли у больной атипизм эпителия, цитологический метод дает значительно больше информации, чем гистологический. Совместное использование цитологического и гистологического методов в этом отношении почти не увеличивает информацию. Этим лишний раз подтверждается высокая эффективность цитологического метода при профилактических осмотрах для отбора больных, внушающих подозрение ввиду обнаружения у них атипичных клеток.

Результаты исследования

Учитывая, что гистологический диагноз позволяет получить еще информацию о наличии или отсутствии инвазии, общая информация, полученная с его помощью, значительно больше полученной цитологическим методом. Однако при использовании обоих методов эта информация увеличивается на 33,11 % (0,503 бита) и позволяет получить 1,519 бит информации, т. е. 93,19 % максимально возможной.

Для выявления ранних форм рака шейки матки и особенно доклинических стадий профилактические осмотры женщин, проводимые только врачом-гинекологом или онкологом, недостаточны. При обычном визуальном обследовании с помощью зеркал и пальпации надвлагалищной части шейки матки невозможно обнаружить начальных, клинически не проявляющихся бессимптомных поражений шейки матки, укладывающихся в морфологическое понятие начальная форма *Carcinoma in situ* (рак на месте), *Carcinoma colli uteri* (рак шейки матки). Вот почему при профилактических осмотрах здоровых женщин использование цитологического метода приобретает особое значение.

Как следует из отечественной и зарубежной литературы [9, 10, 11], для быстроты просмотра мазков, взятых у женщин для цитологического исследования во время профилактических осмотров, может быть применен люминесцентный метод. Однако многие авторы [2, 5] считают этот метод не строго специфичным для установления раковой природы атипичных эпителиальных клеток. Для интерпретации клеток наряду со свечением

учитывать и их морфологические особенности требует квалификации цитоморфолога, на что указывают многие авторы [1, 3, 4].

В этой работе мы стремились оценить на практике достоинства и недостатки люминесцентного метода при профилактических осмотрах женщин и сопоставить результаты исследования, полученные люминесцентным методом и основным методом окраски мазка гематоксилин-эозином (гематоксилин Гарриса+азур эозин). Для сопоставления мы избрали методику просмотра одних и тех же препаратов сначала с помощью люминесцентного микроскопа, а затем переокрашенных гематоксилин-эозином.

Для выяснения ценности данных исследований провели профилактический осмотр 115 женщин 20-60 лет. Подсохшие мазки соскоба, не фиксируя, окрашивали 5-10 мин. акридиновым оранжевым в разведении 1:20 000 на физиологическом растворе (рН 6,8). После просмотра соскоба с шейки матки в люминесцентном микроскопе, подробной записи характера свечения и морфологической характеристики, а также составления заключения мазки переокрашивали гематоксилин-эозином.

Клинические диагнозы были следующими: здоровы 75 человек, эрозия шейки матки у 2; кольпит у 5; эндоцервицит у 2; воспаление придатков (острое и хроническое) у 3; опущение стенок влагалища и опущение матки, климакс, киста яичника, дисфункция яичников, фиброматоз, полип шейки матки у 7; беременность у 3, опухоль матки у 2 человек.

Свечения, характерного для рака, не обнаружено ни разу; нормальное свечение клеток было у 102 женщин, сомнительный характер свечения эпителиальных клеток - у 11 (10 %).

Из 11 клеток, у 2-х женщин обнаружили свечения ядер или цитоплазмы цилиндрических клеток, у остальных 10 наблюдался сомнительный характер свечения ядер или цитоплазмы клеток плоского эпителия различных слоев слизистой оболочки, чаще промежуточного слоя.

Изучая морфологические особенности этих клеток, мы не отметили признаков атипии. В препаратах, переокрашенных гематоксилин-эозином, среди женщин с сомнительным характером свечения клеток у 2 женщин при изучении морфологии установлены признаки, позволившие дать заключение о начале малигнизации.

У одной из них при гистологическом исследовании обнаружен Cg in situ, а у другой - эпидермизация желез атипичным плоским эпителием с атипией клеток, гиперхромией ядер с единичными митозами. Клинически у первой было опущение влагалища, у второй - полип шейки матки.

Следовательно, в препарате, просматриваемом в люминесцентном микроскопе, не всегда могут быть уловлены те морфологические особенности, которые определяются в препарате, окрашенном гематоксилин - эозином. У 2 женщин, у которых обнаружен нормальный характер свечения клеток, в препаратах, переокрашенных гематоксилин-эозином, найдены элементы, подозрительные на рак, что не подтвердилось

гистологическим исследованием кусочка ткани, взятой путем биопсии. Гистологический диагноз у первой - лейкоплакия шейки матки, у второй - аденоматозный полип цервикального канала, железистая гиперплазия эндометрия.

Дальнейшее наблюдение за больными выявит течение патологического процесса. Клинически эти женщины были здоровы по заключению гинеколога, и только данные цитологического исследования позволили определить здоровых и явно больных раком (характерное для рака свечение и морфология клеток).

Выводы

1. Люминесцентно-цитологический метод исследования, несмотря на простоту, позволяет получить результаты не хуже, чем при использовании окрашенных препаратов.

2. Для оценки цитологического метода особенно полезным оказалось использование теории информации. При цитологическом методе получен 0,503 бит информации, при гистологическом 1,016 бит, а при совместном использовании обоих методов - 1,519 из 1,629 бит максимально возможной информации.

3. На данном материале у каждой 5-й больной интраэпителиальным или инвазивным раком шейки матки цитологическое исследование способствовало постановке окончательного диагноза.

4. Люминесцентный метод может быть использован при профилактических осмотрах как менее трудоемкий для быстрого отбора здоровых и явно больных раком (характерное для рака свечение и морфология клеток).

5. Для выявления ранних доклинических форм и внутриэпителиального рака необходимо все мазки с сомнительным характером свечения вне зависимости от морфологической характеристики клеток переокрасить гематоксилин-эозином и определить патологическое состояние эпителия только по переокрашенным препаратам.

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**РОЛЬ ДЕМОГРАФИЧЕСКИХ ФАКТОРОВ И УРБАНИЗАЦИИ В
ДИНАМИКЕ ЧЕЛОВЕЧЕСКОГО КАПИТАЛА И ВЛИЯНИЕ
ВНУТРИСТРАНОВОЙ МИГРАЦИИ ПОД ВОЗДЕЙСТВИЕМ
ИЗМЕНЕНИЙ ОКРУЖАЮЩЕЙ СРЕДЫ**

Аннотация: В данной статье исследуется комплексное взаимодействие демографических переходов, урбанизации и динамики человеческого капитала в развивающихся странах. Особое внимание уделяется роли внутренней миграции, вызванной экологическими изменениями, которая выступает ключевым механизмом, влияющим на эти процессы. На основе анализа академической литературы показывается, что урбанизация может способствовать накоплению человеческого капитала через агломерационные эффекты, однако стремительный и неупорядоченный рост городов, усугубляемый климатическими миграциями, создает значительные вызовы для устойчивого развития. Статья подчеркивает необходимость интеграции политики в области управления миграцией, развития человеческого капитала и климатической адаптации.

Ключевые слова: человеческий капитал, урбанизация, развивающиеся страны, внутренняя миграция, экологические изменения, климатическая миграция, агломерационная экономика.

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THE ROLE OF DEMOGRAPHIC FACTORS AND URBANISATION IN THE DYNAMICS OF HUMAN CAPITAL AND THE IMPACT OF INTERNAL MIGRATION UNDER THE INFLUENCE OF ENVIRONMENTAL CHANGES

Summary: *This paper examines the complex interaction between demographic transitions, urbanisation and human capital dynamics. Particular attention is paid to the role of internal migration caused by environmental changes, which is a key mechanism influencing these processes. Based on an analysis of academic literature, it is shown that urbanisation can contribute to the accumulation of human capital through agglomeration effects, but rapid and disorderly urban growth, exacerbated by climate migration, poses significant challenges to sustainable development. The article emphasises the need to integrate policies on migration management, human capital development and climate adaptation.*

Keywords: *human capital, urbanisation, developing countries, internal migration, environmental change, climate migration, agglomeration economics.*

Введение

В современном мире динамика человеческого капитала играет ключевую роль в экономическом и социальном развитии стран. Особенно актуальна эта тема для развивающихся стран, где демографические факторы, урбанизация и миграция под воздействием изменений окружающей среды оказывают значительное влияние на формирование и распределение человеческого капитала. Узбекистан, как одна из крупнейших стран Центральной Азии, сталкивается с аналогичными вызовами, что делает изучение мирового опыта в этой области особенно важным.

Человеческий капитал, включающий образование, здоровье и профессиональные навыки населения, является основным драйвером экономического роста и социального развития. Демографические факторы,

такие как возрастная структура населения, уровень фертильности и гендерное равенство, оказывают значительное влияние на формирование человеческого капитала. Урбанизация, в свою очередь, создает как возможности, так и вызов для накопления и распределения человеческого капитала. Внутрискановая миграция, стимулируемая изменениями окружающей среды, добавляет еще один слой сложности и многовариантности в эту динамику.

Демографические факторы играют фундаментальную роль в социально-экономическом развитии стран, во многом предопределяя темпы экономического роста и уровень благосостояния населения. Опыт стран с переходной экономикой показывает, что рост населения может быть мощным драйвером экономического развития, однако чрезмерно стремительный рост создает риски увеличения бедности и снижения качества жизни. В современном мире эти демографические процессы неразрывно связаны с двумя другими глобальными трендами - ускорющейся урбанизацией и изменением окружающей среды.

Согласно данным ООН, по состоянию на 2025 год 45% из 8,2 миллиардов человек на планете проживает в городах, и ожидается, что к 2050 году две трети глобального роста произойдет именно в городских агломерациях. Этот процесс особенно ярко выражен в развивающихся странах, где урбанизация зачастую происходит стремительно, в сжатые сроки, не оставляя времени на адаптацию институтов, инфраструктуры и социальных взаимосвязей. Параллельно с этим набирает силу феномен климатически обусловленной миграции. По оценкам Всемирного банка, к 205 году более 140 миллионов человек в странах Африки к югу от Сахары, Южной Азии и Латинской Америки могут стать внутренними мигрантами из-за усиления засух, дефицита стока крупных рек, неурожаев, подъема уровня моря и подтопления прибрежных районов в результате штормовых нагонов. Эти экологические мигранты в основном перемещаются внутри стран, часто из сельских районов в города. Цель данного исследования проанализировать, как демографические сдвиги, урбанизация и экологическая миграция взаимодействуют, формируя динамику человеческого капитала в развивающихся странах.

Человеческий капитал: определение и подходы

Человеческий капитал — это совокупность знаний, навыков и здоровья, которые индивиды приобретают в течение жизни и которые способствуют их производительности и экономическому благополучию. Концепция человеческого капитала была впервые предложена в работах Гэри Беккера и Теодора Шульца в 1960-х годах (Becker, 1964; Schultz, 1961). С тех пор эта концепция стала основой для понимания экономического развития и социального прогресса.

Демографические факторы и человеческий капитал

Демографические факторы, такие как возрастная структура населения, уровень фертильности и гендерное равенство, играют решающую роль в

формировании человеческого капитала. Например, демографический дивиденд, который возникает при уменьшении доли детей в населении и увеличении доли трудоспособного населения, может способствовать экономическому росту (Bloom et al., 2003). Однако, для реализации этого потенциала необходимы соответствующие инвестиции в образование и здравоохранение.

Урбанизация и человеческий капитал

Урбанизация создает как возможности, так и вызов для накопления и распределения человеческого капитала. Города часто являются центрами образования, здравоохранения и инноваций, что способствует накоплению человеческого капитала (Glaeser, 1998). Однако, быстрая урбанизация может также приводить к социальному неравенству и проблемам с доступом к основным услугам, особенно в трущобах (UN-Habitat, 2020).

Урбанизация исторически ассоциируется с экономическим ростом благодаря возникновению агломерационной экономики - экономии от масштаба, когда производительность предприятий растет за счет соседства с другими предприятиями, легкости распространения информации о технологиях, наличия квалифицированных кадров и снижения торговых издержек. Города предоставляют уникальные возможности для роста человеческого капитала. Крупные городские центры, особенно мегаполисы, выступают центрами концентрации человеческого капитала. В них сосредоточены высшие учебные заведения, научно-исследовательские институты и высокотехнологичные компании. Доказана сильная зависимость между накоплением человеческого капитала в городах и их экономическим ростом. Города накапливают опыт, навыки и квалификацию горожан, создавая синергетическую среду для обучения и инноваций.

Исследования показывают, что урбанизация играет ключевую роль в накоплении человеческого капитала через структурные изменения в экономике и имеет долгосрочную связь с экономическим ростом. Урбанизация стимулирует развитие инфраструктуры, инвестиции в человеческий капитал и совершенствование институтов. Этот процесс не только повышает предпринимательскую активность, но и способствует росту уровня жизни за счет лучшего доступа к социальным услугам - здравоохранению и образованию. Однако урбанизация в развивающихся странах сопряжена с серьезными проблемами. Быстрый рост городов часто опережает возможности властей по обеспечению базовой инфраструктуры, что приводит к формированию трущоб, перегруженности и росту стоимости жизни. Как показывает пример Нигерии, сама по себе урбанизация не обязательно способствует экономическому росту; ее позитивный эффект проявляется только в сочетании с инвестициями в человеческий капитал. Без этого города не могут воспользоваться преимуществами агломерации и сталкиваются с агломерационными издержками.

Внутристрановая миграция и изменения окружающей среды

Внутристрановая миграция, стимулируемая изменениями окружающей среды, становится все более актуальной проблемой для развивающихся стран. Климатические изменения, такие как засухи, наводнения и деградация почв, вынуждают людей мигрировать в поисках лучших условий жизни (ИОМ, 2019). Эта миграция может оказывать как положительное, так и отрицательное влияние на динамику человеческого капитала.

Изменение окружающей среды выступает мощным катализатором внутренней миграции, усугубляя существующие демографические и урбанизационные тренды.

Такие явления, как повышение температуры, нехватка воды, засухи и наводнения, оказывают глубокое воздействие на население, основу образа жизни которого составляет сельское хозяйство. Миллионы людей вынуждены покидать свои дома из-за участившихся наводнений, уничтожающих посевы и источники дохода, и перемещаться в города в поисках безопасности и новых средств к существованию. Этот поток мигрантов увеличивает нагрузку на и без того перегруженные городские системы. В результате возникают проблемы неформального жилья, ухудшения санитарных условий и нагрузки на рынки труда, что может нивелировать положительные эффекты урбанизации для человеческого капитала. Новоприбывшие мигранты зачастую обладают низким уровнем образования и навыков, что ограничивает их возможности на городском рынке труда и способствует росту неформального сектора. Важно отметить, что не все, кто пострадал от изменений климата, могут мигрировать. Наиболее уязвимые слои населения - беднейшие, пожилые люди, женщины - часто не имеют ресурсов для переезда, оказываясь в "ловушке" в экологически неблагополучных регионах.

Региональные особенности управления человеческим капиталом

Изучение мирового опыта управления человеческим капиталом в условиях демографических изменений и урбанизации может предоставить ценные уроки для Узбекистана. Успешные практики из других стран могут быть адаптированы к местным условиям для улучшения управления человеческим капиталом.

Взаимодействие данных факторов имеет выраженную региональную специфику. Субсахарская Африка демонстрирует наиболее быстрые темпы урбанизации и высокую уязвимость к климатическим изменениям. Здесь урбанизация и развитие человеческого капитала, согласно некоторым исследованиям, могут в краткосрочной перспективе увеличивать экологический след, усугубляя нагрузку на окружающую среду. Ключевой задачей является преобразование человеческого капитала в инструмент экологической устойчивости. Южная Азия является регионом, где формируются одни из крупнейших в мире мегаполисов (Дакка, Джакарта), испытывающих колоссальное давление как со стороны внутреннего демографического роста, так и со стороны миграций, вызванных, в

частности, наводнениями и засухами. Латинская Америка предпринимает попытки комбинированного подхода, как в случае с Мексикой, где программы устойчивого лесопользования создают экономические возможности на местах, потенциально снижая стимулы для деструктивной миграции.

Эффективная политика должна быть нацелена на:

1. Интегрированное планирование: Внедрение климатической миграции в национальные стратегии развития и урбанизации, как это делается в Китае с его системой многоуровневого пространственного планирования.

2. Инвестиции в человеческий капитал: Стратегические планы, сфокусированные на развитии образования и здравоохранения, должны быть неотъемлемой частью городской политики. Это позволяет трансформировать урбанизацию в более устойчивый процесс.

3. Снижение экологических рисков: Глобальное сокращение выбросов парниковых газов и адаптация на местном уровне критически важны для уменьшения масштабов вынужденной миграции в будущем.

Методология исследования

Для достижения поставленных целей в данном исследовании используются: обзор академических источников и отчетов международных организаций по теме исследования, использование данных World Bank, UN Data и других источников для анализа демографических факторов, урбанизации и миграции в развивающихся странах, сравнение опыта различных стран в управлении человеческим капиталом и его применимости в Узбекистане.

Результаты исследования

Анализ данных показывает, что демографические факторы играют значительную роль в формировании человеческого капитала. Например, страны с более молодым населением и высоким уровнем фертильности часто сталкиваются с вызовами в обеспечении качественного образования и здравоохранения. В то же время, страны с более зрелым населением могут испытывать нехватку рабочей силы и давление на системы социального обеспечения.

Демографические факторы, урбанизация и человеческий капитал в развивающихся странах находятся в сложной и динамичной взаимосвязи, которая все в большей степени опосредуется экологическими изменениями. Внутренняя миграция, вызванная климатическими стрессорами, выступает мощной силой, которая может как стимулировать развитие человеческого капитала через агломерационные эффекты города, так и подрывать его через дестабилизацию городских систем и рост неравенства.

Для того чтобы урбанизация реализовала свой потенциал в качестве катализатора развития, а не источника кризиса, необходимы проактивные и комплексные политические решения. Управление миграционными потоками, инвестиции в образование и здравоохранение, а также создание

адаптированной и высокотехнологичной городской инфраструктуры, в том числе с использованием геоинформационных систем, должны осуществляться с учетом неизбежного роста климатически обусловленных перемещений населения. Только такой интегрированный подход позволит превратить вызовы, связанные с демографией и изменением окружающей среды, в возможности для устойчивого развития человеческого капитала в развивающихся странах.

Урбанизация способствует накоплению человеческого капитала за счет лучшего доступа к образованию и здравоохранению в городах. Однако, быстрая урбанизация может также приводить к социальному неравенству и проблемам с доступом к основным услугам, особенно в трущобах.

Внутристрановая миграция, стимулируемая изменениями окружающей среды, оказывает значительное влияние на динамику человеческого капитала. Климатические мигранты часто сталкиваются с вызовами в адаптации к новым условиям жизни и доступе к основным услугам.

Изучение мирового опыта показывает, что успешные страны в управлении человеческим капиталом часто используют комплексные подходы, включающие инвестиции в образование, здравоохранение и инфраструктуру. Эти подходы могут быть адаптированы к условиям Узбекистана для улучшения управления человеческим капиталом.

Обсуждение результатов

Результаты исследования показывают, что демографические факторы, урбанизация и внутристрановая миграция под воздействием изменений окружающей среды оказывают значительное влияние на динамику человеческого капитала в развивающихся странах. Особое внимание следует уделить управлению человеческим капиталом в условиях быстрой урбанизации и климатических изменений.

Важность мирового опыта для управления человеческим капиталом в Узбекистане

Узбекистан, как и многие другие страны с растущей экономикой, сталкивается с вызовами в управлении человеческим капиталом в условиях демографических изменений, урбанизации и миграции под воздействием изменений окружающей среды. Изучение мирового опыта может предоставить ценные уроки для улучшения управления человеческим капиталом в стране.

1. Инвестиции в образование: Многие успешные страны уделяют большое внимание инвестициям в образование, что способствует накоплению человеческого капитала. Узбекистан может адаптировать эти практики для улучшения качества образования и доступа к нему.

2. Развитие инфраструктуры: Инвестиции в инфраструктуру, включая транспорт, здравоохранение и жилищное строительство, могут способствовать лучшему распределению человеческого капитала.

3. Управление миграцией: Эффективное управление миграцией, включая поддержку климатических мигрантов, может способствовать лучшей интеграции и использованию человеческого капитала.

Узбекистан может использовать мировой опыт для разработки стратегий управления человеческим капиталом, учитывающих местные условия и вызовы. Например, инвестиции в образование и инфраструктуру в сельских регионах могут способствовать сокращению миграции в города и лучшему распределению человеческого капитала.

Практические рекомендации

1. Улучшение качества образования: Инвестиции в улучшение качества образования и доступа к нему могут способствовать накоплению человеческого капитала.

2. Развитие инфраструктуры: Развитие инфраструктуры в сельских регионах может способствовать сокращению миграции в города и лучшему распределению человеческого капитала.

3. Поддержка климатических мигрантов: Разработка программ поддержки для климатических мигрантов может способствовать их лучшей интеграции и использованию человеческого капитала.

Заключение

Управление человеческим капиталом требует комплексного подхода, учитывающего демографические факторы, урбанизацию и миграцию под воздействием изменений окружающей среды. Изучение мирового опыта управления человеческим капиталом может предоставить ценные уроки для Узбекистана в улучшении управления человеческим капиталом в условиях демографических изменений, урбанизации и миграции под воздействием изменений окружающей среды.

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ТИПОЛОГИЧЕСКАЯ ТРАНСФОРМАЦИЯ И ХУДОЖЕСТВЕННАЯ ИНТЕРПРЕТАЦИЯ ВОЕННОЙ ТЕМАТИКИ В УЗБЕКСКОЙ И АНГЛИЙСКОЙ ПОЭЗИИ НА ПРИМЕРЕ СТИХОТВОРЕНИЙ «НИДО» И «ВОЕННЫЙ ФОТОГРАФ»

***Аннотация.** Данная статья посвящена изучению типологической трансформации и художественной интерпретации мотива войны в узбекской и английской поэзии на основе сравнительно-аналитического подхода. В качестве исследовательского материала были выбраны стихотворения «Нидо» и «Военный фотограф». Эти поэтические тексты были проанализированы сравнительно с точки зрения формы, лексико-семантического слоя, системы образов, эмоциональной тональности, хронотопа и идеологического содержания.*

***Ключевые слова:** мотив войны, узбекская поэзия, английская поэзия, типологическая трансформация, художественный образ.*

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TYPOLOGICAL TRANSFORMATION AND ARTISTIC INTERPRETATION OF MILITARY THEMES IN UZBEK AND ENGLISH POETRY USING THE EXAMPLE OF THE POEMS "NIDO" AND "WAR PHOTOGRAPHER".

***Annotation.** This article examines the typological transformation and artistic interpretation of the war motif in Uzbek and English poetry using a comparative analytical approach. The poems "Nido" and "War Photographer" were selected as research material. These poetic texts were analyzed comparatively in terms of form, lexical and semantic layers, imagery, emotional tone, chronotope, and ideological content.*

***Keywords:** war motif, Uzbek poetry, English poetry, typological transformation, artistic imagery.*

В английском народном устном творчестве баллады занимают важное место. Баллады представляют собой поэтические произведения, которые в основном распространялись устно среди народа и в которых отражаются исторические события, любовь, верность, воинская доблесть и различные социальные явления. Английские баллады отличаются простым сюжетом, повторяющимися строками и мелодичностью. Обычно они исполнялись в песенной форме и передавались из поколения в поколение.

В узбекском народном устном творчестве важное место занимают героические эпосы. Героические эпосы отражают историческую память народа, его мечты, надежды и национальные ценности. В них изображаются подвиги храбрых героев, защищающих Родину, борющихся за справедливость и отстаивающих интересы народа. Например, такие эпосы, как *Alpomish* и *Go'ro'g'li*, демонстрируют героические традиции узбекского народа.

Между английскими балладами и узбекскими героическими эпосами существуют определённые сходства. Оба жанра относятся к устному народному творчеству и отражают исторические события и дух героизма. Кроме того, они передавались из поколения в поколение посредством устной традиции исполнения.

В то же время между ними существуют и различия. Английские баллады, как правило, имеют небольшой объём, простой сюжет и лирико-драматический характер, тогда как узбекские героические эпосы отличаются развернутым сюжетом, многосоставной структурой и богатством эпических описаний. В эпосах подробно раскрываются жизнь, приключения и борьба героев.

Война является одной из наиболее универсальных и глубоких тем в литературе, поскольку отражает состояние и опыт человечества в периоды тяжёлых испытаний. Война оказывает разрушительное влияние не только на жизнь отдельных людей и народов, но и на ценности и убеждения культур и цивилизаций. Она противопоставляет такие понятия, как справедливость и нравственность, храбрость и трусость, верность и предательство, любовь и ненависть. Вместе с тем война вдохновляет писателей и художников на творческое осмысление действительности. Посредством слова и художественного образа они передают реалии и атмосферу войны, выражают критическое отношение к ней, выступают против неё, чтят память её жертв и выражают надежду на мир.

В мировой литературе тема войны является одной из самых болезненных и актуальных проблем человечества, нашедших отражение в творчестве многих писателей. Как в узбекской, так и в английской литературе влияние войны на человеческую психику и жизнь общества раскрывается с помощью различных художественных средств. В этом отношении стихотворение *Nido* узбекского поэта Эркина Вохидова и стихотворение *War Photographer* британской поэтессы Кэрол Энн Даффи являются важными литературными примерами изображения трагедии войны.

В стихотворении Эркина Вохидова *Nido* через художественные образы передаются бедствия, принесённые войной человечеству, а также страдания и внутренний крик человеческой души. Поэт изображает разрушенные судьбы, детей, оставшихся без родителей, и полное боли человеческое сердце, призывая людей беречь мир. По своей сути произведение представляет собой крик души, выражающий протест против войны. В

стихотворении идея мира раскрывается через лиризм, сильную эмоциональную тональность и символические образы.

В стихотворении War Photographer Кэрол Энн Даффи военные события показаны не непосредственно с поля боя, а через взгляд фотографа, запечатлевающего войну. Лирический герой, сортируя сделанные в зонах конфликта фотографии, вспоминает пережитые им эмоциональные состояния. Через объектив фотографа раскрываются ужасающие картины войны — разрушения, страдания людей и смерть. Поэтесса глубоко передаёт психологические травмы, оставляемые войной в человеческом сознании.

Эркин Вохидов известен своим стихотворением Nido, посвящённым теме материнской боли и человеческого страдания; он является одним из известных поэтов нашей страны. Кэрол Энн Даффи в 2009–2019 годах занимала пост поэта-лауреата Великобритании и написала стихотворение War Photographer, посвятив его своим друзьям — военным фотокорреспондентам. Оба поэта рассматривают войну с разных позиций и с использованием различных художественных средств, однако в обоих произведениях отражены ужасы войны, страдания людей, а также равнодушие и отчуждение тех, кто не вовлечён непосредственно в военные действия.

В статье анализируются способы усиления художественной выразительности и воздействия посредством таких поэтических средств, как образ, метафора, реминисценция, повтор, рифма, ирония и сарказм. Также рассматривается контраст между реальностью войны и неосведомлённостью мирной жизни, а также личные и социальные аспекты войны — утрата близких, травмы свидетелей насилия, двойственность положения наблюдателя и участника. Проведённый анализ доказывает, что оба стихотворения побуждают читателя задуматься о последствиях и причинах войны, а также обратиться к осмыслению собственной роли и ответственности.

Произведения анализируются с точки зрения формы, языка, образности и идейного содержания. С формальной точки зрения оба стихотворения состоят из четырёх строф, однако в «Nido» схема рифмовки и метр варьируются, тогда как в «War Photographer» сохраняется устойчивая рифмовка ABBCDD и ямбический пентаметр. Это свидетельствует о том, что «Nido» написано в экспрессивно-импульсивной манере, а «War Photographer» — в сдержанно-структурированном стиле.

С языковой точки зрения оба произведения написаны простыми и прямыми словами, однако в «Nido» используются узбекские лексические единицы, такие как «отажон», «ёлғизим», «қўзим», что создаёт ощущение близости и культурной идентичности.

Эркин Вохидов. «Nido». Отрывок:

“Otajon, yolg‘izim, qo‘zim, jonim,
Sizning ko‘ksingizni teshgan qora o‘q
Qalbimni o‘rtamoqda so‘ngsiz armonim,

O'sha olis yurtda qon kechib hozir..."¹

Примечание: Обращения к отцу с элементами нежности («ёлғизим», «қўзим») являются характерными формулами ласкательности узбекской народной поэзии. Метафора «чёрная пуля» («Qora o'q») символизирует неизбежность смерти, а плеоназм «безпесенные печали» («songsiz armon») кодирует бескрайность горя. Выражение «далёкая земля» («Olis yurt») указывает на могилу отца, погибшего в советских войнах за границей, показывая расстояние войны, достигшей трудовой деревни.

В стихотворении «War Photographer» технические термины, такие как «spools», «solutions» и «supplement», отражают профессиональную жизнь фотографа и его эмоциональную отстранённость. "In his darkroom he is finally alone

with spools of suffering set out in ordered rows.

The only light is red and softly glows,

as though this were a church and he a priest..."³⁹

Примечание: «Spools of suffering» — это синтез аллитерации и метафоры, посредством которого невыраженные страдания приобретают материальную форму (плёночный рулон); это заменяет профессиональную объективность фотографа личной болью. Сравнение «church / priest» выражает идею «крещения» военных снимков, то есть намерение сохранить их как священную память. В изобразительном плане оба стихотворения используют яркие и контрастные образы для передачи воздействия войны.

В «Nido» такие метафоры, как «Sizning ko'ksingizni teshgan qora o'q», «Qalbimni o'rtamoqda so'ngsiz armonim», «O'sha olis yurtda qon kechib hozir», передают чувство скорби и утраты поэта.

В «War Photographer» такие выразительные образы, как «as though this were a church and he a priest», «to fields which don't explode beneath the feet», «a hundred agonies in black and white», подчеркивают нравственный конфликт фотографа и различие между мирами.

Даффи, Кэрол Энн. «War Photographer».

"A hundred agonies in black and white

from which his editor will pick out five or six

for Sunday's supplement.

The reader's eyeballs prick

with tears between the bath and pre-lunch beers..."⁴⁰

Примечание: «A hundred agonies in black and white» — посредством партитивного числительного («hundred») и цветового контраста передаётся множественность боли, заключённой в матрицу (фотографический негатив); в заключительной строке повседневный ритм «bath – pre-lunch beers» контрастирует с «быстро проходящей слезой», вызванной военными

³⁹ Vohidov, Erkin. Tanlangan asarlar. – Toshkent: G'afur G'ulom, 2020.

⁴⁰ Duffy, Carol Ann. *Selected Poems*. – London: Penguin, 2018.

снимками. Это осуждает постмодернистский феномен «потребления травмы».

Тон (настроение): Оба произведения написаны в печальном и гневном настроении, однако «Nido» носит личностно-эмоциональный характер, тогда как «War Photographer» выполнено в отчуждённо-ироническом стиле. «Nido» выражает любовь к отцу, ненависть к войне и чувство безысходности. «War Photographer» раскрывает чувство беспомощности и вины фотографа, а также его циничное отношение к равнодушию читателей.

Идея (смысловой вывод): Оба стихотворения передают антивоенную идею и человеческое страдание, однако «Nido» отличается патриотическим и оптимистическим настроением, тогда как «War Photographer» написано в критическом и пессимистическом ключе. «Nido» возвеличивает мужество отца и борьбу народа за свободу, выражая надежду на лучшее будущее для следующего поколения. «War Photographer» же ставит под сомнение цель и эффективность труда фотографа, раскрывая равнодушие общества.

Оба стихотворения мощно и выразительно передают ужасы войны и её влияние на человеческую психику. Они обладают общими чертами — простым языком, яркими образами и контрастной средой, однако различаются по форме, настроению и послы. «Nido» является личным и эмоциональным, тогда как «War Photographer» — профессиональным и ироничным по стилю. «Nido» выполнено в патриотическом и оптимистическом духе, а «War Photographer» — в критическом и пессимистическом ключе. Оба произведения имеют свои преимущества и недостатки в зависимости от точки зрения и предпочтений читателя.

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ОСОБЕННОСТИ КОНКУРЕНЦИИ НА КИТАЙСКОМ РЫНКЕ МОТОЦИКЛОВ

***Аннотация.** Степень конкуренции производителей двигателей, мотоциклов на китайском рынке повышается из года в год. Кроме традиционных участников – китайских, японских, других – появляются новые игроки, особенно – на рынке электромотоциклов. Структура спроса и доля рынка участников стремительно меняется. Методы исследования: динамические ряды, сравнение, структурный анализ. Результаты свидетельствуют: экспортные поставки китайских мотоциклов растут, внутренний спрос стагнирует. Рыночная доля компании Chongqing Zongshen незначительно снизилась, что требует корректировки комплекса маркетинга.*

***Ключевые слова:** рынок мотоциклов, Китай, конкуренты, рыночная доля, Chongqing Zongshen.*

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COMPETITION FEATURES IN THE CHINESE MOTORCYCLE MARKET

***Abstract.** Competition among engine and motorcycle manufacturers in the Chinese market is increasing year after year. In addition to traditional players—Chinese, Japanese, and others—new players are emerging, particularly in the electric motorcycle market. The structure of demand and market share of these players are rapidly changing. Research methods include dynamic series, comparison, and structural analysis. The results indicate that export shipments of Chinese motorcycles are growing, while domestic demand is stagnating. Chongqing Zongshen's market share has declined slightly, necessitating adjustments to its marketing mix.*

***Keywords:** Motorcycle market, China, competitors, market share, Chongqing Zongshen.*

Факторы, оказывающие влияние на динамику рыночной доли производственных компаний, интересуют многих экономистов, менеджеров. Так, А.В. Судакова исследовала процесс построения прогноза рыночной доли компании для целей моделирования. Автор попыталась доказать, что для «получения несмещённых прогнозов необходимо использовать методы моделирования» [3].

М.В. Горячих уверен, что «Степень концентрации можно оценить с помощью прямых и косвенных показателей. Косвенные показатели степени концентрации описывают ситуацию на рынке в общем виде, к ним относятся в том числе дисперсия рыночных долей. [1].

В данной статье нами предпринята попытка оценки доли рынка китайской компании Chongqing Zongshen Power Machinery – крупного производителя двигателей, энергетического оборудования, и ее конкурентов в одном рыночном сегменте – на китайском рынке мотоциклов.

В целом мотоциклетная промышленность Китая завершила 2025 год с позитивной тенденцией, характеризующейся ростом продаж. Причем если экспорт в течение года был устойчиво растущим, внутренний рынок восстанавливался от предыдущего спада относительно медленными темпами.

С января по декабрь 2025 г. в КНР было произведено 184975 млн бензиновых мотоциклов, что на 11,7% больше, чем в 2024 г. Производство электромотоциклов достигло показателя 36118 млн единиц, что на шесть процентов больше, чем годом ранее [4].

С учетом поставок на экспорт общий объем производства составил 221093 млн единиц – на 10,3% больше, чем в 2024 г. Но продажи мотоциклов внутри материкового Китая составили 8602 млн единиц, что на 3,5% меньше, чем годом ранее, а продажи бензиновых мотоциклов упали на 6,2% по сравнению с прошлым годом, и составили 51449 млн единиц.

Сегмент мотоциклов для отдыха и развлечений с большим объемом двигателя продолжал демонстрировать сильный рост, а электромотоциклы – восстановительный рост после заметного падения.

За 2025 год в десятку крупнейших компаний по продажам электромотоциклов вошли: Yadea Group (921 100 единиц), Luyuan (591 500 единиц), Zongshen (465 100 единиц), Huaihai (344 900 единиц), CFMOTO (300 300 единиц), Jiangsu Sunra (262 900 единиц), Bus New Energy (206 900 единиц), Lovol (75 500 единиц), Loncin (66 900 единиц) и TAIGL (57 800 единиц).

За 2025 год в десятку крупнейших компаний по продажам мотоциклов (с топливом, без учета электромотоциклов) вошли:

- Dachangjiang – 2 686 700 единиц,
- Loncin – 1 578 300 единиц,
- Zongshen – 1 139 200 единиц;
- Tayo – 1 109 100 единиц,

- Sundiro-Honda – 1 003 100 единиц,
- Haojin – 736 600 единиц,
- Yinxiang – 729 100 единиц,
- Dayang – 610 200 единиц,
- Wuyang-Honda – 594 800 единиц,
- Jiangmen Summit – 529 100 единиц.

Всего за 2025 год реализовано 8028005 единиц продукции, в том числе компанией Zongshen – 1139200 единиц, это составляет 14,1% процентов рынка:

$$1139200 * 100 / 8028005 = 14,1 \quad (1)$$

Следовательно, рыночная доля компании за год снизилась на 1,6 процента, по сравнению с 2024 годом, когда доля рынка была равна 15,6%. Это негативный для менеджмента факт.

Заключение

Установлено – при растущем экспорте, продажи мотоциклов внутри материкового Китая снижаются – это касается всех игроков данного сегмента рынка.

Доля рынка компании Chongqing Zongshen, являющейся объектом данного исследования, незначительно снизилась за 2025 год. Конкурентная стратегия и ценовая политика компании в таких условиях требуют корректировок.

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СИЛЬНЫЕ И СЛАБЫЕ СТОРОНЫ КИТАЙСКОГО ПРОИЗВОДИТЕЛЯ ДВИГАТЕЛЕЙ

***Аннотация.** Китайские производственные компании, в том числе экспортеры, развиваются в рамках множества ограничений и мер поддержки со стороны государства. Их сильные и слабые стороны, кроме того, связаны с масштабами деятельности, уровнем конкуренции на целевом рынке, множеством иных факторов. Цель работы – выявление конкурентных преимуществ и недостатков компании Chongqing Zongshen – крупного производителя двигателей и другой продукции. Методы исследования: SWOT и PEST анализ. Результаты свидетельствуют: компания имеет потенциал развития, связанный с мерами государственной поддержки и участием КНР в соглашении о свободной торговле RCEP, но одновременно несет повышенные затраты, связанные с соблюдением нормативных и регуляторных требований государства.*

***Ключевые слова:** SWOT-анализ, PEST-анализ, компания Chongqing Zongshen, преимущества, недостатки.*

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STRENGTHS AND WEAKNESSES OF THE CHINESE ENGINE MANUFACTURER

***Abstract.** Chinese manufacturing companies, including exporters, develop within a multitude of government restrictions and support measures. Their strengths and weaknesses are also related to their scale of operations, the level of competition in the target market, and numerous other factors. The objective of this study is to identify the competitive advantages and weaknesses of Chongqing Zongshen, a major manufacturer of engines and other products. The research methods include a SWOT and PEST analysis. The results indicate that the company has growth potential due to government support measures and China's*

participation in the RCE free trade agreement, but simultaneously incurs increased costs associated with compliance with government regulations.

Keywords: *SWOT analysis, PEST analysis, Chongqing Zongshen Company, advantages, disadvantages.*

Проблемы структурирования факторов внешней и внутренней среды коммерческих организаций интересуют многих экономистов. Так, Ю.Е. Ситникова утверждает: «Рациональное планирование стратегии обязательно включает в себя анализ внешней и внутренней среды деятельности организации. При этом SWOT-анализ направлен на выявление сильных и слабых сторон организации, возможностей и угроз со стороны ее внешнего окружения. Основной целью PEST-анализа является определение факторов внешней среды, оказывающих наибольшее влияние на деятельность компании» [3].

Е.А. Харитонов, С.А. Назаревич исследуют возможности комбинированного использования SWOT- и PEST-анализа, их преимущества и недостатки, особенности этих инструментов [3].

А.А. Кисель, К.В. Панкратова рассматривают особенности SWOT- и PEST-анализа с позиций принятия стратегических решений, их роль в разработке стратегических планов [1].

В данной статье нами приведены отдельные результаты проведенного автором SWOT- и PEST-анализа китайской компании Chongqing Zongshen Power Machinery, которая с момента своего основания (в 1982 году) прошла путь от производства малогабаритных двигателей до диверсифицированного холдинга, охватывающего традиционную энергетику, авиацию, новые источники энергии, различные виды сельскохозяйственной и лесозаготовительной техники.

Рыночная капитализация компании превышает 25 млрд юаней (на конец 2025 г.). Настораживает, что по итогам девяти месяцев 2025 года выручка компании снизилась на 14,6%, а прибыль – на 5,1% [2; 5].

Значительная часть «сильных сторон» компании связана с преференциями со стороны государства. В частности, в КНР применяют:

- национальные программы субсидирования производства (программа «Сделано в Китае» и др.);
- налоговые льготы (снижение корпоративного налога до 15%, если компания удовлетворяет требованиям госконтроля; налоговый кредит на НИОКР, иные);
- субсидируемые государством кредиты банков (по ставкам 0,5–1,5 процента годовых);
- другие программы.

С другой стороны, государство применяет ряд ограничений и регуляторных требований, которые вынуждают производителей продукции увеличивать затраты, в том числе:

1. борьба с «углеродным следом»;

2. усиление контроля за выбросами;
3. усиление контроля за экспортом (в том числе по продукции «двойного назначения»);
4. защита прав миноритарных акционеров;
5. комплаенс-контроль корпоративного управления;
6. меры по управлению отходами;
7. стандарты «зеленого производства».

Соблюдение нормативных требований связано в том числе с ростом расходов компаний на сертификацию, тестирование продукции (особенно экспортной), и др.

Проведенный нами анализ позволил выявить ряд угроз в деятельности компании Chongqing Zongshen, к ним, в частности, относятся торговые барьеры со стороны США и других государств (тарифные и нетарифные), неблагоприятное изменение валютных курсов, удорожание сырья, рабочей силы.

Определенные возможности роста компании связаны с такими процессами и проектами:

- урбанизация;
- программы ускоренного развития механизации сельских районов;
- интенсивное развитие БПЛА, малой авиации;
- наведение порядка в сертификации по «малым высотам»;
- среднегодовой рост (более 25% в год) для силовых установок малой авиации;
- сокращение сроков типовых разрешений в малой авиации (с 24 месяцев в среднем до 12 месяцев);
- муниципальные льготы провинции Чунцин (скидки на землепользование, гранты);
- рост популярности отдыха на природе;
- рост внутреннего туризма.

Chongqing Zongshen производит двигатели, мотоциклы, генераторы, другую продукцию на экспорт, поэтому особое значение имеет беспопшлинный доступ на рынки стран-участниц РСЕР, которые формируют около четверти экспортных операций компании. РСЕР – крупнейшее в мире соглашение о свободной торговле, подписанное в ноябре 2020 года (вступившее в силу с января 2022 года). Оно объединяет 10 стран АСЕАН (Бруней, Вьетнам, Индонезия, Камбоджа, Лаос, Малайзия, Мьянма, Сингапур, Таиланд, Филиппины) и пять их партнеров (Китай, Япония, Южная Корея, Австралия, Новая Зеландия). Страны-участницы охватывают около 30% мирового ВВП. Снижение тарифных и нетарифных барьеров, упрощение таможенных процедур, гармонизация правил происхождения товаров, формирование единого рынка создают новые возможности для компаний-экспортеров.

Заключение

Компания Chongqing Zongshen интенсивно развивается, устойчиво наращивая объемы производства. Одновременно она испытывает давление со стороны глобальных и китайских конкурентов – это одна из причин снижения продаж продукции (за девять месяцев 2025 года). В таких условиях важно точно оценивать угрозы, риски, и возможности развития на внутреннем и внешних рынках – особенно в странах-участницах РСЕР.

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ЭТАПЫ РАЗВИТИЯ И ДИВЕРСИФИКАЦИИ ДЕЯТЕЛЬНОСТИ КРУПНОЙ КИТАЙСКОЙ КОМПАНИИ

***Аннотация.** Китайские компании реального сектора нередко реализуют стратегию лидерства по издержкам, используя преференции со стороны государства. Отдельные производители, кроме того, целенаправленно формируют и реализуют стратегии диверсификации и вертикальной интеграции. Цель работы – периодизация развития и оценка стратегий Chongqing Zongshen – крупного производителя двигателей, иной продукции машиностроения. Метод исследования – кейс-стади. Результаты свидетельствуют: компания использует «портфельный подход» к стратегиям развития, что позволяет ей не только наращивать масштабы давно освоенного производства двигателей, но и интенсивно развивать новые, современные линейки продукции.*

***Ключевые слова:** стратегия диверсификации, вертикальная интеграция, компания Chongqing Zongshen, товарная политика.*

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STAGES OF DEVELOPMENT AND DIVERSIFICATION OF A LARGE CHINESE COMPANY ACTIVITIES

***Abstract.** Chinese companies in the real sector often pursue cost leadership strategies, taking advantage of government incentives. Some manufacturers also deliberately formulate and implement diversification and vertical integration strategies. The purpose of this study is to periodize the development and evaluate the strategies of Chongqing Zongshen, a major manufacturer of engines and other mechanical engineering products. The research method is a case study. The results demonstrate that the company uses a "portfolio approach" to development strategies, allowing it not only to expand its long-established engine production but also to rapidly develop new, modern product lines..*

Keywords: *diversification strategy, vertical integration, Chongqing Zongshen Company, product policy.*

Проблемы формирования и реализации корпоративных стратегий диверсификации и вертикальной интеграции представляют не только теоретический, но и практический интерес.

Так, Н.В. Сергеева, Г.К. Джанчарова утверждают, что «интеграция и диверсификация производства являются одним из способов повышения экономической эффективности хозяйственной деятельности и вектором устойчивого развития предприятий» [2].

Г.Б. Кирпичев разработал модель корпоративных стратегий диверсификации и вертикальной интеграции, включая пять основных компонентов, отражающих сочетание двух названных стратегий [1].

В данной статье рассмотрены этапы и направления роста компании Chongqing Zongshen Power Machinery – это диверсифицированный холдинг (КНР). Материнская компания холдинга объединяет производство двигателей и комплектующих (компоненты и узлы), занимается финансированием производственной цепочки, финансовым лизингом. В качестве дочерних компаний выделены: подразделение силовых компонентов Chongqing Zonsen (литье/механическая обработка); Chongqing Zonsen New Energy Development (электрические системы), и другие компании, занимающиеся в том числе экспортом.

Производство компании структурировано следующим образом: группа двигателей (бензиновые/дизельные), группа машин общего назначения (генераторы, насосы), авиационное оборудование; новые источники энергии (электродвигатели, водородные топливные элементы).

Компания начала свою деятельность в 1982 году как Chengdu Lianyi Industrial. В 2003 году стала публичной компанией (на Шэньчжэньской фондовой бирже). В 2005 году получила современное название – Chongqing Zongshen Power Machinery [3].

В ходе анализа нами установлено: на протяжении всего жизненного цикла компания реализовала стратегии «развития товара», «развития рынков», «диверсификации», «вертикальной интеграции». В конкурентной борьбе компания использует сравнительно низкую себестоимость продукции – за счет субсидирования государством – по сравнению с ценами многих глобальных (в том числе японских, европейских) производителей.

В 2010-е годы было запущено производство высококачественных деталей (литье/механическая обработка) для автомобильных и мотоциклетных систем. Одновременно расширился выпуск мотоциклов, запчастей/аксессуаров, машиностроения. В «портфеле» продукции нами выявлено доминирование двигателей – более 60% выручки в этот период приходилось на мотоциклы/малые двигатели. Реализуя стратегию «развития рынков» компания вышла на международные рынки (Азия, Европа, Северная и Южная Америка, Африка). Экспорт продукции к концу 2010-х годов достиг трети годовой выручки [4].

В 2020-е годы компания продолжила диверсификацию, одновременно реализуя стратегию «внутренней вертикальной интеграции», и стала производить продукцию для авиации – более двадцати линеек, таких как Zonsen Aero – двигатели для дронов/авиации общего назначения, пропеллеры; платформы, др.

Одновременно компания осваивала направление «новая энергетика»: электродвигатели/контроллеры, системы хранения энергии для гольф-каров/погрузчиков, водородные топливные элементы. Был запущен полный цикл производства деталей – двадцать миллионов единиц алюминиевых деталей для электромобилей/трансмиссий в год.

При этом основным видом деятельности оставалось производство двух- и четырехтактных малогабаритных бензиновых двигателей (до 500 куб. см.) для мотоциклов, генераторов, газонокосилок, садовой техники (ассортимент был расширен до трех с лишним сотен моделей).

Рыночная капитализация компании на конец 2025 г. превысила 25 млрд юаней [4].

Заключение

Компания Chongqing Zongshen развивается, реализуя комплекс стратегий – от стратегии «развития товара» и «развития рынка», до стратегий «дифференциации» и «вертикальной интеграции». Такой подход позволяет постоянно расширять и модернизировать производство, используя преимущества сочетания традиционной для компании продукции (двигатели) и новой (товары для малой авиации, энергетики, др.).

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ОСОБЕННОСТИ ЦИФРОВЫХ МАРКЕТИНГОВЫХ КОММУНИКАЦИЙ В КИТАЕ

***Аннотация.** Китайские компании реального сектора активно взаимодействуют с потребителями на множестве локальных рынков, в материковом Китае, и за его пределами. Инструменты цифрового маркетинга позволяют относительно быстро охватить широкую аудиторию, потенциально заинтересованную в продуктах или услугах компании. Объект анализа – Chongqing Zongshen – крупный китайский производитель двигателей, мотоциклов, продукции машиностроения. Метод исследования – кейс-стади. Результаты свидетельствуют: компания широко использует возможности цифрового маркетинга, но при этом не всегда учитывает культурные особенности зарубежной целевой аудитории.*

***Ключевые слова:** цифровой маркетинг, коммуникации, культурные особенности, компания Chongqing Zongshen.*

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FEATURES OF DIGITAL MARKETING COMMUNICATIONS IN CHINA

***Abstract.** Chinese companies actively engage with consumers in numerous local markets, both within mainland China and beyond. Digital marketing tools allow them to relatively quickly reach a wide audience potentially interested in a company's products or services. The subject of this study is Chongqing Zongshen, a major Chinese manufacturer of engines, motorcycles, and machinery. The research method is a case study. The results demonstrate that the company makes extensive use of digital marketing, but does not always consider the cultural characteristics of its international target audience.*

***Keywords:** digital marketing, communications, cultural characteristics, Chongqing Zongshen Company.*

Проблемы digital-маркетинга, его национальной специфики, представляют не только теоретический, но и практический интерес. Так, В.И. Гостенина, К.С. Карандин, С.Л. Мельников глубоко исследовали инструментарий цифрового маркетинга. Авторы утверждают: «Массовая реклама потеряла свое влияние, компании стали больше фокусироваться на клиенте. Цифровой маркетинг становится все более заметным, поскольку позволяет более точно отслеживать расходование средств по отношению к другим традиционным маркетинговым каналам. В цифровую эпоху основная функция маркетинга – находиться в постоянном контакте с пользователями, коммуницировать с людьми, давая им возможность взаимодействовать с брендом, компанией, в созданной коммуникативной среде» [1].

Китай представляет собой значительный по масштабам рынок, имеет многомиллионную интернет-аудиторию со специфическими культурными чертами.

Н.Н. Черник исследовал «феномен социальных связей «гуанси» как элемент деловых отношений и маркетинговых коммуникаций в Китае». Автор убедительно доказывает необходимость «гуанси» для успешного ведения бизнеса на китайских рынках [3].

Е.П. Пешкова глубоко исследовала особенности различных инструментов цифровых маркетинговых коммуникаций: таргетированной и контекстной рекламы, SEO продвижения, иных, с позиций продвижения на китайском рынке. [2].

В данной статье рассмотрены вопросы оценки влияния культурных особенностей, типичных для Китая, на формы и содержание цифровых маркетинговых коммуникаций, в том числе – в интернет-маркетинге.

Важно учитывать, что «конфуцианская» этика охватывает как «цин» (эмоции), так и «ли» (разум), а также такие этические ценности, как «гуаньси» (связи), «цин» и «мяньцзы» (лицо), которые играют важную роль в коммуникациях, в том числе в маркетинговых. Понимание конфуцианской этики имеет практическое значение для корпоративных и частных маркетинговых практик [4; 5].

Маркетологи компаний реального сектора планируют и реализуют коммуникации разных форм на множестве медиа-платформ. Каждый день множество потенциальных потребителей взаимодействует с продуктами, предложениями, рекламными акциями компаний в глобальной сети.

Специалисты по медиапланированию разрабатывают стратегию и методы реализации медиакампаний, включая разнообразные инициативы в социальных сетях. Одна из основных прикладных проблем – адаптация предложений к национальному (региональному) рынку. При этом важно обеспечить сильное и эффективное присутствие бренда в разных медиаканалах (телевидение, наружная реклама, цифровые каналы, социальные сети и т. д.).

Корпоративные сайты, в этом ряду, обладают лингвистическими, культурными, коммуникационными характеристиками, которые определяют

различный опыт, в зависимости от культуры участников коммуникационного процесса. Разработка сайтов, соответствующих культурным особенностям, представляет собой важный аспект маркетинговой коммуникации. При этом особенно важен анализ влияния культурных особенностей на содержание, форму общения с потребителями, ее тональность.

Особое значение имеют кампании по выводу той или иной специфической продукции на рынок. Объект нашего исследования – компания Chongqing Zongshen Power Machinery работает в сегментах B2B, B2C, B2G. Компания реализует оптовым и розничным покупателям в Китае, за рубежом, такие виды продукции, как двигатели, мотоциклы, газонокосилки, дроны, пропеллеры; генераторы, насосы, авиационное оборудование; новые источники энергии, электродвигатели, водородные топливные элементы, многое другое. Только за последний компания вывела на рынок девять новых продуктовых «линеек» [6].

При разработке комплекса маркетинга и рекламного предложения по каждой линейке продуктов необходимо учитывать особенности целевой аудитории в разных странах. В ходе анализа корпоративного сайта Chongqing Zongshen нами выявлен важный недостаток: многие маркетинговые обращения на сайте компании дословно переведены на английский язык с китайского оригинала – в текстах не учтены особенности восприятия англоязычной аудитории, по сравнению с китайскими потребителями [6]. В целом дизайн корпоративного веб-сайта, по нашему мнению, нуждается в серьезном обновлении.

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ИНСТИТУЦИОНАЛЬНЫЙ ПОТЕНЦИАЛ НЕМАТЕРИАЛЬНОГО ВОДНОГО НАСЛЕДИЯ В УПРАВЛЕНИИ ИРРИГАЦИЕЙ ЦЕНТРАЛЬНОЙ АЗИИ

Абстракт: для обеспечения водной, продовольственной и экологической безопасности населения стран Центральной Азии, в том числе Узбекистана, необходимо повысить качество управления водопоставкой.

Тема. В статье рассмотрены негативные и позитивные элементы нематериального водного наследия Узбекистана в сфере управления водопоставкой, включающей процессы забора, аккумуляирования, транспортировки и подачи воды пользователям.

Цель статьи: на основе анализа некоторых элементов нематериального водного наследия, которое накопилось с древнейших времен, сформулировать уроки, которые можно было бы из них извлечь и тем самым содействовать улучшению водопоставки.

Методы исследования: 1) метод сбора научно-технической литературы по истории ирригации (для извлечения информации по нематериальному водному наследию); 2) метод систематизации информации (для исследования достоинств и недостатков элементов нематериального водного наследия; 3) методы анализа и синтеза (для оценки элементов нематериального водного наследия и формулирования уроков, извлеченных из анализа).

Использованы также 1) системный/интегрированный подход, рассматривающий нематериальные элементы водного наследия во взаимосвязи и 2) эволюционный подход, рассматривающий развитие элементов нематериального водного наследия во времени.

Ключевой вывод: устойчивое водопользование требует смещения акцента с "твердых" инфраструктурных мер к "мягким" институциональным, включая совершенствование управления, возрождение традиционных практик (хаиар, водооборот) и интеграцию уроков прошлого в современную водную политику.

Ключевые слова: наследие, вода, земля, орошение, водохозяйственные организации, практика, традиции, методы, принципы, стимулы, правила, право, мираб, хашар, др.

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INSTITUTIONAL POTENTIAL OF INTANGIBLE WATER HERITAGE IN IRRIGATION MANAGEMENT IN CENTRAL ASIA

Abstract: To ensure water, food, and environmental security for the populations of Central Asian countries, including Uzbekistan, it is necessary to improve the quality of water supply management.

Subject: This article examines the negative and positive elements of Uzbekistan's intangible water heritage in the area of water supply management, including the processes of abstraction, storage, transportation, and delivery of water to users.

Objective: Based on an analysis of certain elements of the intangible water heritage that has accumulated since ancient times, to formulate lessons that can be learned from them, thereby contributing to the improvement of water supply.

Research methods: 1) a method for collecting scientific and technical literature on the history of irrigation (to extract information on intangible water heritage); 2) a method for systematizing information (to study the strengths and weaknesses of intangible water heritage elements); 3) methods of analysis and synthesis (to evaluate intangible water heritage elements and formulate lessons learned from the analysis).

Also used were 1) a systemic/integrated approach, which considers intangible water heritage elements in their interconnectedness; and 2) an evolutionary approach, which considers the development of intangible water heritage elements over time.

Key conclusion: sustainable water use requires a shift in emphasis from “hard” infrastructure measures to “soft” institutional ones, including improved governance, the revival of traditional practices (khashar, water rotation), and the integration of lessons from the past into modern water policy.

Keywords: heritage, water, land, irrigation, water management organizations, practice, traditions, methods, principles, incentives, rules, law, mirab, hashar, etc.

Введение

Водное наследие Узбекистана традиционно рассматривается сквозь призму материальных объектов — гидротехнических сооружений, каналов, водохранилищ. Однако не менее значимой, хотя и менее изученной, является его нематериальная составляющая: многовековые практики управления водой, обычаи, принципы распределения, социальные институты (мирабство, хашар, водооборот), которые формировали устойчивость ирригационных систем в условиях жёстких природных и социальных ограничений.

Актуальность обращения к этому наследию обусловлена современными вызовами водного сектора Центральной Азии. Рост дефицита воды, старение инфраструктуры, высокие энергетические затраты на машинный водоподъём, институциональная нестабильность и конфликтность между водопользователями — всё это требует не только технических решений, но и пересмотра управленческих моделей. В постсоветский период водное хозяйство Узбекистана пережило серию реорганизаций, сопровождавшихся снижением статуса водных организаций, ослаблением кадрового потенциала и утратой части традиционных механизмов саморегуляции. Одновременно переход к фермерскому укладу породил новые экономические интересы, которые не всегда согласуются с принципами справедливого и эффективного водораспределения.

В экономической и социологической литературе всё чаще подчёркивается, что устойчивое водопользование определяется не только объёмом инвестиций в инфраструктуру, но и качеством институтов — формальных и неформальных правил, стимулов, механизмов координации. Нематериальное водное наследие представляет собой уникальный ресурс, который при правильной адаптации может восполнить институциональные дефициты современной системы управления.

Настоящая статья продолжает предыдущее исследование авторов, посвящённое материальному водному наследию [1], и фокусируется на управленческих, социальных и институциональных аспектах.

В настоящей статье собрана, систематизирована и проанализирована информация [2 - 28] о нематериальном водном наследии Узбекистана (практика, традиции, методы, принципы, правила, ...) в части, касающейся управления водопоставкой. Цель статьи заключается в том, чтобы 1) привлечь внимание читателя к необходимости смещения акцента с применения твёрдых мер (освоение новых земель, строительство новой водохозяйственной инфраструктуры), к мягким мерам, включающим улучшение управления, эксплуатации и обслуживания гидромелиоративных систем с использованием политико-правовых, финансовых, институциональных и других мер; 2) расширить знания в области управления водопоставкой; 3) проанализировать минусы и плюсы водного наследия и с учетом особенностей, противоречий, проблем, присущих

текущей водной ситуации и уроков нематериального водного наследия;
4) сформулировать извлеченные уроки.

Нематериальное водное наследие: практики, знания

Наряду с материальным водным наследием в Узбекистане имеется и нематериальное ирригационное наследие, включающее организации, практики, приемы, традиции, пословицы, принципы, методы и знания, имеющие нетехническую направленность (политика, право, финансы, институты, мораль, этика...).

Субъекты ирригации: поставщики воды

Для водопоставки на протяжении веков создавались различные ирригационные структуры. Для всех них характерно то, что они являются естественными монополистами. Это обстоятельство определяет характер взаимоотношений между поставщиками и пользователями ирригационных услуг и уровень качества водопоставки.

В ханский период поставку воды осуществляли *арык-аксакалы*, *мирабы*⁴¹ *туганчи*⁴². Они всегда занимали важное и видное положение, поскольку эти лица занимались распределением воды.

Главный мираб (визирь водного хозяйства) государства осуществлял общее руководство, в его непосредственном подчинении находились местные мирабы, или по- другому, арык-аксакалы магистральных каналов, распределителей. Главные мираб получал жалование из казны. Он назначался ханом и подчинялся *кушбеги* (первый министр при ханском дворе) [2]. Там, где избрание/назначение и оплата труда мирабов проводилось ненадлежащим образом, имели место несправедливость, взяточничество, вымогательство.

В Ферганском оазисе арык-аксакалы (старейшины арыков) *избирались* местным населением. Их также называли *мираб-боши* (главный мираб). Мираб-боши избирали из числа нескольких *кок-боши*. В Хивинском оазисе местные мирабы *назначались* из селения, которое обслуживал распределительный канал по рекомендации местных властей и мираба магистрального канала. В Зарафшанском оазисе мирабы назывались *арык-аксакалами*, *туганчи варкбон*, *бандбон* [2].

Изменения, произошедшие в водных структурах после ханского периода, отражены кратко в блоке 1.1.

⁴¹ Слово «*мираб*» образовано от арабского слова «*мир*», означающее высокий титул, глава или руководитель, и персидского «*об*» – вода. Мираб - герой многочисленных преданий и народных сказок, где он выступает воплощением честности и кладезем житейского опыта.

⁴² «*Туганчи*» - это заведующие плотинами, которые отвечали за их сохранность и регулирование воды: увеличение её притока возвышением или удлинением плотины, а также уменьшение или отброс воды.

Блок 1.1. Водные структуры в различные периоды развития ирригации

Дореволюционный/колониальный период. «Положение об управлении Туркестанским краем» практически ничего не изменило в правилах водопользования. Главными арыками заведовали арык-аксакалы, а мирабы – их ответвлениями.

Советский период. До национального размежевания создано «Управление ирригационными работами в Туркестане (ИРТУР)» в структуре Главного управления по землеустройству. После национального размежевания руководство водным хозяйством Узбекистана осуществлялось ММ и ВХ в составе ММ и ВХ СССР.

После майского Пленума ЦК КПСС (1966г) внесены изменения в структуру управления водным хозяйством: районные и областные отделы водного хозяйства, входившие в состав райисполкомов и облисполкомов, были преобразованы в РайУОСы, ОблУОСы и УМРКа.⁴³

Постсоветский период. Ликвидировано ММ и ВХ Узбекистана, снижен статус национальной водной администрации/агентства до уровня департамента/управления и, наконец, вновь создано министерство.

В настоящее время субъектами ирригации Узбекистана являются поставщики воды в лице водохозяйственных организаций (ВХО) различных уровней иерархии: на национальном уровне - министерство водного хозяйства (МВХ)⁴⁴, на территориальном уровне - бассейновые управления ирригационных систем (БУИС) и др.

В структуре МВХ Узбекистана в качестве самостоятельного юридического лица создано «Агентство по эксплуатации объектов водного хозяйства» и др. Упразднены 155 районных отделов ирригации и 161 специальная водохозяйственная служба.⁴⁵ На их базе создано 159 районных ГУ «Суветказиб бериш хизмати» («Служба водоснабжения»)⁴⁶.

Наряду с органами управления в практике Узбекистана были созданы и органы руководства водой в лице водных советов/комиссий на уровнях бассейнов и ирригационных систем.

Практики

Водооборот (межхозяйственный, межрайонный, ...).

В практике ирригации воду пользователям подают двумя способами: 1) непрерывным током и 2) поочередно. Основным видом подачи воды пользователям считается плановая подача непрерывным током. Очередное

⁴³ РайУОСы, ОблУОСы - соответственно районное и областное управление оросительных систем; УМРКа – управление межрайонных каналов.

⁴⁴ При МВХ имеется Общественный совет.

⁴⁵ УП РУз от 07.05.2024 г. № УП-74 «Об определении приоритетных направлений внедрения и развития современной системы управления в водном хозяйстве».

⁴⁶ ПП РУз от 05.01.2024 г. № ПП-5 «О мерах по совершенствованию системы управления водными ресурсами и повышению эффективности их использования в низовом звене»

водораспределение вводится только в случаях резко выраженного недостатка воды, когда потери в сети, вследствие недостаточного наполнения каналов, заметно возрастают.

В практике ирригации Узбекистана в условиях дефицита воды с древнейших времен [2]⁴⁷ и до настоящего времени вводится водооборот⁴⁸ между постоянными оросителями. При этом подача воды начиналась с конца источника (конечного водопользователя). По мере роста дефицита водных ресурсов повышается уровень и степень использования водооборота: используются межфермерский, межрайонный и другие виды водооборота,⁴⁹ включая водооборот между гидроучастками магистрального канала⁵⁰ [3].

Оптимизация самотечной и машинной водопоставки

В связи с тем, что основная часть затрат в Узбекистане на водный сектор (больше 70%), это затраты на электроэнергию, а также то, что системы орошения, распределяющие воду самотеком, играют решающую роль в снижении выбросов углекислого газа от выработки и использования энергии, очень важно, где это возможно перейти от машинной водопоставки к самотечной. Такие возможности в Узбекистане имеются, так как в советское время, в силу относительной дешевизны электроэнергии и насосного оборудования, а также отсутствия сильных стимулов к энергосбережению, предпочтение отдавалось машинному орошению. В постсоветский период распространилась практика отказа от использования насосов в тех случаях, когда использование гравитационного (самотечного) орошения представлялось технически и/или экономически более целесообразным⁵¹.

Водоучет.

Вопросы водоучета были и остаются актуальными для всех уровней водной иерархии, но наиболее слабым звеном остается водоучет на нижнем уровне управления водой (бывшая «внутрихозяйственная сеть») [4]. В прошлом учет на границе водопользователей велся «на глаз». Сейчас, как правило, также используется этот метод. На протяжении многих десятилетий, начиная с советских времен, предпринимаются безуспешные

⁴⁷ Подача воды в отводы и арыки осуществлялась по принципу «мардикурак» (местное название), означающее полив в строго отведенный промежуток времени.

⁴⁸ Современные местные названия водооборота: «аврон» (Ошская и Джалалабадская области Кыргызстана), «авандоз», «асвак», «навбат» (соответственно Кашкадарьинская, Хорезмская и Ташкентская области Узбекистана), «об гардон» (Согдийская область Таджикистана), «су айналыма» (Казахстан); «варабанди» (Индия, Пакистан).

⁴⁹ Несмотря на то, что при этом неизбежно могут ухудшаться условия водообеспечения орошаемых культур и техническое состояние оросительных каналов, введение водооборота выгодно с точки зрения снижения технических и организационных потерь воды в ирригационной сети.

⁵⁰ Этот вид водооборота используется на ЮФМК (между двумя концевыми гидроучастками).

⁵¹ В некоторых областях Узбекистана, например, убрали насосные станции, обеспечив подвод воды самотеком. В Сурхандарье, например, в результате реализации проекта модернизации ирригационных систем были убраны более 400 фермерских насосов, а также 20 малых и 3 крупных насосных станций. Вода стала подаваться самотеком, сократилось потребление электроэнергии, газа, и, как следствие, сократился выброс парниковых газов. <http://www.uzdaily.uz/ru/post/78776>.

попытки наладить водоучет: раньше - на границе бригад колхозов/совхозов, а теперь - на границе фермерских хозяйств. Следствием внедрения рыночных отношений в водное хозяйство интерес/стимул для организации «коммерческого водоучета» должен был бы повыситься, но этого не происходит, так как оплата ирригационных услуг по водопоставке проводится на основе плановых данных, а не фактических.

Планирование водораспределения.

Методика составления системного плана водораспределения была разработана проф. Н.А. Янишевским, работником Среднеазиатского опытно-исследовательского института водного хозяйства (будущего САНИИРИ). Плановое водораспределение способствовало упорядочению водопоставки и ослаблению проблемы «голова-конец» [5].

Реконструкция/переустройство и модернизация.

Наряду с крупномасштабным ирригационным строительством на новоорошаемых зонах проводились важные работы, направленные на реконструкцию/переустройство⁵² и модернизацию существующих ирригационных систем в староорошаемой зоне, таких как канал Нарпай в Заравшанской долине и ирригационная система Нижнего Хана в бассейне реки Ангрен-Чирчик [6]. Техническая реконструкция включала ликвидацию параллельных каналов, сокращение холостых частей и излишней протяженности, объединение многочисленных отводов, уменьшение количества точек забора воды каналами.

Особое место в реконструкции (1940 - 1960 годы) крупной межхозяйственной сети занимает «кольцевание» источников орошения, которое заключалось в устройстве магистральных и распределительных каналов для переброски воды из источника орошения многоводных систем в системы маловодные.

Разработка схем КИОВР⁵³.

Развитие ирригации происходило не стихийно. В соответствии с заданиями Союзного и Республиканского правительства разрабатывались, так называемые, "Схемы развития..." разных уровней: Союзные, Республиканские и Бассейновые (Аральского моря, рек Амударьи и Сырдарьи) [7 - 18] и другие. В этих уникальных по своей масштабности работах принимали участие крупные специалисты различных ведомств, известные проектировщики и учёные: топографы, гидротехники, мелиораторы, почвоведы, гидрогеологи, гидрологи, агроэкономисты и др. [19].

⁵² Реконструкция/переустройство - это ликвидация параллельных арыков, сокращение холостых частей и излишней протяженности, объединение многочисленных отводов, уменьшение количества точек забора воды каналами и выделы воды хозяйствам, укрупнение полей. Этот процесс, ориентированный на создание крупных хозяйств и использование механизмов для повышения производительности труда при поливе и обработке почвы, создал в последствии сложности при переходе от ширкатов к созданию фермерских и крестьянских хозяйств.

⁵³ КИОВР – комплексное использование и охрана водных ресурсов.

Проектирование оросительных систем

Проблемы управления водопоставкой тесно связаны с множеством факторов, включая такие факторы как состояние/достижения гидромелиоративной науки, качество проектирования и строительства оросительных систем, а также система выбора приоритетов и принятия решения. На имевшие место пробелы в практике проектирования указал ближайший ученик и последователь акад. Н. Костякова – акад. С. Ф. Аверьянов, который касаясь вопроса соответствия теоретических и практических положений об оросительных нормах на оросительных системах отметил: «Тенденция к снижению водообеспеченности систем у нас началась ... под флагом «экономии» с различной мотивировкой (... требования идеального соответствия «теоретических» поливных норм практическим и др.). Все это надуманные, не обоснованные ни теорией, ни практикой орошаемого земледелия предложения отдельных научных и проектных организаций и привели к тому, что планирующие и руководящие водохозяйственные органы приняли их ввиду мнимой экономии при строительстве. Это привело к тому, что ряд крупнейших ирригационных систем, построенных по проектам 50-х годов, испытывает недостаток в воде (Голодная степь, ... и др.)⁵⁴».

Анализ элементов нематериального водного наследия

Ключевые проблемы ирригации

Ключевые проблемы ирригации:

- Несправедливость/неравномерность распределения воды (проблема «голова-конец»).
- Ненадежность/нестабильность водоподачи (частая остановка каналов, ...).

Виды элементов водного наследия

Анализ показывает, что элементы нематериального водного наследия можно условно поделить на

- Актуальные элементы нематериального водного наследия, которые продолжают широко использоваться (водооборот, система планового водопользования...).
- Актуальные элементы нематериального водного наследия, которые не используются в достаточной степени (водные советы/комиссии ирригационных систем/бассейнов, ...).
- Негативные элементы нематериального водного наследия.
- Позитивные элементы нематериального водного наследия.

Негативные элементы нематериального водного наследия

Можно выделить следующие негативные черты/элементы нематериального водного наследия:

⁵⁴ Аверьянов С. Ф. Инженерно-технические мероприятия, необходимые для обеспечения высокого уровня поливного земледелия. - Материалы межведомственной комиссии по ирригации. - М., 1966.

- Недооценка (особенно в постсоветский период) значимости воды и роли/труда мирабов водохозяйственных организаций и, как следствие, непрестижность водной профессии.
- Приоритет политических и идеологических ценностей; неспособность лиц, принимающих решения, жертвовать этими принципами в пользу принципов справедливости, эффективности и устойчивости.
- Почти круглогодичное использование ирригационной инфраструктуры (из-за увеличения посевных площадей под озимые зерновые), следствием чего стало резкое сокращение сроков, благоприятных для поддержания ирригационной инфраструктуры путем проведения ремонтно-восстановительных работ надлежащего качества.
- Отсутствие баланса между обязанностями и полномочиями у персонала, а также между функциями и потенциалом ВХО.
- Частые изменения в организационной структуре управления водной отраслью.⁵⁵
- Основная часть затрат на ирригацию – это огромные затраты на энергоснабжение для машинного водоподъема.
- Недостаточный уровень мотивации у поставщиков воды в повышении качества управления водопоставкой (критерии качества водопоставки: водообеспеченность, равномерность/справедливость водоподачи, стабильность водоподачи).
- Ненадлежащий стиль принятия решений в ВХО: 1) чрезмерно централизованный подход: по принципу "сверху вниз" при низком уровне участия заинтересованных сторон в принятии решений («ручное управление»); 2) преимущественно «реактивный» подход: работники, ответственные за принятие решений, привыкли/приучены получать сигналы/решения сверху, чтобы «спускать» их вниз на нижние уровни иерархии; 3) вольонтаризм.⁵⁶
- Поставщики ирригационных услуг (ВХО) отвечают 1) как за принятие решений по водопоставке, так и за реализацию этих решений, а также за контроль над реализацией этих решений; 2) как за водопоставку пользователям, так и за водопользование.
- Доминирование инженерного подхода (технократическая направленность) в решении водных проблем.

⁵⁵ В ЦА постоянно регулярно проводились организационные изменения в структуре управления водной отраслью, которая то сливается с сельским хозяйством, то с энергетикой, то с окружающей средой. При этом, как правило, штаты ужимаются, функции выпадают из сферы управления и контроля, и руководить отраслевым прогрессом и действиями становится всё труднее [20].

⁵⁶ Проявления вольонтаризма при управлении водными ресурсами разнообразны - от принятия решений о радикальных преобразованиях объектов и систем управления, которые недостаточно хорошо изучены, до присущего им смутного представления о правовых последствиях принимаемых решений и игнорирования интересов других людей и социальных групп. Как правило, у таких руководителей ВХО волевой компонент принятия решения доминирует над информационно-аналитическим, а интересы личные и приближенной группы людей – над интересами других членов социальной группы. Вольонтаризм выступает причиной многих конфликтов всех уровней управления водой.

- Нарушения правил водораспределения на ирригационной сети (коррупция, кумовство, произвол местной/водной элиты и администрации, ...) [21].
- Проблема «голова-конец» (блок 2.1).
- Рост конфликта интересов между ирригацией и гидроэнергетикой (после развала СССР).⁵⁷
- Ненадлежащий выбор вариантов/зон первоочередности ирригационных действий (блок 2.2).⁵⁸
- Низкий уровень достоверности и полноты информации о реальном состоянии дел в сфере управления водопоставкой из-за ненадлежащего уровня практики водоучета и состояния ирригационной науки⁵⁹ [4].
- Валюитаризм в управлении водой (принятия решений о радикальных преобразованиях объектов и систем управления, которые еще недостаточно хорошо изучены и отсутствуют четкие представления о правовых последствиях принимаемых решений).
- Традиционная практика приоритетного в водном секторе финансирования «твердого» компонента по сравнению с финансированием «мягкого» компонента.⁶⁰
- Основным инструментом борьбы с дефицитом воды, как правило, было строительство новых водных инфраструктур и масштабное освоение новых земель, то есть основной путь развития ирригации - экстенсивный (блок 2.3).
- Ориентация на решение проблем водопоставки за счет переборки вод сибирских рек (блок 2.4).
- Ненадлежащий уровень управления, эксплуатации и обслуживания ГМС [22, 23].
- Недостаточный учет мнения научного сообщества при принятии решений.⁶¹

⁵⁷ Верховья речных бассейнов являются зоной преимущественного развития гидроэнергетики. Срединные и нижние участки бассейнов, где сосредоточены основные ирригационные земельные фонды, являются зонами развития орошаемого земледелия. Страны верховья заинтересованы в максимальном сбросе воды в зимнее время для теплоснабжения, когда потребности в электроэнергии очень высоки, а страны низовья нуждаются в том же максимальном сбросе воды в летний период для орошения земель.

⁵⁸ Судя по состоянию хозяйств, освоенных одновременно, но расположенных поблизости и вдали от староорошаемых зон, а также учитывая судьбу Арала, точка зрения противников масштабных освоений крупных целинных земель выглядит более разумной. Не исключено, что методы, масштабы и последовательность освоения новых земель в Узбекистане, принятые в значительной степени из политических соображений, были недостаточно дальновидными.

⁵⁹ О фактическом значении ключевого показателя - КПД канала/сети/системы в большинстве случаев можно только догадываться, так как существующая информация не внушает доверия. Парадокс в том, что официально в штате ВХО, нередко, отсутствует гидрометр.

⁶⁰ Формально признается, но фактически игнорируется при планировании финансирования водной отрасли то обстоятельство, что самым большим ресурсом страны является персонал, осуществляющий управление, эксплуатацию и обслуживание.

⁶¹ Предупреждения о высыхании Арала, а также предложения по спасению Арала не были приняты во внимание [24].

– Другие.

Блок 2.1. О проблеме «голова-конец»

Самая жгучая проблема распределения воды - это своевременная транспортировка установленного количества воды до конечного участка реки/канала/арыка. Проблема «голова-конец» существовала во все времена. Недаром в памяти народа сохранились эти пословицы/поговорки: «Отангиз катта мироб бўлса хам, сугориладиган ер ариқ бошида бўлсин»,⁶² «Ери ариқнинг охирида бўлган одамга қизингни берма».⁶³

Блок 2.2. О методах орошения/освоения целинных/степных земель

Г. К. Ризенкамф [25] отмечает существование сторонников подхода о «...Преимуществах орошения не новых крупных площадей, а более мелких, в пределах существующих систем. ...Многие привыкли считать издавна орошенные районы (в частности Ферганский) районами заведомой первоочередности всяких ирригационных действий, так как здесь как бы веками уже приготовлена почва для пышного и наилучшего расцвета производительных сил Туркестана».

Блок 2.3. Об экстенсивном способе ведения водохозяйственной деятельности

Судя по состоянию хозяйств, освоенных одновременно, но расположенных 1) поблизости и 2) вдали от староорошаемых зон, а также учитывая судьбу Арала, точка зрения противников грандиозных освоений земель, расположенных вдали от староорошаемых зон, не выглядит ошибочной. Не исключено, что приоритетное освоение целинных земель Голодной, Джизакской, Шерабадской и Каршинской степей, а также зоны Каракумского канала (удаленных от староорошаемых зон) была в принципе преждевременной и поэтому ошибочной.

В настоящее время ЦА практически достигла своего предела в экстенсивном развитии ирригации. В Узбекистане потенциал практически исчерпан (его реализованность оценивается в 87%). Большая часть новых земель относится к малопродуктивным, требующим более значительных вложений ресурсов [21].

Блок 2.4. О водной политике и переброске вод сибирских рек

Знаменитое предвидение В. И. Ленина насчет орошения стало действительно явью: орошение возродило край, привело к расцвету ЦА, похоронило колониальное прошлое, ... Однако, никто не предвидел, что СССР, который сделал возможным, в угоду геополитических целей, такое гигантское развитие орошения в ЦА, тоже будет похоронен и, как

⁶² На русском: «Если твой отец даже большой мираб - землю имей в начале арыка».

⁶³ На русском: «Не отдавай дочь тому, чья земля в конце арыка».

следствие, будет практически похоронено Аральское море и создана новая пустыня - Аралкум.

Было очевидно, что, при таких масштабах освоения земель, Аральское море наверняка погибнет, но политика покорения природы продолжалась в надежде на переброску вод сибирских рек. Надежда на переброску воды, однако, начала гаснуть еще при существовании СССР и полностью угасла после его развала.

Перефразируя пословицу можно сказать, что «Не было бы «несчастья», да «счастье» помогло»: ни одна из республик ЦА по своему желанию и на свои средства без союзного финансирования не смогла бы освоить столько земель.

В надежде на переброску вод сибирских рек при планировании орошаемого земледелия в ЦА на протяжении многочисленных советских «пятилеток» и семилетки игнорировался краеугольный принцип: принцип устойчивости – учет интересов будущих поколений, включая интересы экосистемы.⁶⁴

Позитивные элементы водного наследия

Позитивные черты/элементы водного наследия:

– Хорошо сохранившаяся и модернизированная/реконструированная часть водохозяйственной инфраструктуры.

– Закольцованные источники орошения путем переброски части стока одних рек в бассейны других.

– Практика:

- внедрение принципов ИУВР⁶⁵ [26];
- внедрение системы платного водопользования [27];
- внедрение государственно-частного партнерства (ГЧП), аутсорсинга;

- разработка схем КИОВР;
- применение «хашара» (блок 2.5);
- применение водооборота (между хозяйствами, районами...) (блок 2.6);

- планирование водораспределения;
- оснащение оросительной сети средствами водоучета (водомеры: Чиполетти, Вентури, САНИИРИ, Томсона, ...);

- переход от системы машинного орошения к самотечному там, где это возможно/целесообразно даже с учетом частичной потери

⁶⁴ Россия, как, по существу, правопреемник СССР, в значительной степени несет моральную ответственность за последствия от масштабного «покорения природы» в угоду хлопковой независимости и было бы здорово, если бы она вернулась к обсуждению идеи переброски сибирских рек.

⁶⁵ ИУВР – интегрированное управление водными ресурсами.

орошаемых земель и, соответственно, снижения коэффициента земельного использования;

- водоучет на оросительной сети (за исключением водоучета на границе водопользователей); др.

Блок 2.5. О «хашаре»

Слово «хашар» (узб.: *hashar*) в переводе на русский язык означает: добровольный коллективный труд, чаще всего на благо общества или общины. В русском языке аналогом хашару может быть «субботник».

Хашар – это традиция, распространённая в странах Центральной Азии, особенно в Узбекистане, Таджикистане и других тюркоязычных регионах. Этот обычай сохранился испокон веков, его почитают и сохраняют до наших дней. Люди собираются вместе, чтобы бесплатно и добровольно выполнить какую-то общественно важную работу в том числе работу, связанную с гидромелиорацией: очистить каналы/арыки/коллектора, сделать ремонт гидросооружения и т. д. Часто хашар сопровождается элементами праздника: совместной трапезой, музыкой и тёплой атмосферой. Хашары в Узбекистане часто приурочены к значимым праздникам, таким как Навруз и День независимости, и направлены на укрепление единства, доброты и любви к Родине.

«Асар» — древний обычай казахского народа, согласно которому люди, собравшись вместе, искренне и безвозмездно выполняют непосильные для одного человека или для одной семьи работу.

Блок 2.6. О водообороте (межхозяйственном...)

Водооборот – это вынужденная мера. Он имеет как отрицательные, так и положительные качества. Положительное качество: он дисциплинирует полевых мирабов успеть вовремя произвести полив своего участка, что влечет обязательное применение ночных поливов, не допускать переполивов и затоплений земель и т.д., другими словами, все это способствует достаточно экономному и рациональному использованию поливной воды, содействует снижению потерь воды на фильтрацию и испарение [2], а также решению проблемы «голова-конец», «...крайне упрощает задачу водораспределения и сводит к минимуму обычные споры на почве водораспределения» [25].

Вместе с тем, следует отметить, что качество планирования и реализации водооборота в последние годы ухудшается. Связано это с институциональными изменениями на нижнем уровне вододеления. Если раньше в рамках колхоза/совхоза не представляло больших трудностей организовать водооборот между бригадами (звеньями), так как их интересы не конфликтовали, то в настоящее время, когда у каждого фермерского хозяйства свой экономический интерес, сделать это очень непросто тем более, что размер фермерских хозяйств может быть небольшим и, соответственно, состав участников водооборота очень велик.

В принципе, так как проблема организации водооборота возникла из-

за институциональных изменений, то и решить ее в корне можно только через институциональные меры: через стимулирование процесса укрупнения и /или кооперации фермерских хозяйств. Другая причина - дефицит знаний и кадров-водников (мирабов), умеющих планировать и организовать водооборот. Ниже (таблица 1) дан сравнительный анализ некоторых практик водопользования.

Таблица 1.

Сравнительный анализ традиционных и современных практик водопользования

Практика	Традиционная форма	Современные проблемы	Рекомендации по адаптации
Водооборот	"Навбат", "аврон", ...	Конфликт интересов мелких фермерских хозяйств	Стимулирование кооперации, укрупнение хозяйств
Хашар	Коллективный труд на благо общины	Формализация, потеря мотивации	Интеграция с экопросвещением, поддержка местных инициатив
Роль мираба (блок 2.7)	Уважаемый выборный старшина	Низкий статус, проблема коррупции	Повышение статуса профессии, прозрачные механизмы назначения
Водоучет	"На глаз", по времени	Отсутствие точных данных на уровне фермеров	Внедрение простых измерительных устройств, связь оплаты с фактическим потреблением

Блок 2.5. О мирабах

Понятие «мираб» можно рассматривать в узком и широком смысле. В узком смысле мираб — это конкретное лицо, ответственное за распределение оросительной воды. При этом:

- Мираб, в зависимости от уровня водodelения, мог/может быть
 - мирабом высшего/национального уровня, ответственного за разработку и реализацию водной политики (министр MBX, ...);
 - мирабом среднего уровня (начальник БУИС, УИС, ОВП, ...);
 - мирабом низового/полевого уровня, осуществляющего распределение водного потока непосредственно на орошаемом поле (следит за состоянием ок-арыков, шох-арыков, борозд, ...);
 - мирабом кишлака / махалли.
- Мираб, в зависимости от формы занятости может быть 1) государственным служащим 2) постоянным работником объединения водопользователей (ОВП: АВП, СПК, АО, ...); 3) сезонным работником водопользователя (фермерского/крестьянского хозяйства).
- Мираб, в зависимости от формы найма, может быть назначаемым или избираемым работником.

В широком смысле мираб — это элемент целой системы традиционного водного управления, известной как институт мирабов. Эта система включает в себя не только самих мирабов, но и организационные

структуры, правила, обычаи и социальные нормы, регулирующие использование воды в сельском хозяйстве.

Слово “мираб” можно считать близким по значению к слову “водник”, но не полным синонимом. В качестве знаменитого мираба следует упомянуть великого узбекского поэта Алишера Навоий, который занимал должность высшего визиря (вазира) — то есть фактически премьер-министра государства Тимуридов. За вклад в развитие ирригации и заботу о водоснабжении его в народе часто называли “миробаши”.

«Того, кто не задумывается о далеких трудностях, непременно поджидают близкие неприятности».

Конфуций.

"История - не учительница, а надзирательница: она ничему не учит, но только наказывает за незнание уроков".

Ключевский.

«Единственный урок, который можно извлечь из истории, состоит в том, что люди не извлекают из истории никаких уроков».

Б. Шоу.

Заключение: выводы и извлеченные уроки

История орошения говорит о том, что во все времена перед лицами, принимающими решения, стоит задача найти лучшее сочетание подходов/принципов:

- Централизованного и демократического.
 - Рыночного и социального.
 - Инфраструктурного/материального и институционального/нематериального.
 - Эффективного и справедливого.
 - Реактивного и проактивного.
 - Личного/индивидуального и общественного/государственного,
- др.

Выбор системы приоритетных подходов остается за группой людей (политиков, менеджеров, ученых, ...). Наибольший вес при принятии решений во все времена имеют политики, а они, нередко, исходят из личных/идеологических интересов, часто не совпадающих с интересами общества в целом.

Кроме того, специалисты имеют разные взгляды на подходы и извлекаемые уроки из водного наследия:

- Одни: специалисты-оптимисты, считают, что политики, в том числе водные, всегда извлекают уроки из прошлого.
- Другие: умеренные оптимисты, считают, что водные политики извлекают уроки из прошлого, но, так как человеку свойственно ошибаться, они учатся на собственных ошибках, а не на чужом опыте.
- Третьи: специалисты-пессимисты, отчаявшись, считают, что никто никогда не извлекает уроки из прошлого опыта (ни из собственного, ни из чужого) [28].

Ниже приведены выводы и уроки, извлеченные из анализа нашего многовекового опыта ирригации в Узбекистане, которые, возможно, будут полезны лицам, принимающим решения, для надлежащего выбора приоритетов при разработке стратегий развития системы управления водопоставкой. Они сгруппированные по ключевым направлениям:

1. Управленческие уроки:

- Организационные изменения в системе управления водопоставкой должны быть научно обоснованными.
- Должно соблюдаться соответствие между обязанностями и полномочиями персонала, между функциями и потенциалом ВХО.
- Необходимо сместить акцент
 - со строго централизованной системы управления водным сектором на децентрализованную;⁶⁶
 - с политики «кну́та» на политику «пряника»;
 - с эксклюзивного подхода на инклюзивный (участие в принятии решений по выбору мер представителей от ключевых заинтересованных сторон);
 - с гидроэнергетики в сторону орошения;⁶⁷
 - с твердых мер на мягкие меры;
 - с мер по водоотведению на меры по стимулированию экономии оросительной воды в процессе водопоставки;
- Необходимо находить верный баланс между стабильностью и гибкостью водоподачи.
- Надо до предела реконструировать и модернизировать существующую водохозяйственную инфраструктуру, улучшить управление, эксплуатацию и обслуживание гидромелиоративных систем, а затем уже, по мере необходимости и возможности, заниматься освоением новых земель.
- Традиционные практики (хашар, водооборот...) сохраняют свою актуальность и должны адаптироваться к современным условиям.

2. Социально-экономические уроки:

- Вода в ЦА является экзистенциальным ресурсом, а мирабы ВХО – это ключевые специалисты, от которых зависит водная/продовольственная безопасность населения.⁶⁸
- Самые значительные инвестиции должны быть направлены не только в инфраструктуру, но и в людей, знания: водные проблемы часто

⁶⁶ Строго централизованная система управления водным сектором эффективна при реализации принятых решений, а не в процессе их принятия. При принятии решений более целесообразным является принцип децентрализации, в соответствии с которым ничего не следует выполнять на высшем правительственном уровне, если это можно удовлетворительно выполнить на более низком/местном уровне.

⁶⁷ Там, где гидроэнергетика отстает от спроса, другие возобновляемые источники энергии могут компенсировать нехватку электроэнергии и даже позволить сместить акцент работы плотин в пользу орошения.

⁶⁸ «В древние времена не финансисты были первыми визирями у правителей Востока, а МИРАБЫ!!!» [20].

является результатом неспособности лиц, принимающих решения, правильно выбрать приоритеты.⁶⁹

– Необходимо находить верный баланс между принципами социальной справедливости, экономической эффективности и экологической устойчивости.

3. Методологические уроки:

– Из-за, как правило, непредсказуемости возможных политических и природных изменений самым целесообразным является ориентировать инструменты и механизмы управления водными ресурсами на использование тех вод, которые уже имеются в распоряжении, а не на внешние источники воды.

– Проблемы ирригации сложны, а решения неочевидны, что требует глубокого изучения и сокращения разрыва между наукой и политикой.

– Обилие трудолюбивого населения в Узбекистане и нужда в новых рабочих местах – важные факторы, которые должны приниматься во внимание при выборе приоритетов.

– Чрезмерное вмешательство человека в естественные течения рек оказывает серьёзное влияние на здоровье водных экосистем и их биоразнообразие в глобальном масштабе.⁷⁰

- Необходимо находить верный баланс между
 - принципами социальной справедливости, экономической эффективности и экологической устойчивости;
 - стабильностью и гибкостью водоподдачи.

Синтезируя вышесказанное, главный принципиальный сдвиг, необходимый для устойчивого водопользования в Узбекистане, заключается в переходе от реактивного, инфраструктурно-ориентированного подхода к проактивному, ориентированному на управление, эффективность и адаптацию исторического опыта к современным вызовам.

Изложенные выводы коррелируют с международным опытом и принципами ИУВР, что подтверждает их универсальную значимость и применимость не только в условиях Узбекистана, но и в других странах Центральной Азии с аналогичными водными вызовами.

Использованные источники:

1. Мирзаев Н.Н. Ишанов Ж. Х. Управление водопоставкой: материальное наследие, уроки (в печати).

⁶⁹ Водная политика — это искусство установления приоритетов. Приоритетными в водной политике всегда должны быть принципы 1) эффективности, 2) справедливости и 3) устойчивости, даже если ради них приходится жертвовать идеологическими принципами;

⁷⁰ При строительстве и эксплуатации водохозяйственных объектов, связанных с неуправляемыми сбросами в них загрязнителей разной природы (бытовой, хозяйственной, промышленной) следует учитывать то, что, хотя водоемы обладают определенной способностью к самоочищению от загрязнителей, но только до определенного предела.

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ИННОВАЦИОННЫЕ ПРОЕКТЫ, НАПРАВЛЕННЫЕ НА ПРОПАГАНДУ НАЦИОНАЛЬНЫХ ИГР СРЕДИ МОЛОДЕЖИ

Аннотация: В данной статье анализируются инновационные проекты, направленные на популяризацию национальных игр среди молодежи. В исследовании рассматривается культурное значение национальных игр, современные методы их возрождения и развития, а также стратегии привлечения молодежи к этому процессу. В статье предлагаются эффективные пути популяризации национальных игр через инновационные подходы, включая цифровые технологии, социальные сети и методы геймификации (gamification).

Ключевые слова: Национальные игры, молодежь, инновационные проекты, популяризация, культурное наследие, цифровые технологии, геймификация, социальные сети.

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INNOVATIVE PROJECTS AIMING TO POPULARIZE NATIONAL GAMES AMONG YOUTH

Annotation: This article analyzes innovative projects aimed at popularizing national games among young people. The study examines the cultural significance of national games, modern methods of their revival and development, as well as strategies for involving young people in this process. The article proposes effective ways to popularize national games through innovative approaches, including digital technologies, social networks and gamification methods.

Keywords: National games, youth, innovative projects, popularization, cultural heritage, digital technologies, gamification, social networks.

В современном обществе сохранение национального культурного наследия стало сложной проблемой вследствие глобализации и технологического прогресса. В частности, наблюдается снижение интереса молодежи к национальным традициям, ценностям и играм. Национальные игры являются важнейшей частью культурного достояния любого народа; через них обеспечивается преемственность традиций, ценностей и

национального самосознания между поколениями. Однако в современной молодежной среде место этих игр все чаще занимают видеоигры, цифровые развлечения и другие формы современного досуга.

Национальные игры способствуют не только физическому и интеллектуальному развитию детей, но и играют ключевую роль в формировании их духовно-нравственных ориентиров. Например, такие игры, как «Чилон» и «Ланги», служат повышению физической активности, развитию навыков командной работы и обучению стратегическому мышлению. Тем не менее на сегодняшний день эти игры постепенно предаются забвению и исчезают из повседневной жизни молодежи.

Для решения данной проблемы возникла необходимость в разработке инновационных подходов и проектов. Современные технологии, особенно цифровые платформы, социальные сети и мобильные приложения, открывают возможности для возрождения национальных игр и повышения их привлекательности для молодежи. Кроме того, методы геймификации (игрофикации) позволяют сделать национальные игры более увлекательными и конкурентоспособными.

В данной статье анализируются инновационные проекты, направленные на популяризацию национальных игр среди молодежи. Основная цель исследования — предложить современные методы восстановления национальных игр и адаптации их под интересы подрастающего поколения. Статья призвана ответить на следующие вопросы:

В чем заключается культурная значимость национальных игр?

Какие инновационные подходы существуют для популяризации национальных игр среди молодежи?

Какую роль могут сыграть цифровые технологии и методы геймификации в возрождении национальных игр?

Результаты исследования показывают, что восстановление национальных игр играет важную роль в повышении интереса молодежи к национальной культуре и укреплении их духовно-нравственного воспитания. Эффективная организация этого процесса возможна именно через реализацию инновационных проектов.

Культурная значимость национальных игр. Национальные игры являются неотъемлемой частью культурного наследия любого народа. С их помощью сохраняются традиции, ценности и чувство национальной гордости. Они вносят огромный вклад в физическое, умственное и духовное развитие детей. Например, игры «Коканд», «Чилон», «Ланги» направлены на повышение физической активности, развитие способностей к коллективному взаимодействию и обучение стратегическому мышлению.

Национальные игры также отражают историческое и культурное наследие народа. Каждая игра со своими уникальными правилами, стилем и смыслом выражает образ жизни, обычаи и ценности этноса. В частности, такие игры, как «Улаш» или «Киз кувиш» (Догони девушку), играют важную

роль в обучении молодежи национальным традициям, воспитании их в духе патриотизма и пробуждении национального самосознания.

Однако в условиях глобализации и стремительного технологического развития национальные игры постепенно забываются. Замена их цифровыми форматами развлечений создает риск утраты национального культурного наследия.

Необходимость инновационных проектов. Для привлечения молодежи к национальным играм необходимо использование современных технологий. Благодаря инновационным проектам можно не только реанимировать эти игры, но и сделать их релевантными для современных подростков. Поскольку современное поколение тесно связано с цифровым миром, представление национальных игр в цифровом формате может вызвать у них живой интерес.

Например, создание мобильных приложений, посвященных национальным играм, и их продвижение в социальных сетях может стать эффективным стимулом. Также технологии виртуальной и дополненной реальности (AR/VR) позволяют представлять национальные игры в интерактивной форме. Это не только знакомит молодых людей с играми, но и сближает их с национальной культурой и традициями.

Инновационные проекты позволяют адаптировать национальные игры к современным требованиям. Этого можно достичь через упрощение правил, придание играм соревновательного характера или включение их в учебные программы школ и университетов.

Роль цифровых технологий. Цифровые технологии играют ключевую роль в популяризации национального достояния. Социальные сети, мобильные приложения и виртуальные платформы делают национальные игры доступными и интересными. Благодаря специализированным приложениям молодежь получает возможность играть в эти игры в любом месте и в любое время.

Представление таких игр, как «Коканд» или «Чилон», в виртуальной реальности вызывает интерес у технически продвинутого поколения. Эти методы не только расширяют кругозор, но и укрепляют связь молодежи с культурными корнями. Кроме того, цифровые технологии позволяют продвигать национальные игры на глобальном уровне, знакомя с ними зарубежную аудиторию через социальные медиа, что способствует международной популяризации национальной культуры.

Методы геймификации. Использование элементов геймификации делает национальные игры более захватывающими. Баллы, награды, рейтинги и сертификаты стимулируют интерес молодежи и побуждают их к регулярным занятиям. Организация соревнований и турниров, основанных на принципах игрофикации, способствует глубокому вовлечению участников.

Внедрение национальных игр в образовательный процесс через геймифицированные проекты в школах и вузах позволяет интегрировать

культурное воспитание в повседневную учебную деятельность, делая процесс познания традиций естественным и увлекательным.

Заключение. Национальные игры являются важнейшим компонентом культурного кода народа, обеспечивающим передачу ценностей и сохранение национальной идентичности. Несмотря на вызовы глобализации, использование инновационных технологий и современных педагогических методов (таких как геймификация и цифровизация) позволяет эффективно конкурировать с глобальными продуктами массовой культуры и обеспечивать достойное место национальному наследию в жизни современного поколения.

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РОЛЬ NEAR-MISS АНАЛИЗА В ФОРМИРОВАНИИ ПРОАКТИВНОЙ СИСТЕМЫ ПРОМЫШЛЕННОЙ БЕЗОПАСНОСТИ

***Аннотация:** В статье рассматривается роль near-miss анализа в формировании проактивной системы промышленной безопасности. Раскрывается сущность near-miss как несостоявшегося инцидента, который не привел к ущербу, но выявил наличие скрытых организационных, технических или поведенческих уязвимостей. Показано, что традиционный реактивный подход, основанный преимущественно на анализе уже произошедших аварий и нарушений, не обеспечивает достаточной чувствительности к ранним признакам риска. Особое внимание уделяется значению near-miss анализа как инструмента выявления слабых сигналов, предупреждения опасных событий и накопления организационного опыта. Анализируются основные механизмы использования near-miss событий в практике промышленной организации, включая их систематическую фиксацию, классификацию, выявление причинно-следственных связей, корректировку регламентов и применение результатов в обучении персонала. Рассматриваются преимущества данного подхода, связанные с повышением профилактического потенциала системы безопасности, развитием культуры открытого сообщения о рисках и совершенствованием управленческих решений. Одновременно выявляются ограничения near-miss анализа, обусловленные неполнотой информации, риском формализации отчетности и зависимостью эффективности от качества организационной среды. Делается вывод о том, что near-miss анализ является важным элементом современной проактивной модели промышленной безопасности, ориентированной на предупреждение инцидентов до их фактической реализации.*

***Ключевые слова:** near-miss, промышленная безопасность, проактивная безопасность, несостоявшийся инцидент, управление рисками, организационное обучение, культура безопасности, предупреждение аварий*

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THE ROLE OF NEAR-MISS ANALYSIS IN THE FORMATION OF A PROACTIVE INDUSTRIAL SAFETY SYSTEM

Abstract: *The article examines the role of near-miss analysis in the formation of a proactive industrial safety system. It reveals the essence of a near-miss as an incident that did not result in damage but exposed hidden organizational, technical, or behavioral vulnerabilities. It is shown that the traditional reactive approach, based mainly on the analysis of accidents and violations that have already occurred, does not provide sufficient sensitivity to early signs of risk. Particular attention is paid to the significance of near-miss analysis as a tool for identifying weak signals, preventing hazardous events, and accumulating organizational experience. The paper analyzes the main mechanisms for using near-miss events in industrial practice, including their systematic recording, classification, identification of cause-and-effect relationships, updating of regulations, and application of findings in personnel training. The advantages of this approach are considered in connection with strengthening the preventive potential of the safety system, developing a culture of open risk reporting, and improving managerial decision-making. At the same time, the limitations of near-miss analysis are identified, including incomplete information, the risk of formalized reporting, and the dependence of effectiveness on the quality of the organizational environment. It is concluded that near-miss analysis is an important element of a modern proactive industrial safety model focused on preventing incidents before their actual occurrence.*

Keywords: *near-miss, industrial safety, proactive safety, near-miss incident, risk management, organizational learning, safety culture, accident prevention*

Введение

В условиях усложнения производственных систем и роста требований к надежности технологических процессов промышленная безопасность все чаще рассматривается не только как совокупность регламентов и технических мер, но и как результат способности организации своевременно выявлять и предупреждать потенциальные угрозы. Для предприятий, работающих в среде повышенного риска, особенно важно смещение акцента с реагирования на уже произошедшие аварии к выявлению предвестников опасных событий на ранних стадиях. В этом контексте особую значимость приобретает анализ *near-miss*, то есть несостоявшихся инцидентов, которые не привели к ущербу, но выявили наличие скрытых уязвимостей в системе.

Традиционно система промышленной безопасности во многом строилась на изучении аварий, травм и серьезных нарушений, уже повлекших негативные последствия. Однако такой подход носит преимущественно реактивный характер, поскольку изменения вносятся после наступления ущерба. Между тем несостоявшиеся инциденты позволяют выявлять дефекты организации труда, технические сбои, недостатки взаимодействия персонала и слабые места действующих

регламентов до того, как они перерастут в реальные аварийные события. В связи с этим *near-miss* анализ выступает важным инструментом формирования проактивной модели безопасности, ориентированной на предупреждение, а не только на устранение последствий [1].

Актуальность темы обусловлена тем, что значительная часть рисков сначала проявляется в виде слабых сигналов и потенциально опасных эпизодов, которые нередко остаются недооцененными. Систематический *near-miss* анализ позволяет повысить чувствительность организации к угрозам, создать основу для накопления опыта и совершенствования стандартов безопасности.

Целью данной статьи является рассмотрение роли *near-miss* анализа в формировании проактивной системы промышленной безопасности.

Сущность *near-miss* анализа и его значение в системе промышленной безопасности

Под *near-miss* в системе промышленной безопасности понимается несостоявшийся инцидент, то есть событие, которое при незначительном изменении обстоятельств могло привести к аварии, травме, повреждению оборудования или иному негативному последствию, но фактически не вызвало ущерба. Несмотря на отсутствие прямого вреда, такие эпизоды обладают высокой диагностической ценностью, поскольку позволяют выявлять скрытые дефекты организации труда, технические уязвимости и поведенческие риски на ранней стадии. В отличие от уже произошедших аварий, *near-miss* события выступают как предупреждающие сигналы, указывающие на наличие системных отклонений, которые еще не перешли в фазу открытого ущерба [2].

Значение *near-miss* анализа определяется тем, что он позволяет рассматривать безопасность не только через последствия, но и через процессы, предшествующие опасному событию. Анализ несостоявшихся инцидентов делает возможным обнаружение слабых сигналов, повторяющихся отклонений и факторов, которые в обычных условиях могут оставаться незаметными. К ним относятся нарушения коммуникации между сотрудниками, отклонения от регламентов, недостатки контроля, технические сбои и ошибки принятия решений в нестандартных ситуациях. Тем самым *near-miss* анализ расширяет аналитическое поле системы безопасности и повышает ее чувствительность к потенциальным угрозам.

В условиях современной промышленной организации *near-miss* анализ приобретает особое значение как элемент проактивного управления рисками. Если реактивная модель безопасности строится преимущественно на разборе уже наступивших происшествий, то проактивная модель ориентирована на предупреждение инцидентов до момента их фактической реализации. В этом смысле *near-miss* представляет собой важный источник организационного знания, позволяющий не только фиксировать отдельные опасные эпизоды, но и формировать более глубокое понимание причинно-следственных связей внутри системы. Именно поэтому анализ

несостоявшихся инцидентов следует рассматривать как один из ключевых инструментов развития современной промышленной безопасности.

Основные механизмы использования near-miss анализа в формировании проактивной системы безопасности

Роль near-miss анализа в формировании проактивной системы промышленной безопасности проявляется прежде всего в способности организации работать не только с последствиями опасных событий, но и с их ранними признаками. Несостоявшиеся инциденты позволяют выявлять уязвимости, которые в обычном режиме могут оставаться скрытыми, однако при неблагоприятном стечении обстоятельств способны привести к серьезным последствиям. В этом смысле near-miss анализ становится инструментом раннего предупреждения, повышающим чувствительность системы безопасности к отклонениям и потенциальным рискам.

Одним из основных механизмов является систематическая фиксация и классификация near-miss событий. Если подобные эпизоды не регистрируются, организация лишается важного массива данных о собственных слабых местах. Напротив, регулярный сбор информации о несостоявшихся инцидентах позволяет выявлять повторяющиеся типы отклонений, определять наиболее уязвимые участки производственного процесса и формировать более точное представление о структуре риска. Существенное значение имеет не только сам факт регистрации, но и анализ обстоятельств, при которых событие стало возможным, а также причин, по которым оно не привело к ущербу.

Следующим важным механизмом выступает выявление причинно-следственных связей и преобразование отдельных сигналов в управленческие решения. Near-miss анализ позволяет установить, какие факторы — организационные, технические или поведенческие — способствовали возникновению потенциально опасной ситуации. На основе этого становится возможной корректировка инструкций, обновление регламентов, изменение порядка взаимодействия между сотрудниками и усиление контроля на критических этапах работы. Таким образом, единичный эпизод превращается в источник организационного обучения и профилактических изменений.

Существенную роль играет и использование результатов near-miss анализа в обучении персонала и развитии культуры безопасности. Разбор несостоявшихся инцидентов помогает сотрудникам осознавать реальные риски производственной среды, лучше понимать природу отклонений и воспринимать безопасность как область постоянного внимания, а не как формальное соблюдение правил. В условиях проактивной системы особенно важно, чтобы near-miss сообщения не скрывались, а рассматривались как ценный материал для совершенствования практики. Именно включение near-miss анализа в постоянный цикл выявления, осмысления и обновления стандартов делает его значимым механизмом формирования устойчивой и предупреждающей системы промышленной безопасности [3].

Преимущества и ограничения near-miss анализа в промышленной организации

Near-miss анализ обладает значительным потенциалом как инструмент повышения эффективности промышленной безопасности, поскольку позволяет выявлять риски до их перехода в фазу реального ущерба. Его основное преимущество заключается в предупреждающем характере: организация получает возможность работать не только с уже произошедшими авариями, но и с их предвестниками. Это повышает чувствительность системы к скрытым отклонениям, способствует более раннему принятию корректирующих мер и снижает вероятность тяжелых инцидентов. Кроме того, near-miss анализ формирует основу для постоянного организационного обучения, при котором даже события без негативных последствий становятся источником полезного управленческого знания.

Важным преимуществом данного подхода является также развитие культуры безопасности. Если сотрудники воспринимают сообщение о near-miss не как повод для наказания, а как вклад в повышение общей надежности системы, в организации усиливается открытость, укрепляется доверие и возрастает вовлеченность персонала в процессы предупреждения рисков. Это позволяет использовать near-miss анализ не только как технический или управленческий инструмент, но и как механизм формирования более зрелой организационной культуры. Существенным является и то, что анализ несостоявшихся инцидентов дает материал для совершенствования инструкций, обучения персонала и обновления стандартов безопасности без ожидания реальных аварийных событий.

Вместе с тем эффективность near-miss анализа ограничивается рядом факторов. Одной из главных проблем является неполнота информации, связанная с тем, что сотрудники не всегда фиксируют подобные события. Причинами могут быть страх санкций, недоверие к системе, восприятие near-miss как малозначимого эпизода или отсутствие привычки сообщать о слабых сигналах. В таких условиях организация теряет значительную часть потенциально ценной информации, а система безопасности сохраняет реактивный характер, несмотря на формальное наличие процедур анализа.

Дополнительные трудности связаны с риском формализации near-miss отчетности. Если фиксация несостоявшихся инцидентов превращается в бюрократическую процедуру без последующего анализа и практических выводов, ее профилактическая ценность существенно снижается. Кроме того, сами по себе near-miss события часто сложны для интерпретации: не каждое отклонение действительно свидетельствует о серьезной угрозе, а значит, для их правильного анализа необходимы квалифицированная экспертиза, вовлеченность руководства и готовность организации использовать полученные данные для реальных изменений. Таким образом, near-miss анализ следует рассматривать как эффективный, но требующий развитой организационной среды инструмент, результативность которого

зависит от культуры открытости, качества аналитической работы и способности компании переводить выявленные сигналы в управленческие решения [4].

Заключение

Near-miss анализ играет важную роль в формировании проактивной системы промышленной безопасности, поскольку позволяет организации выявлять и осмысливать потенциально опасные отклонения до того, как они приведут к авариям, травмам или иным негативным последствиям. В отличие от реактивного подхода, ориентированного на разбор уже произошедших происшествий, данный инструмент направлен на работу с ранними признаками риска и предупреждение опасных событий на стадии их зарождения.

Проведенный анализ показывает, что near-miss обладает высокой диагностической ценностью, поскольку позволяет выявлять скрытые организационные, технические и поведенческие уязвимости, а также использовать их как источник организационного обучения. Систематическая регистрация несостоявшихся инцидентов, анализ причинно-следственных связей, корректировка регламентов и включение полученных выводов в обучение персонала создают основу для более чувствительной и адаптивной системы безопасности.

Вместе с тем эффективность near-miss анализа зависит не только от наличия формальных процедур, но и от качества организационной среды. Культура открытого сообщения о рисках, доверие между сотрудниками и руководством, а также готовность компании превращать сигналы в реальные изменения определяют, станет ли near-miss анализ действенным инструментом профилактики или останется формальной практикой. В целом можно сделать вывод, что включение near-miss анализа в постоянный цикл выявления, осмысления и обновления стандартов безопасности является важным условием перехода к современной проактивной модели промышленной безопасности.

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ИННОВАЦИОННЫЕ МЕТОДЫ ПОЛУЧЕНИЯ ПИЩЕВЫХ ПРОДУКТОВ ИЗ ТРИТИКАЛА И ПОВЫШЕНИЕ ИХ БИОЛОГИЧЕСКОЙ ЦЕННОСТИ

***Аннотация:** В данной работе рассматривается потенциал тритикале как перспективной зерновой культуры для обеспечения продовольственной независимости и устойчивого развития агропромышленного комплекса Узбекистана. Анализируется биохимический состав зерна местных сортов, обладающих повышенной адаптивностью к засушливым условиям региона и засолению почв. Особое внимание уделяется инновационным подходам к переработке сырья, направленным на существенное повышение биологической ценности готовой продукции за счет оптимизации нутриентного профиля. В статье предоставляется детальное описание методики твердофазной ферментации с использованием специфических микробных консорциумов, позволяющих нивелировать действие антипитательных факторов. Изучаются технологические аспекты внедрения биоконверсии в производственные циклы отечественных предприятий для создания функциональных продуктов питания.*

***Ключевые слова:** тритикале, узбекистан, биоконверсия, ферментация, ценность, нутриенты, инновация, селекция, технология, безопасность.*

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INNOVATIVE METHODS OF OBTAINING FOOD PRODUCTS FROM TRITICALE AND INCREASING THEIR BIOLOGICAL VALUE

Abstract: *This paper examines the potential of triticale as a promising grain crop for food security and sustainable development of Uzbekistan's agro-industrial complex. The biochemical composition of grain from local varieties with increased adaptability to the region's arid conditions and soil salinity is analyzed. Particular attention is paid to innovative approaches to raw material processing aimed at significantly increasing the biological value of finished products by optimizing their nutrient profile. The article provides a detailed description of a solid-state fermentation technique using specific microbial consortia that mitigate the effects of anti-nutritional factors. The technological aspects of implementing bioconversion into the production cycles of domestic enterprises to create functional foods are explored.*

Keywords: *triticale, Uzbekistan, bioconversion, fermentation, value, nutrients, innovation, breeding, technology, safety.*

Введение

В современных условиях аграрного сектора Узбекистана тритикале рассматривается как стратегически важная культура, способная обеспечить продовольственную безопасность в зонах с засоленными почвами и дефицитом водных ресурсов, характерными для климата Центральной Азии. Благодаря высокому адаптивному потенциалу и устойчивости к засухе, этот амфидиплоид превосходит традиционную пшеницу по содержанию незаменимых аминокислот, таких как лизин и триптофан, а также отличается повышенной концентрацией водорастворимых белков-альбуминов. Внедрение инновационных технологий переработки, включая методы экструзии и биологической ферментации, позволяет трансформировать сырьевой потенциал тритикале в функциональные продукты питания с улучшенной усвояемостью нутриентов.

Методика биоконверсии тритикале молочнокислой закваской. Методика основывается на использовании консорциума штаммов *Lactobacillus plantarum* и *Saccharomyces cerevisiae* для глубокой ферментации размолотого зерна тритикале в условиях контролируемой влажности и температуры. Исследования Ш. Х. Хайдаровой и З. С. Шакировой доказывают, что данный процесс активирует фермент фитазу, которая расщепляет фитиновые комплексы и высвобождает связанные минералы, значительно повышая биодоступность цинка и железа. Биоконверсия позволяет трансформировать трудноусвояемые белки зерна в свободные аминокислоты, что делает конечный продукт биологически ценным и функциональным для отечественной пищевой индустрии.

В результате применения методики твердофазной биоконверсии зерна тритикале зафиксировано существенное изменение его нутриентного профиля и повышение биодоступности минеральных веществ. Лабораторные

анализы показали увеличение содержания свободных аминокислот в ферментированном субстрате на 18–22 % по сравнению с исходным сырьем, а также снижение уровня фитиновой кислоты, препятствующей усвоению микроэлементов, на 35 %. Процесс жизнедеятельности молочнокислых бактерий и дрожжей способствовал накоплению водорастворимых витаминов группы В и органических кислот, что обеспечило рост общей антиоксидантной активности готового продукта на 12 %. Полученные количественные данные подтверждают эффективность использования отечественных штаммов микроорганизмов для создания функциональных пищевых основ с высокой биологической ценностью в условиях промышленного производства.

Таблица 1.

Техническое оснащение процесса биоконверсии зерна тритикале

Наименование оборудования	Назначение в исследовании	Основные рабочие характеристики
Лабораторная мельница ЛМЗ	Измельчение зерна тритикале до заданной фракции	Размер сита 0,5–1,0 мм, высокая однородность помола
Термостат инкубационный	Поддержание температуры для роста микроорганизмов	Диапазон +25...+45 °С, точность поддержания $\pm 0,1$ °С
Спектрофотометр	Определение концентрации нутриентов и фитина	Диапазон длин волн 190–1100 нм, цифровая регистрация данных

Заключение

Развитие технологий глубокой переработки тритикале превращает эту устойчивую к засухе культуру в «золотой резерв» пищевой индустрии Узбекистана, адаптированный к вызовам местного климата. Интеграция методов биоконверсии в отечественное производство не просто повышает биологическую ценность продуктов, но и закладывает фундамент для создания функционального рациона нового поколения, рожденного на стыке традиций земледелия и инновационной науки.

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МАТЕМАТИЧЕСКИЕ МЕТОДЫ ОПТИМИЗАЦИИ LLM В РАЗРАБОТКЕ ЧАТ-БОТОВ

АННОТАЦИЯ: Разработка психологических чат-ботов на базе больших языковых моделей (LLM) требует строгого подхода к математическим методам оптимизации. Данная статья анализирует применение адаптивных градиентных методов (AdamW), техник регуляризации (PEFT/LoRA) и многокритериальных функций потерь в контексте ограниченных и чувствительных клинических данных. Особое внимание уделяется интеграции этических и эмпатических императивов через Обучение с подкреплением на основе обратной связи с человеком (RLHF), где алгоритм PPO (Proximal Policy Optimization) выступает ключевым механизмом для обеспечения стабильности и безопасности генерации ответов. Представленные методы позволяют трансформировать качественные терапевтические требования в количественные, оптимизируемые градиентом сигналы, что критически важно для создания робастных и этически безопасных систем цифрового психического здоровья.

Ключевые слова: большие языковые модели, адаптивные методы, алгоритмы генерации, чат боты с ИИ, трансформеры, NLP

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MATHEMATICAL METHODS OF LLM OPTIMIZATION IN CHATBOT DEVELOPMENT

ABSTRACT: The development of psychological chatbots based on large language models (LLM) requires a rigorous approach to mathematical optimization methods. This article analyzes the application of adaptive gradient methods (AdamW), regularization techniques (PEFT/LoRA), and multi-criteria loss functions in the context of limited and sensitive clinical data. Special attention is paid to the integration of ethical and empathic imperatives through Human Feedback Reinforcement Learning (RLHF), where the PPO (Proximal Policy Optimization) algorithm acts as a key mechanism to ensure the stability and security of response generation. The presented methods make it possible to

transform qualitative therapeutic requirements into quantitative, gradient-optimized signals, which is critically important for creating robust and ethically safe digital mental health systems.

Keywords: *large language models, adaptive methods, generation algorithms, chatbots with AI, transformers, NLP*

ВВЕДЕНИЕ

Развитие больших языковых моделей (LLM), в частности архитектуры трансформер (Vaswani et al., 2017), открыло путь для создания психологических чат-ботов, способных предоставлять первичную поддержку в области психического здоровья. Однако, в отличие от общих NLP-задач, разработка терапевтических моделей сталкивается с уникальными ограничениями и требованиями:

1. **Дефицит данных.** Обучающие выборки терапевтических диалогов (например, когнитивно-поведенческая терапия, КПТ) крайне ограничены, чувствительны и требуют строгой анонимизации.

2. **Этические требования.** Критически важна безопасность и эмпатия.

3. **Необходимость обобщения.** Модель должна эффективно **дообучаться** (fine-tuning) на малых данных, сохраняя при этом общие языковые компетенции, чтобы избежать "катастрофического забывания".

Целью данной работы является систематизация и анализ математических методов оптимизации, критически важных для успешного решения этих проблем в процессе дообучения LLM для психологических приложений.

ОБЗОР ЛИТЕРАТУРЫ

Систематический анализ литературы по данной тематике охватывает три взаимосвязанные области, это эволюцию алгоритмов глубокого обучения, архитектурные достижения в NLP и появление этически-ориентированных фреймворков оптимизации.

Основой для обучения нейронных сетей является Стохастический Градиентный Спуск (SGD), чья эффективность была значительно повышена внедрением Momentum (Rumelhart et al., 1986) для сглаживания траектории и ускорения сходимости в областях низкого градиента. Прорыв в оптимизации больших моделей связан с появлением адаптивных методов, которые динамически масштабируют скорость обучения (η) для каждого параметра. Метод Adagrad (Duchi et al., 2011) впервые ввел масштабирование, обратно пропорциональное корню из суммы квадратов прошлых градиентов, что эффективно для разреженных данных. Однако его склонность к быстрому затуханию η была преодолена в RMSProp (Tieleman & Hinton, 2012). Кульминацией стало появление алгоритма Adam (Kingma & Ba, 2014), который комбинировал свойства Momentum и RMSProp. В контексте современной регуляризации, метод AdamW (Loshchilov & Hutter, 2017) стал стандартом, математически обосновав необходимость декупляции L2-

регуляризации от шага градиента для достижения лучшей обобщающей способности.

Революция в NLP произошла с внедрением архитектуры Трансформер (Vaswani et al., 2017), основанной исключительно на механизме внимания (Attention). Эти модели, будучи сильно избыточно параметризованными, требуют специализированных методов оптимизации. В условиях ограниченных и чувствительных клинических данных особую актуальность приобретают методы Parameter-Efficient Fine-Tuning (PEFT). Эти методы, в частности LoRA (Low-Rank Adaptation) (Hu et al., 2021), позволяют адаптировать модель к узкой задаче, обучая лишь малый набор добавочных низкоранговых параметров (A и B), что значительно снижает вычислительные затраты и предотвращает катастрофическое забывание (Catastrophic Forgetting) общих языковых знаний, критически важных для терапевтического диалога.

Традиционные методы оптимизации, основанные только на кросс-энтропии (L_{CE}), неспособны инкорпорировать нелингвистические императивы, такие как эмпатия и безопасность. Эта проблема привела к разработке фреймворков, основанных на Обучении с подкреплением на основе обратной связи с человеком (RLHF) (Christiano et al., 2017). RLHF включает в себя обучение Модели Вознаграждения (Reward Model) на человеческих оценках, которая затем используется для оптимизации генеративной модели. Ключевым алгоритмом в RLHF является PPO (Proximal Policy Optimization) (Schulman et al., 2017). PPO, являясь методом градиента политики, вводит механизм ограничения (clipping). Этот механизм математически обеспечивает, что каждое обновление политики происходит в безопасном радиусе от предыдущей, гарантируя стабильность и этическую робастность генерируемых ответов, что является жизненно важным для психологических приложений.

МЕТОДЫ

Адаптация LLM достигается через итеративное применение алгоритмов стохастического градиентного спуска, специализированных регуляризационных схем и многокомпонентной функции потерь. Для обеспечения стабильной конвергенции и эффективного управления высокой размерностью пространства параметров используется алгоритм AdamW (Loshchilov & Hutter, 2017). Его преимущество заключается в декупляции регуляризации L_2 (λW_t) от шага обновления, что обеспечивает более точный контроль над обобщающей способностью и снижает риск переобучения на ограниченных клинических выборках:

$$W_{t+1} = W_t - \eta_t \left(\frac{\widehat{m}_t}{\sqrt{\widehat{v}_t} + \epsilon} + \lambda W_t \right)$$

Управление скоростью обучения η_t осуществляется с помощью динамического планировщика с фазой Warmup, что стабилизирует градиенты на начальном этапе обучения и предотвращает катастрофическое забывание общих языковых компетенций. Для интеграции поведенческих и этических требований в процесс обучения используется композитная функция потерь, включающая два основных компонента:

1. Лингвистическая точность (L_{CE}). Стандартная кросс-энтропия для обеспечения связности и грамматической корректности:

$$L_{CE} = - \sum_{c=1}^C y_c \log(\widehat{y}_c)$$

2. Поведенческая оптимизация (L_{RLHF}). Для внедрения эмпатических и этических норм используется Обучение с подкреплением на основе обратной связи с человеком (RLHF). Этот процесс опирается на Модель Вознаграждения $r_{\phi}(x, y)$, обученную на человеческих предпочтениях, которая присваивает скалярную оценку терапевтической ценности ответа.

Для максимизации ожидаемого вознаграждения $E[r_{\phi}(x, y)]$ применяется алгоритм PPO (Proximal Policy Optimization). PPO, являясь методом градиента политики, вводит штрафной член для обеспечения стабильности и безопасности обновления политики. Функция потерь PPO ($L^{CLIP}(\theta)$) включает механизм ограничения, предотвращающий резкие, потенциально опасные сдвиги в генеративной политике π_{θ} :

$$L^{CLIP}(\theta) = E_t[\min(r_t(\theta)A_t, \text{clip}(r_t(\theta), 1 - \epsilon, 1 + \epsilon)A_t)] + \beta \cdot H(\pi_{\theta})$$

Ключевой элемент, $\text{clip}(\dots)$, ограничивает отношение вероятностей $r_t(\theta)$ в интервале $[1 - \epsilon, 1 + \epsilon]$, где $r_t(\theta) = \pi_{\theta}(y|x)/\pi_{\theta_{old}}(y|x)$. Это ограничение гарантирует, что оптимизация, нацеленная на максимизацию терапевтического вознаграждения, происходит только в безопасном радиусе от предыдущей, верифицированной политики, что критически важно для предотвращения генерации токсичных или неэтичных ответов.

Для борьбы с переобучением на ограниченных клинических выборках и повышения операционной эффективности применяется Parameter-Efficient Fine-Tuning (PEFT), в частности, метод LoRA (Low-Rank Adaptation). LoRA замораживает большинство исходных весов W и обучает только низкоранговые матрицы A и B , что значительно сокращает число обучаемых параметров, тем самым снижая дисперсию градиента:

$$W' = W + \Delta W$$

РЕЗУЛЬТАТЫ

Эффективность комбинированного применения этих математических методов подтверждается улучшенной конвергенцией и достижением специфических терапевтических метрик.

Модели, оптимизированные с помощью AdamW и динамического η -планировщика, демонстрируют суперлинейную начальную фазу конвергенции и меньшую дисперсию функции потерь по сравнению с традиционным SGD. Использование Layer Normalization дополнительно обеспечивает инвариантность обучения относительно малого размера мини-батча, типичного для чувствительных данных.

Применение LoRA показывает эквивалентное или превосходящее качество терапевтического вывода по сравнению с полным дообучением W , но при сокращении числа обучаемых параметров в 1000 раз. Это прямо подтверждает, что эффективное дообучение достигается адаптацией лишь низкоранговых подпространств весовых матриц, что критически важно для робастности модели.

Оптимизация с использованием L_{RLHF} и PPO приводит к статистически значимому сдвигу в поведенческих метриках. Модели демонстрируют снижение перплексии (лингвистическая когерентность) и одновременное увеличение баллов по шкалам эмпатии (например, CASS), подтверждая, что механизм PPO-clip успешно направляет градиентный путь к терапевтически целесообразным, но этически ограниченным ответам.

ЗАКЛЮЧЕНИЕ

Применение продвинутых математических методов оптимизации демонстрирует переход LLM от чисто лингвистических задач к многокритериальной и этически обусловленной генерации.

Выбор AdamW и алгоритма PPO является императивом для обеспечения как стабильности, так и безопасности. AdamW предоставляет необходимую адаптивность для обучения разреженных градиентов в глубоких слоях, а PPO вводит математическое ограничение пространства обновления политики, что является не просто техническим приемом, но и этическим механизмом контроля. Этот механизм гарантирует, что даже при максимизации вознаграждения модель не сможет совершить неконтролируемый "прыжок" в область нежелательных или опасных ответов.

PPO позволяет преобразовать субъективные человеческие предпочтения (эмпатия, безопасность) в объективную, дифференцируемую цель для оптимизации. Функция потерь PPO-clip эффективно балансирует между эксплуатацией (максимизация вознаграждения) и исследованием (поощрение разнообразия через энтропийный штраф $\beta \cdot H(\pi_\theta)$), что необходимо для генерации разнообразных, но при этом клинически безопасных терапевтических ответов. Дальнейшие исследования должны

быть сосредоточены на повышении интерпретируемости Модели Вознаграждения, чтобы обеспечить прозрачность процесса оптимизации.

Основное ограничение лежит в проблеме обобщения на out-of-distribution (OOD) данные, особенно в кризисных ситуациях. Текущие методы оптимизации могут не обеспечивать достаточной робастности в таких случаях. Будущие разработки должны включать методы, которые сознательно ищут широкие, плоские минимумы функции потерь (например, через SWA или методы второго порядка), поскольку такие минимумы коррелируют с лучшей обобщающей способностью. Применение REFT-методов должно быть расширено для обеспечения быстрой итерации терапевтических протоколов, что имеет прямое клиническое и операционное значение.

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ЎЗБЕКИСТОНДА ЕР РЕСУРСЛАРИДАН САМАРАЛИ ФОЙДАЛАНИШДА ХОРИЖ ТАЖРИБАСИНИНГ ЎРНИ ВА АҲАМИЯТИ

***Аннотация.** Ушбу мақолада Ўзбекистон қишлоқ хўжалиги ихтисослашуви ва мулкчилик шаклларида асосий ўринни эгаллаган фермер хўжаликлари ривожланиши, ер ресурсларидан фойдаланишда хориж тажрибаларидан фойдаланиш таҳлил қилинган. Шунингдек, ер ресурсларининг фермер хўжаликлари ўртасида тақсимланишига таъсир кўрсатувчи табиий, демографик, иқтисодий омиллар ҳам тадқиқ этилган.*

***Калим сўзлар:** Қишлоқ хўжалиги, фермер хўжалиги, ер ресурси, ер ислоҳоти, ихтисослашув.*

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FEATURES OF USING FOREIGN EXPERIENCE IN LAND RESOURCES USE IN UZBEKISTAN

***Abstract.** The article analyzes the development of farms occupying a leading place in the specialization and forms of ownership of agriculture in Uzbekistan, the use of foreign experience in the use of land resources, and studies natural, demographic and economic factors influencing the distribution of land resources between farms.*

***Key words:** Agriculture, farming, land resources, land reform, specialization.*

Ер ресурси бу – ер фондининг таркибий қисми бўлиб, у ўзига хос тупроқ сифати, иқлим, рельеф, гидрогеологик хусусиятлари билан тавсифланади, жамиятнинг муайян ривожланиш босқичида ундан асосан зарур маҳсулотлар етиштиришда ва бошқа мақсадларда фойдаланилади. Бу таърифдан келиб чиқиб таъкидлаш лозимки, ер кўп функцияли ҳисобланиб, бир вақтнинг ўзида қишлоқ хўжалиги ишлаб чиқаришида асосий меҳнат воситаси ва предмети бўлиши билан бир қаторда аҳоли, саноат, уй-жой фонди, рекреация зоналари ва бошқаларни ҳудудий ташкил этишда етакчи саналади [9].

Ўзбекистонда фермер хўжаликларини ташкил этиш ва уни ривожлантириш борасида ислохотлар дастлаб Ўзбекистон Республикаси Президентининг 1991 йил 29 декабрдаги “Дехқон (фермер) хўжаликларини янада мустаҳкамлаш ва республикада ишбилармонлик фаолиятини давлат йўли билан қўллаб-қувватлаш тўғрисида”ги Фармони ва Ўзбекистон Республикаси Вазирлар Маҳкамасининг 1991 йил 30 декабрдаги 315-сонли “Республикада деҳқон (фермер) хўжаликларини янада ривожлантириш ва мустаҳкамлаш чоралари ҳақида”ги қарори ишлаб чиқиши билан бошланди. Ўтган давр мобайнида фермер хўжаликлари тўлиқ шаклланди ва ривожланиб бормоқда. Мамлакатимизда бу борада муайян даражада тажриба орттирилди. Бироқ, таъкидлаш жоизки, аксарият хорижий давлатларда фермер хўжаликлари ташкил этилганига бир асрдан ортиқ вақт бўлган ва уларда бу соҳада бой тажриба тўпланган. Мазкур давлатлар тажрибаларидан республикамиз фермерлик ҳаракатини янада ривожлантиришда қўллаш, уларни хўжалик юритиш фаолиятларига тадбиқ этиш муҳим илмий-амалий аҳамият касб этади.

Жумладан, Америка Қўшма Штатларида фермер хўжалиги ривожлаганлигининг асосий хусусияти юқори даражада ихтисослашганлиги ва механизациялашганлиги ҳисобланади. Шу боис, бундай хўжаликларда, одатда, фермер ва унинг оиласи, баъзан бир-иккита қўшимча ёлланма ишчи меҳнат қилади. Табиий шароитига боғлиқ ҳолда фермер хўжаликлари сони штатлар даражасида турлича тақсимланган. Хусусан, энг кўп фермерлар Техас, Миссури, Айова штатларида фаолият олиб борса, айни вақтда, шимоли-шарқда жойлашган Коннектикут ва Делаверда уларнинг сони нисбатан кам.

АҚШ статистикасида маҳсулотини бир йилда 1000 доллардан ортиққа сотган фермер хўжаликлари ҳисобга олинади, 250 минг доллардан кўп маҳсулот реализация қилганлари йирик, ундан кам бўлса кичик хўжалик сифатида қайд этилади. Жами фермер хўжаликлари маҳсулотларини 80,0 фоизи йирик хўжаликларда ишлаб чиқарилади [2]. Хўжаликлар катта бўлса ҳам, кичик бўлса ҳам асосан битта оила фаолият олиб боради. 1950 йилга қараганда АҚШ фермер хўжаликларининг ўртача ҳажми 2,1 мартага ошган, яъни 87,0 гектардан 187,0 гектарга етган ва бу жараён кейинги йилларда ҳам давом этмоқда. Хўжаликларнинг асосий қисми 20 гектаргача (30 %) ва 70-200 гектар оралиғида (25 %) шакллانган. Демак бу мамлакатда йирик хўжаликлар билан биргаликда кичик хўжаликлар ҳам самарали фаолият олиб боришмоқда.

АҚШда сўнгги йилларда ерларни ижарага олиш кенг тарқалмоқда. Ижарачи сифатида асосан фермерлар хизмат қилади. Аммо, баъзи штатларда ижарачи шаҳарда яшовчи, қишлоқ хўжалиги соҳасидан мутлақо хабари йўқ кишилар ҳам бўлиши мумкин. Ижарага 15 гектардан 35 гектаргача ер берилади. Бир гектар лалми ерлар нархи 180, суғориладиган ерлар 350, яйловлар эса 23 доллар атрофида. Айтиб ўтиш жоизки, мамлакатда жами

меҳнатга яроқли аҳолининг 2,5 фоизи қишлоқ хўжалиги ишлаб чиқаришида банд [1].

Японияда Иккинчи жаҳон уришидан сўнг ер ислохотлари қайта кўриб чиқилди. Йирик монопол бирлашмалар тарқатилиб, уларнинг ерлари кичик мулкдорлар – фермерларга бўлиб берилди. Бундай ерлар 1946 йилда қабул қилинган “Ер ислохотлари тўғрисида” ги қонунига мувофиқ, монопол бирлашмаларнинг қайта пайдо бўлмаслиги мақсадида чекланган. Бинобарин, бугунги кунда Японияда мавжуд фермер хўжаликларининг 2/3 қисмидан ортиғи бир гектаргача бўлган ерларда фаолият олиб боради. Фақатгина 1,7 фоиз фермерлар ихтиёрида 5,0 га ва ундан ортиқ ер (Хокайдо оролида) мавжуд. Ҳозирги вақтда Японияда жами 4,3 млн. дан ортиқ фермер хўжаликларининг тахминан 15 фоизи ушбу тармоқдан оладиган даромад ҳисобига ҳаёт кечиради [7].

Чунки, ер майдонларининг бундай кичик эканлиги фермерларни қишлоқ хўжалиги маҳсулотларини етиштириш билан бирга бошқа соҳаларда ҳам банд бўлишига олиб келган. Японияда чорвачиликка ихтисослашган бир фермер хўжалигига ўртача 32 бош чорва ҳайвони тўғри келади ва улар асосан молхоналарда парвариш қилинади. Бу мамлакат фермерлари ер майдонлари кичик бўлганлиги боис ёлланма ишчилар меҳнатидан фойдаланишмайди. Таъкидлаш лозимки, Японияда 200 йиллик тажрибага эга бўлган беданачилик фермер хўжаликлари ҳам мавжуд [5].

Австралия иқтисодиётида ҳам қишлоқ хўжалиги катта аҳамиятга эга. 2012 йил 1 январь ҳолатига ушбу мамлакатда 136 минг фермер рўйхатга олинган. Улар мамлакат ер майдонини 60 фоизини эгаллайди. Бу ерда ҳам фермер хўжаликларининг сони қисқариб, ўртача ер майдони ортиб бормоқда. Чорвачиликда асосан қўй ва йирик шохли қорамоллар боқилса, деҳқончиликда ғалла ва мева асосий экин тури ҳисобланади. Бир фермер хўжалигига ўртача 17 бош йирик шохли қорамол парвариш қилиниб, шундан 7 таси соғин сигирлардир. Мамлакатда фермерлари кўпроқ гўштга ихтисослашганлиги билан ажралиб туради [3].

Европа мамлакатларида фермер хўжаликларининг майдони 10 гектардан 60 гектаргача, бир хўжаликда боқиладиган йирик шохли қорамоллар 30-300 бош, чўчқалар 50 бошдан 100 бошгача фарқланади. Бундай ҳудудий тафовутларнинг юзага келишига жойларнинг ем-хашак базаси таъсир этган. Уларда фермер хўжаликларининг ўртача ермайдони 13,9 гектар бўлиб, айти вақтда, мамлакатлар бўйича бу кўрсаткич бир-биридан фарқ қилади. Масалан, Британия фермер хўжалигининг ўртача ер ҳажми 80,4 гектарни, Данияда 30,7, Францияда 29,0, Ирландияда 22,7, Германияда 18,0, Голландияда 14,9, Белгияда 14,1, Италияда 10,8, Грецияда 4,3 гектарга тенг. Кейинги ўринларда Скандинавия давлатлари туради, уларнинг фермерлари нисбатан кичик-кичик ерлардан фойдаланади [4].

Бугунги кунда мамлакатимизда фермер хўжаликлари ер майдонларини белгилашда (оптималлаштиришда) қатор мунозарали ҳолатлар юзага келмоқда. Бу соҳада ҳам хорижий, шу жумладан, МДХ давлатлари

тажрибасини ўрганиш муҳим аҳамият касб этади. Ушбу мамлакатларда фермер хўжаликларининг ер майдонлари 1 гектардан (Арманистон) 50 гектаргача (Украина, Белоруссия, Россия) ўзгаради. Бинобарин, Россия “Дехқон (фермер) хўжаликлари тўғрисида”ги Федерал қонунига мувофиқ, бундай хўжаликлар алоҳида оила, бир неча оилалар гуруҳи ва оиладан ташқаридагилар билан биргаликда ҳам ташкил этилади ва давлат томонидан қўллаб-қувватланади. Ушбу давлат аграр иқтисодиётида бугунги кунда мазкур мулкчилик шаклининг аҳамияти ортиб бормоқда. Хусусан, сўнгги 15 йил ичида уларнинг сони 5 мартага кўпайган. Айниқса, бу кўрсаткич чорвачиликда жуда тез ўсиб борган [6].

Ўрганишлар шуни кўрсатадики, АҚШ, Канада, Швеция, Дания, Япония каби мамлакатларнинг қишлоқ хўжалиги маҳсулотларини асосан оилавий фермер хўжаликлари яратади. Дунё бўйича фермер хўжаликлари ер майдонларини мақбуллаштириш, энг самарали ҳажмини белгилаш бўйича кўплаб олимлар томонидан тадқиқот олиб борилган бўлса-да, бироқ, бу борада бир фикрга келинмаган [8]. Бу хўжаликларнинг катта-кичиклиги жойларнинг табиий шароити, демографик ҳолати ва иқтисодий вазияти билан изоҳланади.

Тадқиқотлар кўрсатишича, аксарият хорижий мамлакатларда фермер хўжаликлари тараққиёти асосан қуйидаги омилларга боғлиқ:

- фермер хўжаликларининг давлат томонидан қўллаб-қувватлаш механизмини самарали ташкил этиш;

- фермер хўжаликлари билан боғлиқ ҳуқуқий-меъёрий асосларни такомиллаштириш;

- фермерларни қишлоқ хўжалиги техникалари билан таъминлаш ва эскирганларини янгилаб бориш;

- фермерларга ажратилаётган кредит ставкаларини пасайтириш ва имтиёзли солиқ тизимини жорий этиш;

- хборот, хизмат кўрсатиш ва қайта ишлаш соҳаларини янада ривожлантириш.

Таҳлиллардан кўриниб турибдики, кооперативлар фермер хўжаликлари фаолиятини ривожлантириш, уни самарадорлигини ошириш, натижада, қишлоқ хўжалиги маҳсулотлари ишлаб чиқариш ҳажмини кўпайтиришда муҳим аҳамият касб этади. Шундай экан, мамлакатимизда ҳам бундай бирлашмаларни йўлга қўйиш, фермерларга кооперациянинг афзаллигини тушунтириш, уларни ихтиёрий бирлашишини таъминлаш мақсадга мувофиқ. Умуман олганда, фермер хўжаликларини ташкил этиш, ихтисослаштириш, ривожлантириш ва бошқариш борасида бозор иқтисодиётига асосланган ривожланган давлатларда шаклланган бой тажрибаларни комплекс таҳлил қилиш, ўрганиш ва умумлаштирган ҳолда республикамиз фермер хўжаликларини тараққий этиши учун илмий таклиф

ва тавсиялар ишлаб чиқиш ҳамда уларни амалиётга тадбиқ этиш ушбу соҳани самарадорлигини янада оширади.

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БИОЭКОЛОГИЯ И ТЕХНОЛОГИЯ ВЫРАЩИВАНИЯ МАРЕНЫ КРАСИЛЬНОЙ (*RUBIA TINCTORUM* L.)

Аннотация: Статья посвящена марене красильной (*Rubia tinctorum* L.) — многолетнему травянистому растению, источнику натуральных красителей. Приводятся результаты изучения биоэкологических особенностей и технологии выращивания марены на слабосолончаковых почвах. Показано, что растение быстро адаптируется к жаркому климату и среднесоленным почвам, обеспечивает высокую всхожесть и формирование корневищ с высоким содержанием красящих веществ.

Ключевые слова: биоэкология, слабозасоленные почвы, выращивание, урожайность, фенология, южные регионы.

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BIOECOLOGY AND CULTIVATION TECHNOLOGY OF MADDER (*RUBIA TINCTORUM* L.)

Abstract: This article is devoted to madder (*Rubia tinctorum* L.), a perennial herbaceous plant and a source of natural dyes. The article presents the results of a study of the bioecological characteristics and cultivation technology of madder in slightly saline soils. It is shown that the plant quickly adapts to hot climates and moderately saline soils, ensuring high germination and the formation of rhizomes with a high dye content.

Key words: bioecology, slightly saline soils, cultivation, yield, phenology, southern regions.

Введение

Марена красильная (*Rubia tinctorum* L.) — многолетнее растение семейства мареновых, ценное как источник натурального красителя, применяемого в промышленности. В последние годы интерес к её

выращиванию возрастает из-за спроса на экологически чистые и устойчивые красители. Биоэкологические особенности растения включают морфологию, физиологию, фенологию, адаптацию к почвенно-климатическим условиям и засухоустойчивость. Эти факторы определяют продуктивность и качество сырья. Цель исследования — комплексная оценка биоэкологии марены и разработка технологии её выращивания в условиях Каракалпакстана (Тахтакупырский район).

Материалы и методы

Экспериментальные работы проводились в 2025 году в Тахтакупырском районе. Перед посевом почва была подготовлена с внесением органического удобрения (навоза) и тщательным рыхлением, что обеспечивало оптимальные условия для прорастания семян. Семена марены высевались на глубину 2–3 см в начале мая, с междурядьями 60 см, что позволяло оценить адаптацию растения к плотности посадки и доступу к питательным веществам. В течение всего вегетационного периода растения регулярно поливались речной водой дважды в неделю, что удовлетворяло потребность культуры в увлажнении при жарке и сухом климате региона. Почвенный состав участка представлял собой слабосолончаковые (среднезасоленные) песчаные почвы, что позволило оценить возможность выращивания марены на слабозасоленных почвах и её адаптационный потенциал. Для мониторинга роста и развития растений применялся комплекс методов, включающий регулярное измерение высоты стеблей, состояния листовой поверхности, площади листовой поверхности, фенологических стадий (цветение, плодоношение, созревание семян), а также развитие корневой системы. Биоэкологическая оценка включала изучение особенностей растений, их адаптации к высоким температурам и слабозасоленным почвам, а также анализ продуктивности и качества сырья. Проведён химический и статистический анализ, позволивший оценить влияние агротехнических факторов на продуктивность.

Результаты и обсуждение

Наблюдения показали, что семена марены красильной успешно адаптировались к слабозасоленной почве Тахтакупырского района. Первые всходы появились через 8 дней после посева, что свидетельствует о высокой всхожести и адаптационной способности растения в условиях жаркого климата и слабозасоленной почвы. Фенологические наблюдения показали последовательность стадий развития: первые цветы появились 18 июля, плоды первоначально были зелёными, затем приобретали красноватый оттенок и к сентябрю становились полностью чёрными. Созревание семян завершилось 20 сентября, что позволило оценить продолжительность вегетационного периода и оптимальные сроки сбора урожая (Рис.1.).



Рис. 1 Изучение роста и развития марены красильной в опытных условиях

Морфологические показатели демонстрировали высокую адаптивность марены к экстремальным условиям: высота наиболее развитых стеблей достигла 70 см, листья оставались зелёными до конца вегетации, несмотря на высокие температуры июля и августа. Эти наблюдения подтверждают термо- и засухоустойчивость растения, а также его способность сохранять фотосинтетическую активность и формировать биомассу в условиях слабосолончаковой почвы.

В первый год эксперимента количество семян было ограниченным, однако их качество оценивалось как высокое, что указывает на способность растения формировать полноценное репродуктивное поколение даже в неблагоприятных условиях. Урожайность сухих корневищ варьировала от 2,5 до 4,8 т/га, что свидетельствует о значительном влиянии схемы посадки и ухода на продуктивность.

Полученные данные подтверждают высокую адаптивную способность марены красильной к южным почвенно-климатическим условиям, включая слабосолончаковые песчаные почвы и высокие летние температуры. Продуктивность растения и качество корней зависят от комплексного сочетания факторов: структуры почвы, режима увлажнения, освещённости и плотности посадки. Разработка технологии выращивания марены должна учитывать биоэкологические особенности растения, включая потребность в питательных веществах, водный режим, температурный диапазон и световой режим. Регулярное рыхление, оптимальная влажность и правильная схема посадки способствуют развитию корневой системы и повышению содержания активных веществ, увеличивая ценность сырья. Напротив, уплотнение почвы, нерегулярный полив и недостаточный уход снижают продуктивность и устойчивость растений, что подчёркивает важность комплексного агротехнического подхода.

Заключение

Марена красильная (*Rubia tinctorum* L.) является перспективной культурой для производства натурального красителя. Её биоэкологические

характеристики — засухоустойчивость, адаптация к слабозасоленным почвам и способность накапливать полезных активных веществ в корнях — позволяют эффективно использовать растение в южных агроэкосистемах. Оптимальная технология выращивания включает посадку с междурядьями 40–60 см, регулярное рыхление и контроль влажности, а также сбор двухлетних корней. Комплексное соблюдение биоэкологических и агротехнических условий позволяет повысить урожайность и содержание активного вещества, обеспечивая стабильное производство высококачественного сырья для промышленного применения.

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МЕРЫ ПО ПОВЫШЕНИЮ ПРОДУКТИВНОСТИ ПРЕДГОРНЫХ ПАСТБИЩ И ИХ ЭКОНОМИЧЕСКОЕ ЗНАЧЕНИЕ

***Аннотация:** В статье рассматриваются вопросы повышения продуктивности и обогащения биоразнообразия растительности путем фитомелиорации с использованием перспективных кормовых пастбищных растений с целью улучшения состояния деградированных естественных пастбищ. Изучение условий предгорных территорий, обоснование мер по повышению продуктивности пастбищ, оценка их экономического значения, а также обеспечение их долгосрочного и эффективного использования.*

***Ключевые слова:** природные пастбища, искусственные пастбища, пастбищный кризис, кормовые растения, фитомелиорация, урожайность, эффективность.*

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MEASURES TO INCREASE THE PRODUCTIVITY OF FOOTHILL PASTURES AND THEIR ECONOMIC SIGNIFICANCE

Abstract: *This article examines the issues of increasing the productivity and enriching the biodiversity of vegetation through phytomelioration using promising forage pasture plants to improve the condition of degraded natural pastures. This article examines the conditions of foothill areas, justifies measures to increase pasture productivity, assesses their economic value, and ensures their long-term and effective use.*

Key words: *natural pastures, artificial pastures, pasture crisis, forage plants, phytomelioration, productivity, efficiency.*

Актуальность темы

Основная часть территорий, используемых в животноводстве в нашей республике, представлена естественными пастбищами, расположенными преимущественно в засушливых регионах. Годовое количество атмосферных осадков в этих районах (степь, адыр) крайне низкое и составляет 160–250 мм. Суточные, сезонные и годовые колебания температуры воздуха характеризуются высокой изменчивостью. Почвы подвержены разрушению, засолению, а также в различной степени деградации. Несмотря на то, что естественные пастбища являются недорогими, удобными и пригодными для круглогодичного использования, их кормовые ресурсы крайне ограничены (1,5–3,5 ц/га) и значительно варьируют в течение года. Еще одной характерной особенностью естественных пастбищ является резкое снижение показателей насыщенности питательными веществами от весны к зимнему периоду.

Кроме того, в результате несоблюдения требований рационального использования пастбищ (неустойчивое использование кустарников и

полукустарников для хозяйственных нужд, проведение геологоразведочных работ, освоение минеральных ресурсов, чрезмерный выпас скота и др.) высокопитательные виды вытесняются, что приводит к кризисному состоянию пастбищ. Улучшение состояния естественных пастбищ, их рациональное использование, а также внедрение мероприятий по повышению их продуктивности относятся к числу наиболее актуальных агробиологических проблем.

Источники и методы исследования

В качестве объекта исследования были выбраны светло-серые почвы предгорий Нураты, пастбища эфемерно-эфемероидного типа, а также полукустарники (щавель, изен, терескен, чагон) и многолетние травы (астрагал, еркак ут) — перспективные кормовые растения пустынной зоны. Запланированные полевые эксперименты проводились на основе биометрических измерений с целью определения урожайности растений с использованием общепринятых методов ботаники и сельского хозяйства.

Результаты исследования и их анализ

Исследования показали, что предгорья Нураты характеризуются более высокой продуктивностью. Продуктивность естественных пастбищ определялась с использованием «полевого» и «трансектного» методов и измерялась с помощью взвешивания.

Для определения урожайности образцы отбирались в 10 точках пастбища, после чего рассчитывалась средняя урожайность с переводом на гектар (ц/га). Трансект представлял собой прямоугольный участок, закреплённый по четырём углам металлическими кольшками и натянутыми шнурами; в данном исследовании его размеры составляли 50 м в длину и 2 м в ширину. В пределах трансекта определялось количество полукустарников и видов с крупными стеблями. По каждому виду отбирались модельные образцы (крупные, средние, мелкие) в трёх повторностях, после чего они взвешивались в свежем и высушенном состоянии. Рассчитывалась средняя масса растений по каждому виду, затем суммарная масса всех видов пересчитывалась на гектар, и общая урожайность определялась с учётом переходных (сопутствующих) видов. Для проведения исследований на опытном участке «Нурата» были отобраны засухоустойчивые, высокоурожайные полукустарники (изен, терескен, чогон,) и многолетние травы (астрагал, еркак ут). На их основе были созданы искусственные пастбища с использованием перспективных фитомелиорантов, а их экономические показатели изучены и сопоставлены с естественными пастбищами. Известно, что период наибольшей урожайности и интенсивного роста кормовых пастбищных растений приходится на третий год их вегетации, тогда как рост, развитие и продуктивность растений в последующие годы во многом зависят от погодных условий. Средняя урожайность может варьировать в сторону увеличения или снижения. В связи с этим в данном исследовании урожайность естественных пастбищ

была сопоставлена с урожайностью искусственно созданной растительности на третьем году вегетации пастбищ.

Таблица 1.

Экономические характеристики кормовых пастбищных растений.
Вегетация – 3 (2025 г.). Опытное поле «Нурата»

No	Виды растений	Количество растений (тыс. шт./га), доля (%).	Высота растений, см.	Урожай сена, ц/га.	Урожай сена естественных пастбищ, ц/га.
1.	Изен	17,5±0,8	91,5±3,8	16,7±0,7	
		86,7			
2.	Терескен	15,2±0,6	81,3±3,6	14,9±0,5	
		78,3			
3.	Чогон	14,3±0,7	84,7±4,0	15,3±0,6	
		75,6			
4.	Сорные растения	14,8±0,5	72,4±3,1	13,7±0,4	
		72,8			
5.	Астрагал	16,9±0,7	86,5±3,2	15,1±0,6	
		82,4			
6 .	еркак ут	19,8±0,9	62,7±2,5	10,3±0,3	
		69,6			
Продуктивность (средняя):		14,3 ц/га; урожай сена искусственных пастбищ.		2,8 ц/га урожай сена естественных пастбищ.	

Данные из таблицы показывают, что показатели выживаемости (69,6–86,7 %), роста (62,7–91,5 см) и продуктивности (10,3–16 ц/га) пастбищных кормовых растений существенно различаются. Продуктивность искусственно созданных пастбищ с высоким уровнем урожайности составила в среднем 14,3 ц/га по видам растений, что в 5 раз превышает урожайность естественных пастбищ (2,8 ц/га). Фитомелиорация естественных пастбищ с использованием перспективных видов кормовых растений позволяет достигать высокой эффективности. Известно, что годовая потребность одного барана каракульской породы в корме составляет 9 ц сена или 425 кормовых единиц. В 2025 году урожайность естественных пастбищ предгорий Нураты составила 2,8 ц/га, что требует 3,2 га пастбища для прокорма одной головы барана каракульской породы. Урожайность

искусственных пастбищ, созданных из перспективных сортов кормовых растений, составляет 14,3 ц/га, что достаточно для прокорма 0,63 га пастбища на одну голову барана.

В настоящее время цена 1 ц сена составляет 17 000 сумов. В 2025 году урожайность естественных пастбищ Нураты 2,8 ц/га, доход с него составит 1 196 000 сумов. Урожайность искусственных пастбищ 14,3 ц/га, доход с них составит 16 001 000 сумов. Расходы на создание искусственных пастбищ (покупка семян, пахота, посев) производятся однократно и окупаются уже на второй год вегетации растений. Кроме того, искусственные пастбища сохраняют стабильно высокую продуктивность в течение 25–30 лет, обеспечивая предприятия гарантированным кормом.

Таблица 2.
Экономическая эффективность искусственных пастбищ

№	Показатели	Естественные пастбища	Искусственные пастбища
1.	Площадь пастбищ, га	1	1
2.	Урожай сена на 3-й год вегетации, ц/га.	2,8	14,3
3.	Плотность посадки для баранов каракульской породы, голова/га.	3,2	0,63
4.	Общая стоимость продукции, тыс. сумов.	1 196,0	160 00,00
5.	Расходы на пастбища, тыс. сумов.		590,0
6.	Чистый доход от пастбищ, тыс. сумов		411
7.	Рентабельность, %.		69,6

Рентабельность чистого дохода = 69,6 %

Выводы

Определение продуктивности естественных пастбищ имеет среднюю значимость при оценке процессов выпаса и расчете кормовой ёмкости пастбищ для скота. Фитомелиорация пастбищ с использованием перспективных видов кормовых растений является гарантированной мерой, которая позволит восстановить растительный покров естественных пастбищ, обогатить их состав новыми растениями с ценными питательными свойствами и повысить продуктивность.

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СОДЕРЖАНИЕ ИЗУЧЕНИЯ НЕМЕЦКОГО ЯЗЫКА КАК ВТОРОГО ЯЗЫКА

***Аннотация:** В данной статье рассматриваются ключевые аспекты изучения немецкого языка как второго иностранного с использованием качественных методов исследования и, в частности, сравнительного анализа. Задача преподавателя немецкого языка состоит в том, чтобы использовать имеющиеся у студентов знания английского языка для облегчения процесса обучения, поскольку немецкий язык легче освоить, когда уже есть прочная база в родном языке. Хотя преподавание немецкого языка как второго иностранного сопряжено с определенными трудностями, их можно преодолеть с помощью эффективных методических подходов.*

***Ключевые слова:** Немецкий язык, обучение, принципы, второй иностранный язык, интерференция, межкультурная коммуникативная компетенция, слово, значение.*

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CONTENTS OF STUDYING GERMAN AS A SECOND LANGUAGE

***Abstract:** This article examines key aspects of learning German as a second language using qualitative research methods, particularly comparative analysis. The task of the German teacher is to utilize students' existing knowledge of English to facilitate the learning process, as German is easier to acquire when a strong foundation in one's native language is already established. Although teaching German as a second language presents certain challenges, they can be overcome with effective methodological approaches.*

***Key words:** German language, learning, principles, second foreign language, interference, intercultural communicative competence, word, meaning.*

Преподавание немецкого языка в высших учебных заведениях может быть не только проще для изучающих иностранный язык, но и вызывать некоторые трудности из-за различий в языковых системах немецкого языка. Цель данного исследования — определить и систематизировать принципы

преподавания немецкого языка как второго языка в контексте глобализации и растущего спроса на знание иностранного языка в современном обществе.

В данном исследовании мы анализируем особенности изучения немецкого языка как второго языка после английского.

Есть много причин для изучения немецкого языка. Во-первых, Германия является одним из лидеров в области образования и исследований. Высшее образование в немецких университетах часто бесплатное или доступное для иностранных студентов. Многие студенты предпочитают продолжить обучение в немецких высших учебных заведениях. Во-вторых, многие международные компании сотрудничают с немецкими фирмами или имеют свои штаб-квартиры в Германии. Знание немецкого языка может стать ключом к высокооплачиваемой работе. В-третьих, экономическая мощь Германии является важным фактором привлекательности немецкого языка. Германия — крупнейшая экономика Европы и одна из ведущих экономик мира. Знание немецкого языка помогает вести бизнес и устанавливать международные связи. Одна из веских причин для изучения немецкого языка — это возможности для путешествий и культурного обмена. Знание языка помогает лучше понимать культуру и традиции страны. Также стоит отметить, что знание немецкого языка обеспечивает дополнительный доступ к информации. Немецкий — один из наиболее широко используемых языков в научных публикациях, технической документации и литературе. Многие первоисточники по философии, медицине и технике написаны на немецком языке.

Содержание преподавания немецкого языка как второго включает в себя ряд взаимосвязанных и взаимозависимых компонентов. Предметный аспект охватывает типичные для учащихся сферы общения: повседневную жизнь, социально-культурную, академическую и профессиональную. В каждой из этих областей выделяются темы и подтемы, относящиеся к повседневной жизни, а также актуальные социально-политические вопросы, история и культура страны обучения. Образовательный процесс основан на концентрическом подходе, который предполагает многократное изучение тем на каждом этапе обучения с постепенным углублением и расширением рассматриваемых вопросов.

При изучении немецкого языка с родного языка необходимо опираться на принципы, используемые при обучении иностранному языку. Хотя эти принципы имеют определенные сходства, они все же отличаются, когда речь идет о втором иностранном языке, особенно если учитывать специфику учебной среды. Например, изучение двух (чаще родственных) иностранных языков, наличие некоторого опыта изучения иностранного языка.

Проанализировав подходы современных ученых к преподаванию немецкого языка после английского, мы можем выделить следующие принципы, которые каждый преподаватель должен учитывать в своей преподавательской деятельности:

1. Коммуникативно-познавательный подход. Коммуникативная ориентация преподавания иностранного языка определяет общий методологический подход. Поскольку студенты уже имеют опыт изучения английского языка, процесс изучения немецкого языка проходит более осознанно и легко. Они могут сравнивать языковые явления английского и немецкого языков, а также особенности организации учебного процесса.

2. Ориентация на личностное развитие ученика. Учебный процесс должен быть направлен на личностное развитие и самостоятельность, а также учитывать потребности и интересы учащихся. Благодаря предыдущему опыту изучения иностранного языка, подход к изучению немецкого языка становится более осознанным. Это позволяет дифференцировать обучение: для одних учащихся – создавать условия для быстрого прогресса, для других – предоставлять возможности для повторения и тренировки. Если преподаватель недостаточно свободно владеет родным языком, он может передать инициативу учащимся, поощряя их сравнивать особенности обоих языков и используя принцип взаимного обучения. Это можно сделать в форме игры, что повышает мотивацию и вовлеченность учащихся.

3. Обучение на основе деятельности. Как и в случае с английским языком, акцент должен делаться на активном использовании языка в коммуникативных ситуациях. Овладение языковыми средствами должно сопровождаться овладением речевыми действиями, направленными на решение реальных коммуникативных задач. Важную роль в этом процессе играют проектные мероприятия, такие как создание коллажей, стенгазет и т. д., которые требуют обсуждения на иностранном языке и презентации результатов другим учащимся. Один из наиболее эффективных методов — вовлечение студентов в проектную работу.

4. Взаимосвязь всех видов устной деятельности. Все четыре аспекта языковой деятельности – аудирование, говорение, чтение и письмо – развиваются во взаимодействии. Специфика изучения второго иностранного языка заключается в том, что на начальных этапах чтению уделяется меньше времени, чем при изучении первого иностранного языка, поскольку учащиеся уже знакомы с латинским алфавитом и обладают навыками работы с иностранными текстами. Однако может возникнуть интерференция с английским языком, которую следует учитывать в процессе обучения [1].

5. Принцип экономии в обучении. Поскольку учащиеся уже знакомы с латинским алфавитом, знакомство с немецким письмом можно свести к объяснению произношения и звуковых соотношений. Благодаря английскому языку у них также есть определенный словарный запас (интернационализмы, похожие слова), что способствует более быстрому усвоению лексики и чтению [2].

6. В современном глобализированном мире невозможно избежать интерференции английского языка, особенно учитывая тесную связь английского и немецкого языков. Эффективными методами предотвращения

интерференции английского языка при обучении немецкому языку являются использование сравнительных упражнений; Использование немецкого языка для обучения и общения в классе; выделение типичных ложных родственных слов или структур, которые часто вызывают путаницу; использование реальных жизненных ситуаций и заданий (диалоги, ролевые игры, эссе), где английский язык не требуется; поощрение самокоррекции и исправления ошибок, возникающих из-за влияния английского языка, со стороны сверстников.

Знание немецкого языка открывает огромные возможности для личностного и профессионального развития. Это полезный инструмент для учебы, карьеры, путешествий и общения. Изучение немецкого языка дает людям конкурентное преимущество во все более глобализированном мире.

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ОЦЕНКА ТRENDA РАЗВИТИЯ ОБЪЕМОВ ПРОДАЖ КОМПАНИИ HUAWEI

Аннотация. *Перенос сложившихся тенденций в будущее требует использования адекватных исходных данных и соответствующих инструментов. Среднегодовые приросты, а также регрессионный анализ только линейной зависимости для экстраполяции в современных условиях не достаточен. Методы исследования: динамические ряды, регрессионный анализ, временной тренд. Результаты свидетельствуют: для описания генеральной тенденции развития продаж компании Huawei в 2015-25 гг. лучше других подходит логарифмическая функция. Получено соответствующее уравнение регрессии, которое может быть использовано для прогнозирования выручки компании на предстоящие периоды, методом экстраполяции.*

Ключевые слова: *объем продаж, временной тренд, прогнозирование, экстраполяция, компания Huawei.*

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HUAWEI'S SALES DEVELOPMENT TRENDS ASSESSMENT

Abstract. *Transferring existing trends into the future requires the use of adequate source data and tools. Regression analysis of a linear relationship alone is insufficient for extrapolation in today's conditions. Research methods: dynamic series, regression analysis, and time trend. The results indicate that the logarithmic function is best suited to describe the general trend in Huawei's sales development in 2015-2025. A corresponding regression equation was obtained, which can be used to forecast the company's revenue for future periods using extrapolation.*

Keywords: *sales indicators, general trend, forecasting, extrapolation, Huawei.*

Многие современные, в том числе крупные технологические, компании практикуют прогнозирование объемных показателей несколькими методами одновременно, получая диапазон возможных значений. При этом простейшая экстраполяция тенденций на основе среднегодовых приростов не всегда позволяет получить наиболее вероятные значения доходов и прибыли.

Отдельные исследователи рекомендуют использовать для этих целей результаты сравнения нескольких трендов, таких как линейный, степенной, и др. Так, А.С. Семернева, Т.А. Тарабарина исследовали возможности метода экстраполяции выручки, на базе изучения сложившихся устойчивых тенденций, и переносе их в будущее. Авторы справедливо отмечают, что анализируемый процесс при этом должен быть устойчиво динамическим, и обладать инерционностью [2].

А.С. Косинов, Е.А. Дегтярева рассмотрели различия показателей среднегодового абсолютного прироста, линейного, полиномиального и степенного трендов для прогнозирования финансовых показателей одной из российских технологических компаний [1].

В данной статье нами предпринята попытка оценки тренда развития объемов продаж крупной китайской технологической компании Huawei.

Несмотря на санкции недружественных государств, компания Huawei в 2025 г. продемонстрировала прирост доходов. Ее выручка за весь год составила 881 миллиардов юаней (или 127 миллиардов долларов США), став второй по величине в истории компании, после предыдущего «пика» 2020 года (891 миллиард юаней). Выручка за весь 2025 год увеличилась на 2,2%, а за первое полугодие – на четыре процента (год к году). Второе полугодие оказалось сложнее по наращиванию доходов [3].

Показательно, что Huawei вернула себе первое место на китайском рынке смартфонов (с долей 16,4%), опередив Apple (16,2% рынка). Но прибыль в 2025 г. снизилась на треть – это негативный для инвесторов и менеджмента компании факт. В ходе анализа установлена одна из причин снижения финансовых результатов – высокие и растущие расходы на НИОКР (97 миллиардов юаней, 22,7% к выручке). Прирост этих расходов составил 9% (год к году), в том числе на цели разработки чипов, автомобилей, приложений искусственного интеллекта.

Нами предпринята попытка оценки тенденций роста выручки компании в 2015-25 гг. (рис. 1).

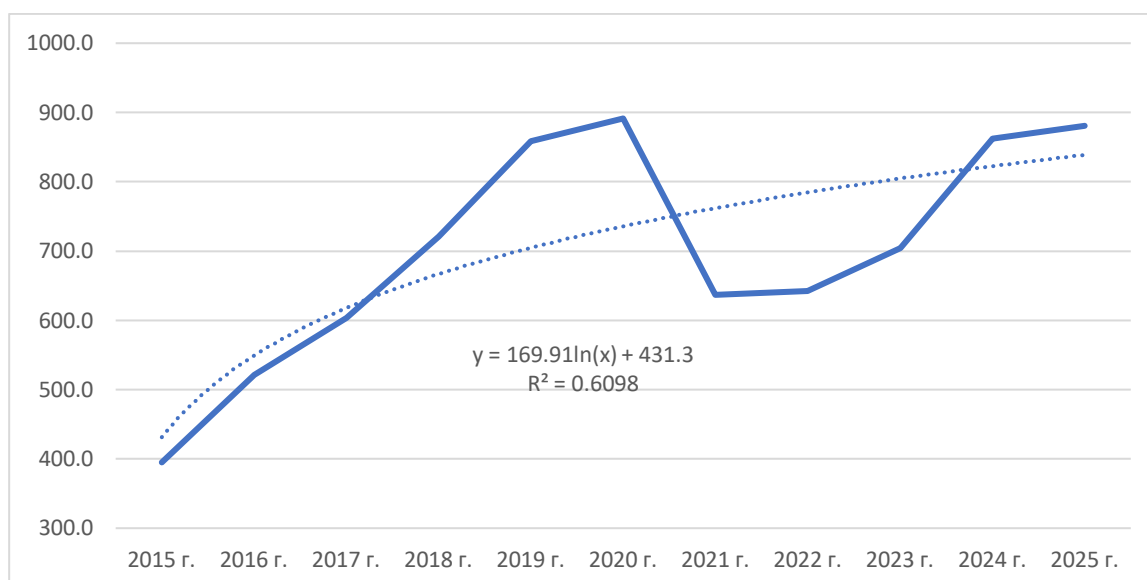


Рисунок – тренд развития выручки компании Huawei в 2015-25 гг.

(рассчитано автором по: [3]; суммы в млрд юаней)

Методом итераций нами оценена величина достоверности аппроксимации. Получены коэффициенты, характеризующие соответствие динамического ряда по таким зависимостям как:

- экспоненциальная – 0,45;
- линейная – 0,45;
- логарифмическая – 0,61;
- полиномиальная – 0,56;
- степенная – 0,58.

Логарифмическая зависимость оказалась наиболее адекватной фактическим данным за девять последних лет ($R^2 = 0,6098$). Поэтому для целей прогнозирования выручки мы считаем целесообразным использовать уравнение регрессии вида:

$$y = 169,91\ln(x) + 431,3 \quad (1),$$

где Y – выручка компании за год (млрд юаней)

x – номер периода (2015 = 1, 2027 = 13).

На следующем этапе анализа мы планируем с помощью полученного уравнения регрессии и сценарного метода рассчитать значения выручки по трем сценариям: а) по тенденции; б) шоковый; в) усредненный.

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ДИНАМИКА СОБСТВЕННОГО И ЗАЕМНОГО КАПИТАЛА КОМПАНИИ HUAWEI

Аннотация. Санкции, в последние годы введенные недружественными государствами в отношении ряда крупных китайских компаний, вызвали ряд дополнительных трудностей в их развитии. Руководство компании Huawei было вынуждено принимать меры структурного характера, которые отразились в том числе на соотношении собственного и заемного капитала компании. Методы исследования: графический, средних величин, динамических рядов. Результаты анализа позволили охарактеризовать финансовую политику компании как консервативную. Важное значение при этом имеют особенности Huawei как непубличной компании, связанные с составом собственников.

Ключевые слова: собственный, заемный капитал, финансовая политика, структура собственников, компания Huawei.

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HUAWEI'S SALES DEVELOPMENT TRENDS ASSESSMENT

Abstract. Sanctions imposed by unfriendly states on several large Chinese companies in recent years have created a few additional challenges to their development. Huawei's management was forced to take structural measures, which, among other things, impacted the company's debt-to-equity ratio. Research methods included graphical analysis, averages, and time series. The analysis results allowed us to characterize the company's financial policy as conservative. Huawei's unique characteristics as a private company, including its ownership structure, are also important.

Keywords: equity, loan capital, financial policy, ownership structure, Huawei.

Результаты деятельности компаний реального сектора во многом зависят от структуры пассивов.

Отдельные авторы связывают соотношение собственных и заемных средств с условиями финансирования и ценой капитала. Так, О.И. Иваничев утверждает: «Решение руководства корпораций о финансировании своих активов зависит от его доступа к соответствующим источникам. Это могут быть собственные средства или заемный капитал. Структура капитала компании отражает совокупность финансовых решений, принятых в прошлом, она является важным индикатором условий финансирования, а также предпочтений топ-менеджеров в отношении различных финансовых инструментов [1].

А.В. Строкова рассматривает управление капиталом организации как одну из наиболее значимых тем: его создание и использование дает предприятию возможность стать более независимым. Автор анализирует источники финансирования с позиций эффективности использования и способности компании обеспечивать «возврат» кредиторам и акционерам [4].

Многие китайские компании испытывают трудности в финансировании деятельности. Так, Л. Цзюй, Я. Чжао, И. Цзян констатировали возросшее число дефолтов (по облигационным займам) китайских компаний. Одной из причин этого «стали санкции США в отношении десятков компаний КНР. Другая причина состоит в высокой степени закредитованности многих компаний. Авторы акцентируют модели количественной оценки влияния собственного и заемного капитала на динамику индикатора капитализации [3].

В данной статье нами предпринята попытка анализа основных показателей задолженности крупной китайской технологической компании Huawei.

Важно: Huawei не является публичной компанией. Это частная фирма, на 99 процентов принадлежащая ее сотрудникам через профсоюз работников. Ее акции не торгуются на фондовых биржах. Собственность компании принадлежит бывшим и нынешним сотрудникам (за исключением иностранцев). Сотрудники коллегиально выбирают представителей в комиссию, которая затем выбирает совет директоров [2].

Совокупный собственный капитал компании к концу 2025 года достиг 544,6 млрд юаней (табл. 1).

Таблица 1.

Динамика собственного и заемного капитала Huawei в 2015-25 гг.
(суммы в млрд юаней)

Показатель / Год	Собственный капитал	Заемный капитал	Финансовое «плечо»
2015 г.	119,1	253,1	2,125
2016 г.	140,1	303,5	2,166
2017 г.	175,6	329,6	1,877
2018 г.	233,1	432,7	1,856
2019 г.	295,5	563,2	1,906
2020 г.	330,4	546,5	1,654
2021 г.	414,7	568,3	1,370
2022 г.	437,1	626,7	1,434
2025 г.	544,6	712,1	1,308
2025 /2015	4,57	2,81	

Источник: *рассчитано автором по: [2]*

За девять последних лет сумма собственного капитала компании возросла в 4,6 раза (в том числе за счет нераспределенной прибыли прошлых периодов), а заемных средств – в 2,8 раза. Значение финансового «плеча» соответственно снизилось, с 2,13 в 2015 г. до 1,31 в 2025 г. [2]. Это свидетельствует об осторожной, консервативной финансовой политике компании.

Важный для инвесторов показатель Huawei – отношение долга к активам (стоимости имущества) – оставался стабильным в течение последних пяти лет (рис. 1).

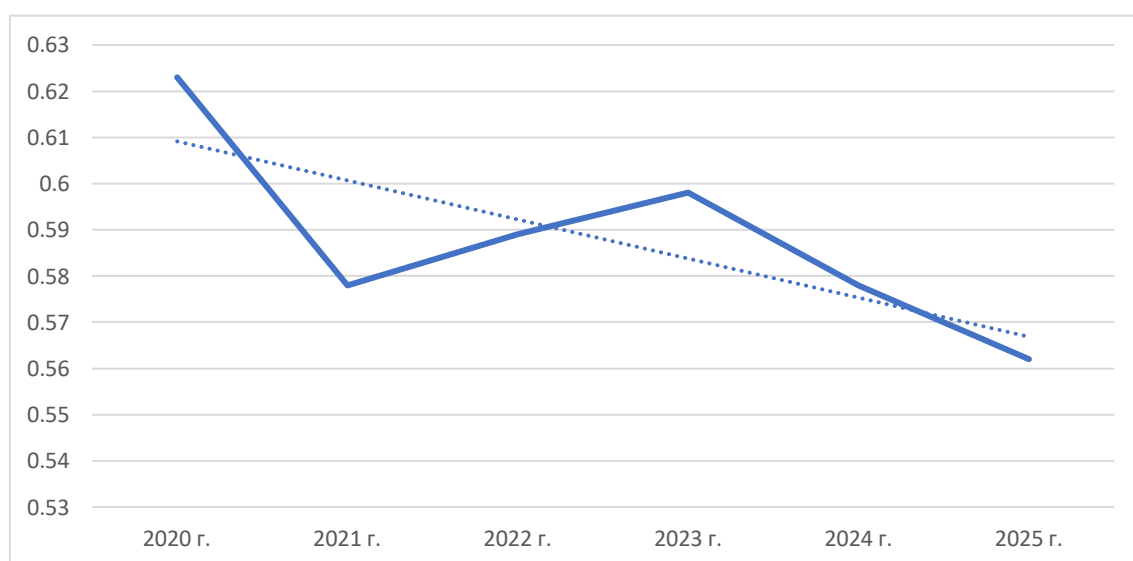


Рисунок 1. Коэффициент задолженности (долг / активы) компании Huawei в 2020-25 гг. Рассчитано автором по: [2]

Компания с весны 2019 года находится под жесткими санкциями США, что привело к заметному падению продаж смартфонов, и вынужденной продаже бренда Honor в конце 2020 года. Однако нами выявлена тенденция к снижению коэффициента задолженности – с 62,3% в 2020 году до 56,2% в 2025 г. Важную роль при этом играет состав собственников Huawei, представленных трудовым коллективом.

Рассчитанное нами значение финансового «плеча» компании – одна из переменных, используемых для расчета финансового рычага (левериджа). На следующем этапе анализа мы планируем оценить этот показатель компании Huawei, сравнить его с аналогичными показателями других китайских технологических компаний.

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ОСОБЕННОСТИ БРЕНД-МЕНЕДЖМЕНТА КИТАЙСКОЙ ТЕХНОЛОГИЧЕСКОЙ КОМПАНИИ

***Аннотация.** Китайские технологические гиганты конкурируют между собой, и одновременно – с глобальными зарубежными игроками. Современные продуктовые инновации обуславливают особые требования к бренд-менеджменту. Метод исследования – эмпирический; кейс-стади. Результаты свидетельствуют: компания Huawei отличается уникальной структурой собственности (99% акций принадлежит персоналу), и специфическим механизмом частой ротации генеральных директоров. Это оказывает влияние в том числе на управление брендом, основные компоненты которого – инновации, клиентоориентированность, эмоции.*

***Ключевые слова:** бренд, инновации, клиентоориентированность, бренд-менеджмент, компания Huawei.*

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FEATURES OF DIGITAL MARKETING COMMUNICATIONS IN CHINA

***Abstract.** Chinese tech giants compete with each other and with global foreign players. Modern product innovations create unique demands on brand management. The research method is empirical, using a case study. The results demonstrate that Huawei has a unique ownership structure (99% of shares are owned by employees) and a specific mechanism for frequent CEO rotation. This also impacts brand management, the key components of which are innovation, customer focus, and emotion.*

***Keywords:** brand, innovation, customer focus, brand management, Huawei.*

Проблемы брендинга представляют практический интерес для специалистов и руководителей. Так, Я.О. Молохова исследовала «этапы разработки и управления брендом в системе маркетинговой деятельности предприятия, а также классифицировала риски потребителей при выборе товаров. Особый акцент автор делает на целях эффективного управления брендом [2].

Ц. Го утверждает, что «в мире насчитывается 4,9 млрд активных пользователей социальных сетей». В этом контексте автор анализирует – как китайские и российские СМИ создают на платформах социальных сетей уникальные и узнаваемые бренды; как повысить конкурентоспособность медийных брендов, чтобы они «достигли более широкой аудитории». [1].

В данной статье рассмотрены особенности бренд-менеджмента компании Huawei, которая в течение многих лет позиционирует себя в качестве одного из мировых технологических лидеров, – это подтверждено в том числе масштабом инвестиций в НИОКР [3].

В управлении брендом Huawei делает акцент на трех компонентах: инновации, клиентоориентированность, эмоциональное повествование (рис.1).

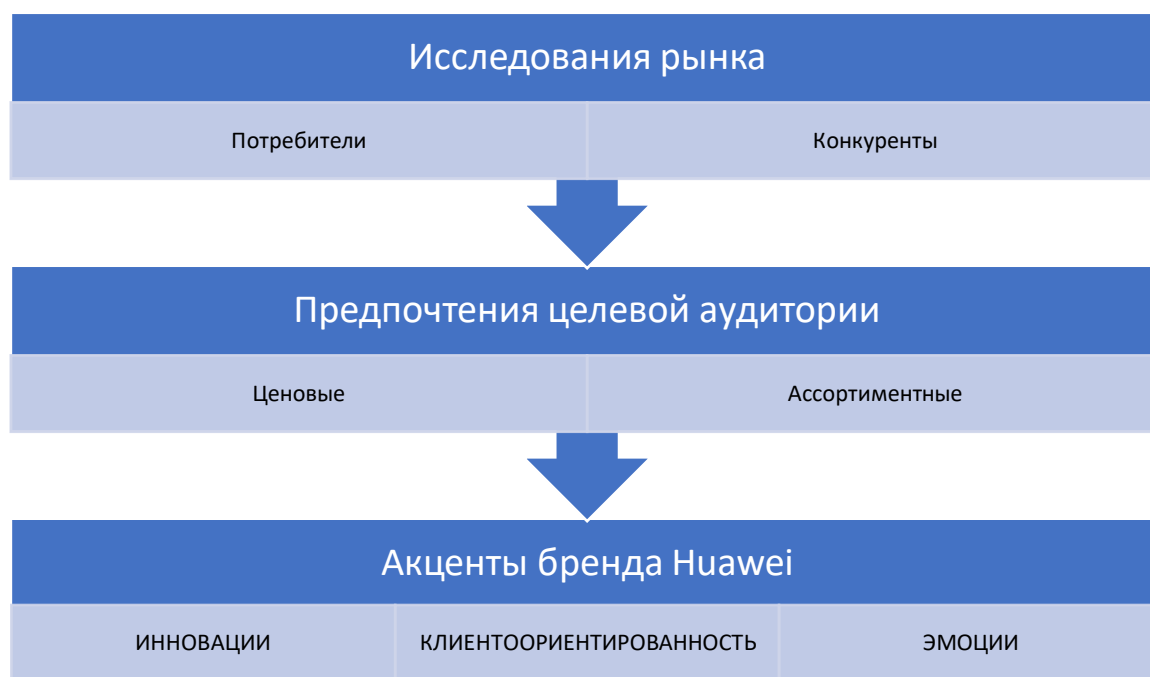


Рисунок 1. Базовые компоненты бренд-менеджмента Huawei
(Источник – разработано автором)

Детальные исследования потребностей клиентов в Huawei рассматривают в качестве «отправной точки» брендинга.

Huawei позиционирует себя как поставщика инновационных продуктов по конкурентоспособным ценам. При этом компания сознательно ориентируется на потребителей, обращающих внимание на соотношение, цена / качество. Компания нередко позиционирует свою продукцию как «лучшую» или «самую быструю», чтобы стимулировать восприятие высокой потребительской ценности. При этом компания декларирует формирование «целиком взаимосвязанного интеллектуального мира». Слоган «Сделаем это возможным» подчеркивает избранный инновационный подход.

Логотип компании соответствует избранной стратегии маркетинга – с акцентированным красным цветом (который используется умеренно), минималистичной графикой, второстепенными графическими элементами, а также изображениями, выражающими инновации, открытость, целеустремленность. Компания выработала и выдерживает строгие корпоративные правила, регулирующие использование логотипа, его применение в печатной, цифровой продукции.

Huawei использует выразительные метафоры в таких кампаниях, как «Превосходство с изюминкой» и «Строим лучший взаимосвязанный мир».

Заключение

Проведенный анализ показал: бренд-менеджмент, в связке с маркетинговыми исследованиями, оригинально встроен в систему управления компании. Важным фактором развития инноваций в корпоративном бренд-менеджменте является уникальная система ротации генеральных директоров Huawei – это нетипичный для китайских технологических компаний механизм. С другой стороны, децентрализованное принятие решений в области маркетинга способствуют обеспечению гибкости брендинга.

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ОЦЕНКА АНТРОПОГЕННОЙ ТРАНСФОРМАЦИИ ВОДНОГО БАЛАНСА РЕК ЦЕНТРАЛЬНОЙ АЗИИ

***Аннотация:** В статье рассматриваются изменения водного баланса и гидрологического режима рек Центральной Азии (на примере бассейна Амударьи) под влиянием антропогенных факторов. Проанализированы источники стока и влияние климата и хозяйственной деятельности. Показано, что орошение, гидротехнические сооружения и возврат дренажных вод приводят к снижению стока, изменению его сезонности и росту минерализации. Результаты важны для рационального управления водными ресурсами и обеспечения экологической устойчивости региона.*

***Ключевые слова:** Амударья, водный баланс, гидрологический режим, антропогенное воздействие, орошение, минерализация, водные ресурсы.*

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ASSESSMENT OF ANTHROPOGENIC TRANSFORMATION OF THE WATER BALANCE OF CENTRAL ASIAN RIVERS

***Abstract:** This article examines changes in the water balance and hydrological regime of Central Asian rivers (using the Amu Darya basin as an example) under the influence of anthropogenic factors. Runoff sources and the impact of climate and economic activity are analyzed. It is shown that irrigation, hydraulic structures, and drainage return lead to reduced runoff, changes in its seasonality, and an increase in mineralization. The results are important for rational water resource management and ensuring the environmental sustainability of the region.*

Key words: *Amu Darya, water balance, hydrological regime, anthropogenic impact, irrigation, mineralization, water resources.*

Самые первые гидрографические использования по бассейну Амударьи были начаты в 1873 г. Участники экспедиции Российского императорского географического общества выпустили труды Амударьинской экспедиции «Гидрографические исследования на Амударье», где помещены сведения по гидрологической ситуации и химическому составу воды данной реки. Информация относительно химического состава рек бассейна Аральского моря имеется с 1910 г. Регулярные ежегодные сообщения относительно речного загрязнения выпускаются Управлением Гидрометеослужбы Среднеазиатских республик с 1970г. В.Л.Шульц в 1965 году обобщил многолетние гидрологические и гидрохимические характеристики всех рек в своей монографии «Реки Средней Азии».

Основой для современных ученых, которые исследуют водные ресурсы республики уже на другом уровне, где принимается во внимание, что изучение гидроэкологического состояния водных ресурсов затрагивают всю региональную экологию бассейна Аральского моря. В 1980-е годы проблемы охраны водных ресурсов и гидроэкологические исследования стали одним из главных и приоритетных направлений гидроэкологической науки. На рис. 1.1 приведена схема расположения гидрологических постов «Узгидромета», сведения по которым используются для оценки ресурсов поверхностных вод Республики Узбекистан.

Гидрометрические наблюдения на реках бассейна Амударьи имеют различную длительность. Приведение их к одному периоду невозможно по следующим причинам. Погрешности измерения расходов воды на горных реках обычно превышают 10%. Максимальные расходы редкой повторяемости, как правило, не бывают измеренными, они определяются по экстраполированным частям кривых $Q=f(H)$, причем за счет экстраполяции кривой и по причине несовпадения времени прохождения максимального уровня со сроками наблюдений погрешность в определении максимального расхода может дополнительно возрасти на 15—20%. Это накладывает ограничения на возможность удлинения рядов наблюдений. Удлинение рядов с периодом наблюдений 10—15 лет по рекам-аналогам не всегда возможно также из-за отсутствия связей. Если же связь оказалась хорошей, то ее достоверность низка по причине короткого ряда наблюдений. Лучше ограничиваться проработками по рекам с длительным периодом наблюдений для Средней Азии более 15лет).

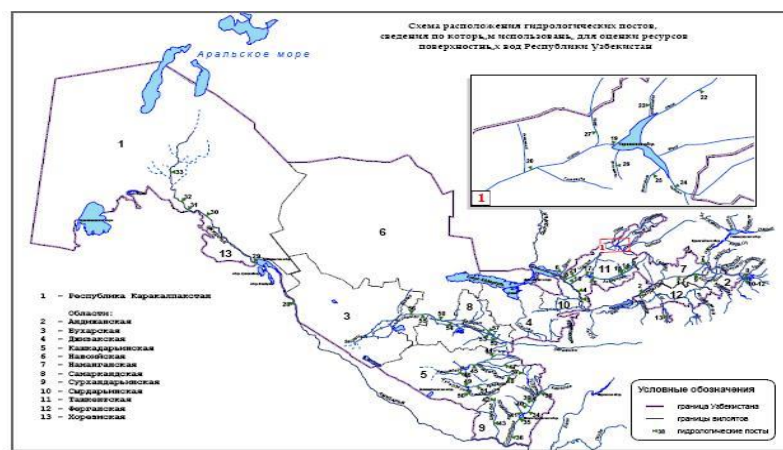


Рисунок 1.1. Схема расположения гидрологических постов Узбекистана⁷¹

Амударья протекает по территории Узбекистана в пределах своего среднего и нижнего течения. Образуется Амударья слиянием рек Пяндж и Вахш. Длина реки 1437 км, площадь водосбора 22700 км². Ниже слияния Пянджа и Вахша Амударья принимает левобережный приток Кундуздарью, формирующую свои воды на территории Афганистана, и правые притоки Кафирниган и Сурхандарью. Следующий правый приток — река Шерабад — сбрасывает в Амударью свои воды в ничтожном количестве и не каждый год.

Реки Зарафшан и Кашкадарья, являющиеся гидрографически притоками Амударьи, своих вод до нее не доносят вследствие разбора их стока на орошение. Ниже впадения реки Шерабад Амударья не только не получает поверхностного питания, а, наоборот, разбирается на орошение, теряет воду на испарение и инфильтрацию, постепенно уменьшая свой сток. В формировании стока рек Средней Азии, как указывает В. Л. Шульц, участвует не весь бассейн реки (или территория, откуда возможен приток воды в реку по рельефным условиям), а только его горная часть, называемая водосбором или областью формирования стока. Остальные части бассейна занимают области рассеивания стока (культурная территория с развитым орошением) и равновесия стока (часть равнины, где выпадающие осадки полностью испаряются). Речной сток в годовом разрезе формируется в общем случае за счет четырех источников питания: 1) подземных (главным образом грунтовых) вод; 2) сезонных запасов снега; 3) вечных снегов и ледников и 4) жидких осадков (дождей).

По В. Л. Шульцу, основную роль в питании рек Средней Азии играют талые воды, образующиеся в результате таяния снега и ледников в горах. При этом чисто ледниковое питание среднеазиатских рек не превышает 10% годового стока и до 50% занимает сток, образующийся от таяния снежников. Дождевое питание рек Средней Азии в среднем составляет 5—6% годового

⁷¹ Чуб В.Е. Изменение климата и его влияние на гидрометеорологические процессы, агроклиматические и водные ресурсы Узбекистан. // Узгидромет, НИГМИ, «VORIS-NASHRIYOT» Ташкент, 2007, 132 с.

стока; на юго-западе оно достигает до 15%, а в бассейне Амударьи — 3 — 3,5%. Однако на малых и средних реках дожди формируют максимальные расходы.

В Средней Азии осадки слабо влияют на годовой ход стока. На высокогорных водосборах влага накапливается весной, на низкогорных — в конце зимы. В тёплый период влияние дождей заметно лишь при их значительном количестве. На высокогорных реках сток определяется снеготаянием и зависит от теплового баланса, формируя термический ход, синхронный с температурой воздуха.

Интенсивное использование водных ресурсов приводит к значительным изменениям речного стока и водного режима, особенно в аридных и полупустынных регионах. Масштабы антропогенного воздействия нередко сопоставимы с природными факторами. В этих условиях рациональное управление водными ресурсами невозможно без достоверной оценки их влияния на гидрологический режим.

Существует научная гипотеза, согласно которой в зоне формирования речного стока рек Центральной Азии в силу изменения климатических факторов произошло изменение гидрологического режима рек, когда начало половодья сместилось с летнего периода на весенние месяцы. Река Амударья является крупнейшей водной артерией Центральной Азии и играет ключевую роль в формировании водных ресурсов региона. Среднегодовой сток реки оценивается примерно в 70–75 км³ воды в год, однако его величина существенно варьирует в зависимости от климатических условий и антропогенных факторов.

Основная часть стока формируется в горных районах Памира и Тянь-Шаня за счет таяния ледников и сезонного снежного покрова. В условиях аридного климата равнинных территорий бассейна реки вклад атмосферных осадков в формирование стока относительно невелик. Поэтому любые изменения в горных водосборных областях и системе водопользования оказывают значительное влияние на гидрологический режим реки. Долговременный анализ гидрологических наблюдений показывает, что во второй половине XX века произошло заметное изменение структуры речного стока. Эти изменения обусловлены сочетанием климатических факторов и интенсивного антропогенного воздействия. Наиболее значительные изменения гидрологического режима Амударьи начали проявляться с 1960-х годов, когда в регионе активно развивалось орошаемое сельское хозяйство. Масштабное строительство оросительных каналов и водохранилищ привело к значительному увеличению водозабора из реки. В результате:

- уменьшился объем воды, поступающий в нижнее течение реки;
- изменилось сезонное распределение стока;
- увеличилась роль возвратных (дренажных) вод в формировании речного стока.

До 1960-х годов Амударья обеспечивала около 70 % притока воды в Аральское море, однако впоследствии этот приток резко сократился из-за

интенсивного водопользования. В ряде маловодных лет поверхностный сток реки практически не достигал Аральского моря, что стало одной из главных причин экологической катастрофы Аральского региона. В естественных условиях гидрологический режим Амударьи характеризуется ярко выраженным летним максимумом стока, обусловленным интенсивным таянием ледников и снежного покрова в горах.

Однако антропогенное регулирование стока существенно изменило сезонную структуру гидрографа. В частности, строительство крупных водохранилищ (Нурекского, Туямуянского и др.) привело к перераспределению стока между сезонами.

В современных условиях наблюдаются следующие тенденции:

- снижение летних расходов воды;
- увеличение зимнего стока;
- уменьшение амплитуды колебаний уровня воды.

Такие изменения оказывают существенное влияние на гидроэкологическое состояние дельтовых экосистем.

Одним из важных факторов трансформации гидрологического режима Амударьи является поступление коллекторно-дренажных вод. Возвратные воды формируются в результате орошения сельскохозяйственных земель и возвращаются в речную систему через сеть коллекторов. Исследования показывают, что в нижнем течении реки значительная часть стока состоит из возвратных вод, которые отличаются повышенной минерализацией. В результате минерализация воды увеличивается вниз по течению реки.

В период с 1960 по 1989 гг. средняя минерализация воды в Амударье увеличилась примерно с 540 мг/л до более чем 1 г/л, что свидетельствует о существенном изменении гидрохимического режима реки.

Климатические изменения существенно влияют на гидрологический режим Амударьи. Повышение температуры и деградация ледников Памира и Тянь-Шаня изменяют питание рек: краткосрочно увеличивая водность, а в долгосрочной перспективе — снижая сток. Также изменение температур смещает сроки снеготаяния и период максимального стока на более раннее время.

В настоящее время крайне трудно оценить сток в Аральское море по Амударье. В дельтовой части реки находятся два поста Кызылджар и Парлытау расстояние между ними 73 км. За последние 5 лет в Кызылджаре все годы фиксируется значительный сток, превышающий 100 м³/с.

В Парлытау только в 1992 и 1993 гг. отмечен сток с расходами в 234 и 59,3 м³/с. В среднем в год за период 1992-2005 годов через створ прошло 20 м³/с и можно считать это стоком речных вод из Каракалпакстана в Аральское море. Согласно проведенным расчетам, все собранные гидрологические данные по величинам среднегодовых расходов воды были разделены на три группы: а) маловодные годы; б) годы средние по водности; в) многоводные годы (табл.1).

В этом бассейне в настоящее время расходы воды измеряются на створах Атамурат (Керки), теснина Тюямуюн, Кипчак, Саманбай, Кызылджар. У створа Керки сведения о среднегодовых расходах воды имеются за 2000-2012гг. За этот период они изменялись от 668 м³/с (в 2001г.) до 2029 м³/с (в 2012г.), при норме стока равной 1325 м³/с.

Таблица 1.
Разделение водности р. Амударьи – г/п Атамырат (Керки)
по величинам среднегодовых расходов
за период 1963-1970; 2000-2012 г.г.⁷²

№	Маловодные годы	Средние по водности годы	Многоводные годы
1	2000	1963	1964
2	2001	1965	1966
3	2008	2002	1967
4	2011	2004	1968
5		2006	1969
6		2007	1970
7		2009	2003
8			2005
9			2010
10			2012

В этом бассейне в настоящее время расходы воды измеряются на створах Атамурат (Керки), теснина Тюямуюн, Кипчак, Саманбай, Кызылджар. У створа Керки сведения о среднегодовых расходах воды имеются за 2000-2012гг. За этот период они изменялись от 668 м³/с (в 2001г.) до 2029 м³/с (в 2012г.), при норме стока равной 1325 м³/с.

Проведённый анализ гидрологических и гидроэкологических особенностей бассейна Амударьи показал, что формирование речного стока в Центральной Азии определяется сложным взаимодействием природных и антропогенных факторов. Основная часть стока реки формируется в горных районах Памира и Тянь-Шаня за счёт таяния сезонного снежного покрова и ледников, тогда как равнинные территории бассейна характеризуются крайне низким вкладом атмосферных осадков в водный баланс.

Исследование многолетних гидрологических наблюдений свидетельствует о существенных изменениях водного режима Амударьи во второй половине XX и начале XXI века. Эти изменения обусловлены прежде всего интенсивным развитием орошаемого земледелия, строительством гидротехнических сооружений и увеличением объёмов водозабора. В результате антропогенного воздействия произошло перераспределение речного стока, снижение объёма воды, поступающей в нижнее течение реки, а также изменение сезонного режима стока.

⁷²Составлен автором по данным Министерства Водного хозяйства РК и Узгидрмета

Установлено, что одним из значимых факторов трансформации гидрологического режима является поступление коллекторно-дренажных вод, образующихся в результате орошения сельскохозяйственных земель. Возвратные воды оказывают существенное влияние на гидрохимический состав речных вод, способствуя увеличению минерализации и изменению гидроэкологических условий водных объектов нижнего течения Амударьи и её дельтовых территорий.

Наряду с антропогенными воздействиями важную роль в изменении гидрологического режима играют климатические факторы. Повышение температуры воздуха, изменение режима атмосферных осадков и сокращение площади горных ледников приводят к смещению сроков половодья и изменению сезонного распределения речного стока. В долгосрочной перспективе данные процессы могут оказать существенное влияние на водные ресурсы региона.

Результаты анализа гидрологических данных показывают значительную межгодовую изменчивость расходов воды на основных гидрометрических постах бассейна Амударьи. При этом в отдельные годы наблюдаются как периоды маловодности, так и периоды повышенной водности, что связано с особенностями формирования стока в горных водосборных районах и влиянием климатических колебаний.

Таким образом, современное состояние водного режима Амударьи характеризуется значительной степенью антропогенной трансформации, проявляющейся в изменении водного баланса, сезонного распределения стока и гидрохимических характеристик воды. В условиях усиливающегося дефицита водных ресурсов особую актуальность приобретает разработка научно обоснованных методов управления водными ресурсами бассейна Амударьи, направленных на повышение эффективности водопользования, снижение негативного воздействия дренажных вод и сохранение экологической устойчивости водных экосистем региона.

Полученные результаты могут быть использованы при разработке программ устойчивого управления водными ресурсами, совершенствовании системы гидрологического мониторинга и проведении дальнейших исследований гидроэкологического состояния рек Центральной Азии.

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ИСКУССТВЕННЫЙ ИНТЕЛЛЕКТ В МАТЕМАТИЧЕСКОМ ОБРАЗОВАНИИ: ТРАНСФОРМАЦИЯ ПРОФЕССИОНАЛЬНОЙ ДЕЯТЕЛЬНОСТИ УЧИТЕЛЯ В ЦИФРОВУЮ ЭПОХУ

***Аннотация:** статья посвящена проблеме интеграции современных технологий и искусственного интеллекта (ИИ) в профессиональную деятельность учителя математики. На основе анализа современных цифровых инструментов (динамические геометрические среды, системы компьютерной алгебры, генеративные нейросети, адаптивные обучающие платформы) раскрываются возможности трансформации педагогической деятельности: от автоматизации рутинных операций до персонализации обучения и создания интерактивного образовательного контента. Особое внимание уделяется методическим аспектам использования ИИ-инструментов на различных этапах урока математики, а также вопросам сохранения познавательной автономии учащихся в условиях цифровизации. Представлены практические рекомендации по внедрению ИИ-технологий в работу учителя математики, включая промпт-инжиниринг для генерации задач, создание адаптивных тестов и организацию проектной деятельности.*

***Ключевые слова:** искусственный интеллект, учитель математики, цифровые образовательные технологии, персонализация обучения, нейросети, адаптивное обучение, математическое образование, промпт-инжиниринг.*

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ARTIFICIAL INTELLIGENCE IN MATHEMATICS EDUCATION: TRANSFORMING TEACHER PROFESSIONAL PRACTICE IN THE DIGITAL AGE

Abstract: *This article examines the integration of modern technologies and artificial intelligence (AI) into the professional practice of mathematics teachers. Based on an analysis of modern digital tools (dynamic geometric environments, computer algebra systems, generative neural networks, and adaptive learning platforms), the article explores the potential for transforming teaching: from the automation of routine operations to the personalization of learning and the creation of interactive educational content. Particular attention is paid to the methodological aspects of using AI tools at various stages of the mathematics lesson, as well as to maintaining students' cognitive autonomy in the context of digitalization. Practical recommendations for integrating AI technologies into mathematics teaching are presented, including prompt engineering for problem generation, adaptive test creation, and project-based learning.*

Keywords: *artificial intelligence, mathematics teacher, digital educational technologies, personalized learning, neural networks, adaptive learning, mathematics education, prompt engineering.*

Математическое образование находится на пороге фундаментальных изменений, обусловленных стремительным развитием технологий искусственного интеллекта. Если еще пять лет назад цифровые инструменты в работе учителя математики ограничивались в основном динамическими средами (GeoGebra, Desmos) и системами проверки тестов, то сегодня учитель имеет доступ к генеративным нейросетям, способным создавать индивидуальные задачи, объяснять сложные концепции на разных уровнях сложности, генерировать визуализации и даже выступать в роли виртуального тьютора.

Согласно исследованию Института образования ВШЭ (2024), 78% учителей математики используют цифровые инструменты в своей работе, но лишь 12% систематически применяют технологии на основе ИИ. Основными барьерами являются недостаток методических материалов, непонимание возможностей ИИ и опасения по поводу снижения познавательной активности учащихся при использовании «умных» инструментов.

Проблема исследования заключается в противоречии между широкими возможностями современных ИИ-технологий и недостаточной разработанностью методических подходов к их интеграции в профессиональную деятельность учителя математики, обеспечивающих не просто замену традиционных инструментов цифровыми, но качественную трансформацию образовательного процесса.

Наиболее активно развивающийся класс инструментов, открывающий принципиально новые возможности.

Инструмент Применение в работе учителя математики:

- ChatGPT (OpenAI) Генерация задач с заданными параметрами, объяснение тем на разных уровнях сложности, создание сценариев уроков, разработка критериев оценивания

- Claude (Anthropic) Анализ ученических работ, создание рубрик, генерация пояснительных текстов с акцентом на математическую интуицию

- YandexGPT / GigaChat Отечественные аналоги, работающие в соответствии с российским образовательным контекстом, интеграция с платформами Сферум и МЭШ

- Khanmigo (Khan Academy) Специализированный ИИ-тьютор для математики, не дает готового ответа, а задает наводящие вопросы

Дидактический потенциал: генеративные нейросети выступают как «цифровые ассистенты» учителя, берущие на себя рутинные задачи по подготовке материалов и позволяющие уделить больше времени индивидуальной работе с учащимися.

Платформы, использующие алгоритмы машинного обучения для персонализации траектории обучения.

Платформа Особенности

- ЯКласс Адаптивный подбор заданий на основе результатов, автоматическая проверка, генерация вариантов

- Учи.ру Игровая механика, адаптивная сложность, подробная аналитика для учителя

- MATHia (Carnegie Learning) Платформа с ИИ-тьютором, анализирующим процесс решения, а не только результат

- ALEKS (McGraw-Hill) Система адаптивного оценивания и обучения, использующая технологию Knowledge Space Theory

Дидактический потенциал: адаптивные платформы обеспечивают индивидуализацию обучения в масштабах всего класса, позволяют учителю получать детальную аналитику по каждому ученику и выявлять проблемные зоны.

Поддержка инклюзивного образования. ИИ может адаптировать математические тексты для учащихся с особыми образовательными потребностями: упрощать формулировки, предлагать альтернативные способы объяснения, преобразовывать текст в речь.

Основные ограничения и риски:

1. Снижение познавательной автономии. Если ученик привыкает получать готовые решения от ИИ, у него может атрофироваться способность к самостоятельному поиску и преодолению трудностей.

2. Недостоверность результатов («галлюцинации» нейросетей). Генеративные модели могут давать математически неверные ответы, особенно в сложных или нестандартных задачах. Учитель должен критически оценивать результаты работы ИИ.

3. Отсутствие педагогического контекста. ИИ не учитывает эмоциональное состояние ученика, его мотивацию, особенности межличностных отношений в классе — факторы, критически важные для успешного обучения.

4. Риск замены учителя техникой. Технологический детерминизм, предполагающий, что ИИ может заменить учителя, опасен и несостоятелен. ИИ — инструмент, а не субъект образования.

5. Этические и правовые вопросы. Использование ИИ поднимает вопросы о защите персональных данных, авторских прав на сгенерированные материалы, а также о формировании у учащихся корректного отношения к ИИ как помощнику, а не источнику «готовых ответов».

В педагогике существуют некоторые методические аспекты использования ИИ на уроках математики. Промпт-инжиниринг для учителя математики: искусство формулировать запросы

Эффективность работы с генеративными нейросетями напрямую зависит от качества промпта (запроса). Учителю математики важно освоить навык составления точных и структурированных запросов.

Проектная и исследовательская деятельность с использованием ИИ

ИИ открывает новые возможности для организации математических исследований.

Примеры проектных заданий:

1. «Исследование функций с помощью ИИ». Учащийся выбирает класс функций (например, дробно-рациональные), использует CAS для построения графиков при различных параметрах, формулирует гипотезы о влиянии параметров на свойства функции, затем использует Wolfram Alpha для проверки гипотез на большом количестве примеров.

2. «Визуализация абстрактных математических объектов». С помощью Manim или GeoGebra 3D учащийся создает анимацию, визуализирующую сечение многогранников, преобразование графиков или фрактальные структуры.

3. «Математика в задачах машинного обучения». Учащийся знакомится с базовыми алгоритмами машинного обучения (линейная регрессия, метод k-ближайших соседей) и реализует их на Python с использованием библиотек NumPy и scikit-learn, исследуя математические принципы, лежащие в основе алгоритмов.

4. «Создание ИИ-ассистента по математике». Учащийся проектирует систему промптов для нейросети, которая будет помогать одноклассникам в изучении определенной темы, тестирует различные формулировки и создает методическое руководство по использованию.

Основная задача — это использование ИИ-ассистента в методической работе. Нейросети могут выступать в роли методического помощника:

- Анализ урока. Учитель загружает расшифровку видеозаписи урока, ИИ анализирует соотношение времени говорения учителя и учеников,

выделяет использованные приемы, предлагает альтернативные способы объяснения.

- Разработка программы. ИИ помогает структурировать рабочую программу, подбирать ресурсы по каждой теме, формировать календарно-тематическое планирование с учетом особенностей класса.

- Создание методических материалов. Генерация технологических карт уроков, сценариев внеурочных мероприятий, описаний мастер-классов.

Главный обсуждаемый вопрос — это роль учителя математики в эпоху ИИ, несомненно с развитием ИИ роль учителя не уменьшается, а качественно трансформируется. Учитель остается незаменимым в следующих аспектах:

1. Мотивация и смыслообразование. Только учитель может создать эмоциональную связь с предметом, показать красоту математики, вдохновить на изучение.

2. Развитие математического мышления. ИИ может решить уравнение, но только учитель может научить видеть структуру задачи, выбирать оптимальный метод, выстраивать цепочку рассуждений.

3. Дифференциация с учетом не только знаний, но и личностных особенностей. Учитель учитывает не только уровень подготовки, но и психологические особенности, мотивацию, эмоциональное состояние ученика.

4. Формирование учебного сообщества. Учитель создает среду сотрудничества, взаимообучения, здоровой конкуренции — то, что невозможно в индивидуальном взаимодействии с ИИ.

5. Оценивание сложных компетенций. ИИ может оценить ответ, но не способность ученика аргументировать, отстаивать свою точку зрения, находить нестандартные подходы.

Современные технологии и искусственный интеллект открывают перед учителем математики беспрецедентные возможности для трансформации образовательного процесса. Автоматизация рутинных операций, персонализация обучения, создание интерактивного контента, оперативная обратная связь — эти возможности позволяют учителю сосредоточиться на самом важном: развитии математического мышления учащихся, формировании познавательного интереса и создании поддерживающей образовательной среды.

Вместе с тем, внедрение ИИ требует осмысленного, методически обоснованного подхода. Ключевыми условиями успешной интеграции ИИ в работу учителя математики являются:

1. Освоение учителем навыков промпт-инжиниринга и критической оценки результатов работы ИИ;

2. Сохранение баланса между использованием цифровых инструментов и развитием вычислительной культуры, самостоятельного мышления;

3. Формирование у учащихся ИИ-грамотности и корректного отношения к искусственному интеллекту как инструменту, а не замене собственной мыслительной деятельности;

4. Понимание уникальной, незаменимой роли учителя как наставника, мотиватора и организатора учебного сообщества.

Искусственный интеллект не заменяет учителя математики — он расширяет его возможности, освобождая время и ресурсы для того, что составляет суть педагогического призвания: встреча с мыслью ученика, совместное открытие, вдохновение на познание.

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ЭКОНОМЕТРИЧЕСКИЙ АНАЛИЗ ПРОИЗВОДСТВА МЯСНОЙ ПРОДУКЦИИ В ЖИВОТНОВОДСТВЕ

Аннотация: В статье представлена информация о производстве мяса из продуктов животноводства и представлен анализ факторов, влияющих на него. Учитывая, что в настоящее время мясная продукция сельского хозяйства нашей республики выращивается в основном в фермерских, деханских хозяйствах и на приусадебных участках населения, научно изучена связь между факторами, влияющими на нее, и представлены результаты.

Ключевые слова: регрессия, авторегрессия, производство, производство мяса, мультипликатор, средний лаг, медианный лаг.

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ECONOMETRIC ANALYSIS OF MEAT PRODUCTION IN ANIMAL FARMING

Abstract: The article provides information on the production of meat from livestock products and analyzes the factors influencing it. Considering that currently, meat products of our republic's agriculture are mainly grown in farms, dehkan farms, and household plots of the population, the relationship between factors influencing it has been scientifically studied and the results have been presented.

Keywords: regression, autoregression, production, meat production, multiplier, average lag, median lag.

ВВЕДЕНИЕ

В 2025 году сельское, лесное и рыбное хозяйство Узбекистана продемонстрировало стабильный рост, общая стоимость произведённой продукции (услуг) оценивается в 538 919,7 млрд сумов.

Согласно Национального комитета по статистике Республики Узбекистан, основная часть - 518 822,7 млрд сумов - приходится на растениеводство, животноводство, охоту и сопутствующие услуги, в лесном

хозяйстве произведено продукции на 15 081,5 млрд сумов, в рыбном хозяйстве - на 5 015,5 млрд сумов.

Объём производства продукции сельского хозяйства в 2025 году составил 508 711,1 млрд сумов, что на 4,4% превышает показатели 2024 года.

Продукция растениеводства достигла 243 007,7 млрд сумов (рост 7,2%), животноводства - 265 703,4 млрд сумов (рост 1,6%). Наибольшие объёмы зафиксированы в Самаркандской (57 963,3 млрд сумов), Андижанской (50 263,3 млрд сумов), Кашкадарьинской (49 950,0 млрд сумов) и Ташкентской (48 794,1 млрд сумов) областях, тогда как Сырдарьинская область (17 263,2 млрд сумов), Республика Каракалпакстан (19 932,0 млрд сумов) и Навоийская область (23 574,3 млрд сумов) продемонстрировали низкие показатели⁷³.

АНАЛИЗ ИСПОЛЬЗОВАННЫХ ЛИТЕРАТУРЫ

В научно-исследовательских работах по эконометрике большую роль играли зарубежные ученые Сви Гриллихес, И.Тинберген, В.Н. Афанасьев, С.А. Айвазян, А.М.Гатаулин, Н.М.Гореева, Т.А.Дуброва, Л.Н.Демидова, О.П.Крастин, Н.Ш.Кремер, Н.П.Тихомиров, И.И.Елисеева, Е.М.Четыркин и других имеют важное значение.

Среди ученых, проводивших исследования по вопросам оптимизации в республике Узбекистан С.С.Гулямов, Б.Ю.Ходиев, Б.А.Бегалов, Б.Беркинов, Т.Ш.Шодиев, Ё.Абдуллаев, Н.Б.Ашурова, С.К.Салаев, Н.К. Муродова, И.С.Абдуллаев и другие проводят системные научные исследования по вопросам эконометрического и экономико-математического моделирования и прогнозирования производства промышленной и сельскохозяйственной продукции.

МЕТОДИКА ИССЛЕДОВАНИЯ

Исследование проводился на основе метода научной абстракции, наблюдения, сравнения, оценке параметров моделей с распределенным лагом.

МАТЕРИАЛЫ И МЕТОДЫ

Рассмотрим общую модель с распределенным лагом, что величина лага l конечна. Допустим теперь, что для описания некоторого процесса используется модель с бесконечным лагом вида:

$$y_t = a + b_0 x_t + b_1 x_{t-1} + \dots + b_L x_{t-L} + \varepsilon_t, \quad (1)$$

Очевидно, что параметры такой модели обычным МНК или с помощью иных стандартных статистических методов определить нельзя, поскольку модель включает бесконечное число факторных переменных. Однако, приняв определенные допущения относительно структуры лага, оценки ее параметров все же можно получить.

⁷³ <https://stat.uz/ru/>

Изложенный здесь подход к оценке параметров моделей с распределенным лагом типа (1) впервые был предложен Л.М.Койком. Он предположил, что существует некоторый постоянный темп λ ($0 < \lambda < 1$) уменьшения во времени лаговых воздействий фактора на результат. Если, например, в период t результат изменялся под воздействием изменения фактора в этот же период времени на b_0 ед., то под воздействием изменения фактора, имевшего место в период $t - 1$, результат изменится на $b_0 \cdot \lambda$ ед.; в период $t - 2$ – на $b_0 \cdot \lambda \cdot \lambda$ ед. и т.д. Для некоторого периода $t - l$ это изменение результата составит: $b_0 \cdot \lambda^l$ ед. В более общем виде можно записать:

$$b_j = b_0 \cdot \lambda^j; \quad j = 0, 1, 2, \dots, l \quad 0 < \lambda < 1, \quad (2)$$

Ограничение на значение $\lambda > 0$ обеспечивает одинаковые знаки для всех коэффициентов $b_j > 0$, а ограничение $\lambda < 1$ означает, что с увеличением лага значения параметров модели (11.16) убывают в геометрической прогрессии. Чем ближе λ к 0, тем выше темп снижения воздействия фактора на результат во времени и тем большая доля воздействия на результат приходится на текущее значение фактора x_t .

Выразим с помощью формулы (2) все коэффициенты в модели (1) через b_0 и λ :

$$y_t = \alpha + b \cdot x_t + b \cdot \lambda \cdot x_{t-1} + b \cdot \lambda^2 \cdot x_{t-2} + b \cdot \lambda^3 \cdot x_{t-3} + \dots + b \cdot \lambda^q \cdot x_{t-q} + \varepsilon_t, \quad (3)$$

В результате преобразований (3) мы получаем *модель Койка*:

$$y_t = a \cdot (1 - \lambda) + b_0 \cdot x_t + \lambda \cdot y_{t-1} + \varepsilon_t - \lambda \varepsilon_{t-1}, \quad (4)$$

В качестве исходных данных рассмотрим изменение объемов производства мяса Самаркандской области за период на 2010-2024 годах.

Производство продукции Самаркандской области за период на 2010-2024 годах⁷⁴

⁷⁴ <https://www.samstat.uz/uz/rasmiy-statistika/agriculture-2>

Таблица 1.

годы	посевные площади, гектар	Сельскохозяйственная продукция, млрд. сум	в том числе:	
			земледелие	животноводстве
2010	372 824,0	5 368,6	3 577,2	1 791,4
2011	353 246,0	6 744,0	4 329,5	2 414,5
2012	331 287,0	7 808,6	4 812,1	2 996,5
2013	360 247,0	9 477,7	5 831,5	3 646,2
2014	364 253,0	11 747,6	6 974,1	4 773,5
2015	360 227,0	14 300,0	8 949,4	5 350,6
2016	358 967,0	17 088,6	10 592,9	6 495,7
2017	351 249,0	21 506,8	13 762,7	7 744,1
2018	351 833,0	25 658,0	15 035,3	10 622,7
2019	328 107,0	28 379,5	15 445,4	12 934,1
2020	340 750,0	33 759,4	18 331,4	15 428,0
2021	359 283,0	41 206,1	22 333,7	18 872,4
2022	336 799,7	42 088,9	21 472,0	18 956,0
2023	320 047,0	49 025,9	26 331,1	22 694,8
2024-год- январь- сентябрь	320 041,0	41 824,9	21 617,1	18 995,6

Тип связи линейная зависимость между факторами y и x_1, x_2 ищется в следующем виде: $\tilde{y} = \beta_0 + \beta_1 x_1 + \beta_2 x_2$

Используя метод наименьших квадратов, коэффициенты $\beta_0, \beta_1, \beta_2$ находятся из следующей системы уравнений:

$$\begin{cases} n\beta_0 + \beta_1 \sum x_1 + \beta_2 \sum x_2 = \sum y \\ \beta_0 \sum x_1 + \beta_1 \sum x_1^2 + \beta_2 \sum x_1 \cdot x_2 = \sum x_1 y \\ \beta_0 \sum x_2 + \beta_1 \sum x_1 \cdot x_2 + \beta_2 \sum x_2^2 = \sum x_2 y \end{cases}$$

Из этого уравнения корни находятся следующим образом:

$$\beta_0 = \frac{D_{a_0}}{D}, \quad \beta_1 = \frac{D_{a_1}}{D}, \quad \beta_2 = \frac{D_{a_2}}{D}.$$

РЕЗУЛЬТАТЫ

Находим решение поставленной задачи. Результаты были следующими:

$$\beta_0 = \alpha \cdot (1 - \lambda), \quad \beta_1 = b, \quad \beta_2 = \lambda \quad \text{по формуле } \beta_0 = \alpha \cdot (1 - \lambda) = 2660,9; \\ \beta_1 = b = 1,92; \quad \beta_2 = \lambda = 0,068.$$

Модель Койка выглядела следующим образом:

$$y_t = 2855 + 1,92 \cdot x_t + 0,068 \cdot x_{t-1}.$$

Мультипликатор равен.

$$\beta = \frac{\beta_0}{1 - \beta_1} = \frac{1,92}{1 - 0,068} = 2,06.$$

Распределенная эконометрическая модель сельскохозяйственного производства выглядела следующим образом:

$$\tilde{y} = 2855 + 0,93 \cdot x_t + 0,033 \cdot x_{t-1} + 0,0012 \cdot x_{t-2} + 0,00004 \cdot x_{t-3}.$$

Зная величины β_j с помощью стандартных формул, можно определить еще две важные характеристики модели множественной регрессии: величину среднего и медианного лагов. *Средний лаг* рассчитывается по формуле средней арифметической взвешенной:

$$\bar{L} = \frac{\lambda}{1 - \lambda}, \quad (3)$$

Формула (3) представляет собой средний период, в течение которого будет происходить изменение результата под воздействием изменения фактора в момент времени t .

Медианный лаг – это величина лага, для которого $\sum_{j=0}^{l_{Me}} \beta_j \approx 0,5$. Это тот период времени, в течение которого с момента времени t будет реализована половина общего воздействия фактора на результат $L_{mediana} = \frac{\ln 0,5}{\ln 0,93} = 9,84$.

Средний лаг определяется по следующей формуле:

$$\bar{L} = \frac{\lambda}{1 - \lambda} = \frac{0,068}{1 - 0,068} = 0,072.$$

Если сельскохозяйственная продукция состоит 1 млрд. сумов, то животноводческая продукция увеличится на 72 млн. сумов.

Согласно критерию Фишера $F_{расч} = \frac{MS_{фактор}}{MS_{остат}} = 1003,5$, $F_{расч} = 1003,5$,

значение больше, чем значение, найденное в таблице $F_{кр.} = 2,63$.

ВЫВОД

Если сельскохозяйственная продукция составит 1 млрд. сумов, то животноводческая продукция увеличится на 72 млн. сумов.

Представляем выводы и предложения по эффективной деятельности в производстве мяса: если производство мяса, всего (млрд сумов) увеличится на 1 единицу – это к увеличению прибыли сельскохозяйственного производства на 0,072 единицы.

Оценка значимости и адекватности модели проводится с использованием критерия F-Фишера.

Для оценки плотности и адекватности модели используется критерий Фишера.

При этом $F_{расч} = 1003,5 > F_{кр.} = 2,63$ и а так же коэффициент корреляции равна $R = 0,99$. И так, уравнение регрессии значимый.

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ОБЗОР СОВРЕМЕННОГО ГИДРОЛОГИЧЕСКОГО И ГИДРОХИМИЧЕСКОГО СОСТОЯНИЯ ВОДЫ Р.СЫРДАРЬЯ ПО ДЛИНЕ РЕКИ С УЧЕТОМ АНАЛИЗА ОПУБЛИКОВАННЫХ ИСТОЧНИКОВ

***Аннотация.** В данной статье приводится обзор некоторых научно-исследовательских работ, посвященных изучению современного гидрологического и гидрохимического состояния воды р.Сырдарья по длине реки. В этих публикациях приводятся данные по изменению уровней и расходов воды, а также по изменению химического состава и величине минерализации воды на различных гидропостах по длине реки. В заключительной части публикации приводятся практические рекомендации, подчёркивающие необходимость совершенствования системы мониторинга водных ресурсов р.Сырдарья, рационального управления водным режимом и разработки мер по снижению антропогенной нагрузки на водные экосистемы бассейна реки.*

***Ключевые слова.** Река Сырдарья, гидрологический и гидрохимический режим, современные данные.*

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REVIEW OF THE CURRENT HYDROLOGICAL AND HYDROCHEMICAL STATUS OF THE SYR DARYA RIVER WATER ALONG THE RIVER, TAKING INTO ACCOUNT AN ANALYSIS OF PUBLISHED SOURCES

***Abstract.** This article provides an overview of selected research studies devoted to the current hydrological and hydrochemical status of the Syr Darya River water along the river. These publications present data on changes in water*

levels and discharges, as well as changes in the chemical composition and mineralization of water at various gauging stations along the river. The final section of the publication provides practical recommendations emphasizing the need to improve the Syr Darya River water resource monitoring system, rationally manage the water regime, and develop measures to reduce anthropogenic loads on aquatic ecosystems in the river basin.

Keywords *The Syr Darya River, hydrological and hydrochemical regime, current data.*

Введение

Река Сырдарья является одной из крупнейших водных артерий Центральной Азии и играет ключевую роль в формировании водных ресурсов региона, обеспечивая водоснабжение, орошение сельскохозяйственных земель, а также поддержание экологического равновесия в бассейне Аральского моря. Водные ресурсы реки активно используются в хозяйственной деятельности государств бассейна, что оказывает значительное влияние на её гидрологический режим и качество водной среды. В современных условиях возрастающей антропогенной нагрузки и климатических изменений вопросы оценки гидрологического и гидрохимического состояния реки приобретают особую актуальность.

Гидрологический режим реки Сырдарья характеризуется сложной сезонной динамикой стока, формирующегося преимущественно за счет снегово-ледникового питания в горных районах Тянь-Шаня. Наибольшие объемы стока традиционно наблюдаются в весенне-летний период, когда происходит интенсивное таяние снежников и ледников, тогда как в осенне-зимний период водность реки существенно снижается. В современных условиях естественный режим стока значительно трансформирован вследствие регулирования реки крупными водохранилищами, включая Токтогульское водохранилище, Кайраккумское водохранилище и Чардаринское водохранилище, которые выполняют функции сезонного перераспределения водных ресурсов, гидроэнергетики и обеспечения ирригации. В результате регулирования стока и значительных водозаборов на орошение наблюдаются изменения внутригодового распределения расходов воды, снижение стока в нижнем течении и увеличение межгодовой изменчивости водности. Эти процессы оказывают существенное влияние на гидрологические характеристики реки и формирование гидрохимического состава воды по длине ее течения.

Гидрохимическое состояние воды реки определяется комплексом показателей, включающих ионный состав, содержание биогенных веществ, органических соединений и тяжелых металлов. Систематические наблюдения за качеством поверхностных вод в регионе позволяют отслеживать динамику этих параметров и выявлять тенденции изменения экологического состояния водных объектов. В частности, в рамках гидрохимического мониторинга проводится анализ таких компонентов, как

минерализация, жесткость, концентрации основных ионов, соединений азота и фосфора, а также ряда микроэлементов и загрязняющих веществ.

Цель исследования является обзор современного гидрологического и гидрохимического состояния воды реки Сырдарья по длине её течения на основе анализа опубликованных научных исследований и данных мониторинга. Реализация данной цели предполагает систематизацию существующей научной информации, выявление пространственных особенностей изменения качества воды, а также определение основных тенденций и факторов, влияющих на состояние речной экосистемы.

Обзор некоторых имеющихся публикаций по современному гидрологическому и гидрохимическому состоянию воды р.Сырдарья по длине реки

В 2011 г. Б.Х.Гаппаров, И.Ф.Беглов, А.М.Назарий провели исследования по комплексной оценке качества поверхностных вод в бассейнах рек Амударья и Сырдарья. В данном отчете обобщены результаты многолетних наблюдений за гидрохимическими характеристиками водных объектов региона и дана оценка основных тенденций изменения качества воды под воздействием природных и антропогенных факторов. Согласно данным отчёта, качество воды в бассейнах крупнейших рек Центральной Азии характеризуется выраженной пространственной изменчивостью. В верхних частях бассейнов, где формируется основной речной сток, вода отличается сравнительно низкой минерализацией (до 0,6-0,7 г/л) и благоприятным гидрохимическим составом.

Одной из наиболее характерных особенностей гидрохимического режима рек региона является увеличение минерализации воды вниз по течению. В бассейне Сырдарьи среднемноголетние значения минерализации в верхнем течении составляют около 600–700 мг/л, тогда как в нижнем течении этот показатель может превышать 1200–1400 мг/л. Аналогичная тенденция наблюдается и в бассейне Амударьи, где минерализация возрастает с примерно 700 мг/л в верховьях до 1100–1200 мг/л в нижних участках реки.

Важным аспектом анализа является изменение ионного состава воды по длине рек. В верховьях рек вода преимущественно относится к гидрокарбонатно-кальциевому типу, характерному для горных рек с ледниково-снеговым питанием. Однако в среднем и нижнем течении наблюдается увеличение доли сульфатных и хлоридных ионов, что связано с поступлением солей из орошаемых территорий и минерализованных грунтовых вод. В результате гидрохимический тип воды трансформируется в сульфатно-натриевый или хлоридно-сульфатный.

В целом результаты анализа показывают, что гидрохимическое состояние вод в бассейнах Амударьи и Сырдарьи формируется под воздействием сложного комплекса природных и антропогенных факторов. В верхних горных районах сохраняются относительно благоприятные условия, тогда как в среднем и особенно нижнем течении рек наблюдается ухудшение

качества воды. В связи с этим важное значение приобретает развитие системы регионального мониторинга качества воды, совершенствование управления коллекторно-дренажными водами и внедрение водосберегающих технологий в сельском хозяйстве [1; С.26-68].

В 2018 г. Самбаев Н.С. в статье «Оценка гидрологического состояния р.Сырдарья в пределах Кызылординской области» рассматриваются особенности гидрологического режима реки Сырдарья в пределах Кызылординской области одного из наиболее уязвимых участков нижнего течения реки, непосредственно связанного с экологическим состоянием Аральского моря. Основной целью исследования является оценка современного гидрологического состояния реки на основе анализа гидрологических наблюдений и выявление факторов, влияющих на формирование стока в данном регионе. Автор отмечает, что гидрологический режим Сырдарьи в пределах Кызылординской области в значительной степени трансформирован под влиянием антропогенных факторов. В частности, существенное воздействие оказывает интенсивное использование водных ресурсов в бассейне реки для ирригационных нужд. Согласно приведённым данным, ежегодный водозабор из бассейна Сырдарьи составляет около 12 млрд м³ воды, из которых примерно 9,6 млрд м³ используется для орошения сельскохозяйственных земель. Это приводит к заметному снижению водности реки в её нижнем течении и изменению естественного распределения стока.

В статье проводится анализ многолетних гидрологических данных, полученных на гидрологических постах нижнего течения реки. На основе этих данных автор рассматривает изменения уровня воды, сезонного распределения стока и межгодовой изменчивости водности. Показано, что в последние десятилетия наблюдается тенденция снижения среднегодовых расходов воды, а также увеличение неравномерности стока в течение года. Подобные изменения связаны как с климатическими особенностями региона, так и с регулированием стока водохранилищами и водозаборами в верхнем и среднем течении реки.

В целом результаты исследования показывают, что современное гидрологическое состояние Сырдарьи в пределах Кызылординской области характеризуется значительной трансформацией естественного режима стока. Основными факторами этих изменений являются интенсивное водопользование в бассейне реки, регулирование стока гидротехническими сооружениями, а также природно-климатические особенности региона. В связи с этим автор подчёркивает необходимость совершенствования системы управления водными ресурсами бассейна Сырдарьи и проведения комплексного мониторинга гидрологического режима реки для обеспечения устойчивого водопользования и сохранения экосистем нижнего течения [2; 95-99].

В 2018 г. Р.И. Гальперин, Д.М. Бурлибаева и Ж.А. Жанабаева в статье «Максимальные уровни и расходы воды р.Сырдарья современных

условиях» рассматривают особенности формирования максимальных уровней и расходов воды реки Сырдарья в современных гидрологических условиях. Основной целью исследования является оценка экстремальных гидрологических характеристик реки на основе анализа многолетних наблюдений и статистической обработки гидрологических рядов. В работе уделяется внимание изменениям максимальных расходов воды и уровней реки, а также вопросам восстановления гидрологических рядов и определения расчетных характеристик редкой повторяемости.

В рамках исследования были проанализированы многолетние ряды наблюдений за максимальными расходами и уровнями воды на гидрологических постах реки. Особое внимание уделено восстановлению неполных или прерванных гидрологических рядов с использованием методов корреляционного анализа и регрессионных зависимостей между гидрологическими постами-аналогами. Такой подход позволил уточнить статистические характеристики экстремального стока и повысить достоверность расчетов.

На основе обработанных данных авторами были рассчитаны значения максимальных расходов и уровней воды различной обеспеченности (1 %, 3 %, 5 % и 10 %). Эти показатели используются при гидротехническом проектировании, оценке паводковой опасности и разработке мероприятий по защите территорий от затопления. Полученные результаты показывают, что величины экстремальных расходов воды могут значительно варьировать в зависимости от гидрологических и климатических условий конкретного года, а также от режима регулирования стока.

В статье также подчёркивается, что в последние десятилетия наблюдается изменение многолетней изменчивости максимальных расходов воды. В ряде случаев отмечается снижение величин экстремального стока, что связано с регулирующим влиянием водохранилищ, перераспределяющих сезонный сток и уменьшающих пики половодья. Вместе с тем в отдельные годы возможны значительные паводки, обусловленные сочетанием гидрометеорологических факторов и особенностями эксплуатации гидротехнических сооружений.

Результаты исследования имеют важное практическое значение для оценки паводковых рисков и управления водными ресурсами бассейна Сырдарьи. Определение расчетных характеристик максимальных расходов и уровней воды позволяет уточнить параметры гидротехнических сооружений, совершенствовать системы прогнозирования паводков и повышать эффективность мероприятий по защите населённых пунктов и сельскохозяйственных территорий от затопления [3; С.75-82].

В 2019 г. Д. Арыстамбекова, М. Турсумбаева, Н. Тевс провели оценку современных гидрологических и экологических условий функционирования дельты реки Сырдарья, расположенной на территории Кызылординской области в зоне Приаралья. Основной целью исследования является комплексная оценка гидроэкологического состояния дельтовых экосистем на

основе анализа гидрологических и гидрохимических показателей, характеризующих современное состояние водных объектов нижнего течения реки.

Авторы отмечают, что формирование современной дельты Сырдарьи связано с существенными изменениями водного режима реки, произошедшими в конце XX века в результате резкого снижения уровня воды в Аральском море. В условиях сокращения притока воды и трансформации русловых процессов произошли значительные изменения гидрологической структуры дельты, включая перераспределение водных потоков, изменение площади водных объектов и деградацию отдельных водно-болотных экосистем.

Для оценки гидроэкологического состояния дельты в исследовании использовались данные гидрологических наблюдений на постах Каратерень и Казалинск, расположенных в нижнем течении реки. Анализ проводился по ряду ключевых показателей, включая уровень воды, годовой объем стока, минерализацию воды, содержание взвешенных веществ, концентрации меди, а также биохимическое потребление кислорода (БПК₅). Полученные значения сравнивались с нормативными показателями предельно допустимых концентраций, что позволило оценить степень антропогенного воздействия на водные экосистемы региона.

Результаты исследования свидетельствуют о том, что гидроэкологическое состояние дельты Сырдарьи в современных условиях характеризуется высокой чувствительностью к изменениям водного режима реки. Для сохранения устойчивости природных систем региона необходимы дальнейшие исследования, направленные на совершенствование мониторинга гидрологических и гидрохимических процессов, а также разработку эффективных механизмов управления водными ресурсами в бассейне реки [4; С.49-62].

В статье Н.Ю. Андрулионис, П.О. Завьялов и А.С. Ижицкий (2022 г.) рассматриваются современные гидрохимические процессы, происходящие в остаточных водоёмах Аральского моря, и анализируется эволюция солевого состава воды в условиях продолжающегося усыхания водоёма. Исследование основано на данных гидрохимических и гидрологических экспедиций, проведённых в 2015, 2016, 2018 и 2019 годах в различных остаточных бассейнах бывшего Аральского моря.

Особое внимание в работе уделяется роли речного притока, прежде всего воды реки Сырдарья, которая в современных условиях является основным источником поступления пресной воды в северную часть бывшего Аральского моря. После разделения водоёма на отдельные бассейны гидрохимические условия в них начали формироваться поразному в зависимости от степени изолированности и наличия притока речной воды. В бассейнах, получающих регулярный приток воды из Сырдарьи, наблюдается относительная стабилизация гидрохимического режима и более низкий

уровень минерализации по сравнению с полностью изолированными водоёмами.

Полученные результаты показывают, что в водоёмах, куда поступает вода из Сырдарьи, сохраняется относительно устойчивый ионный состав, тогда как в изолированных остаточных бассейнах происходят интенсивные процессы испарительного концентрирования солей. Это приводит к значительному росту минерализации и изменению соотношения основных ионов в воде. В статье отмечается, что трансформация солевого состава связана с изменением водного баланса Аральского региона. Сокращение притока воды из рек бассейна, прежде всего Сырдарьи и Амударьи, стало ключевым фактором деградации Аральского моря и формирования современных остаточных водоёмов. Снижение речного стока привело к нарушению естественного гидрологического режима, усилению процессов испарения и накоплению растворённых солей в водной толще [5; С.41-58].

В 2024 г. Э.Чембарисовым и М.Рахимовой была опубликована монография «Река Сырдарья: гидрология и гидроэкология», посвященная комплексному исследованию природных и антропогенных факторов, формирующих современное состояние водных ресурсов реки Сырдарья. В ней рассматриваются особенности формирования стока, гидрологического режима, гидрохимического состава воды, а также экологические последствия интенсивного хозяйственного использования водных ресурсов в бассейне реки. Основной целью исследования является анализ изменений гидрологического и гидроэкологического состояния Сырдарьи в условиях возрастающего антропогенного воздействия и трансформации природной среды.

Особое внимание в ней также уделяется влиянию гидротехнических сооружений на гидрологический режим реки. В частности, отмечается значительная роль таких водохранилищ, как Токтогульское водохранилище, Кайраккумское водохранилище и Чардаринское водохранилище, которые обеспечивают регулирование стока и перераспределение водных ресурсов между энергетическими и ирригационными потребностями стран бассейна. В результате эксплуатации этих гидротехнических объектов произошли существенные изменения сезонного распределения стока, уменьшение весенне-летних половодий и увеличение зимних расходов воды.

В монографии также рассматриваются гидрохимические особенности воды Сырдарьи. Показано, что по мере продвижения реки вниз по течению происходит постепенное увеличение минерализации воды и изменение её ионного состава. В верховьях реки вода характеризуется преимущественно гидрокарбонатно-кальциевым типом, тогда как в среднем и нижнем течении возрастает содержание сульфатов и хлоридов, что связано с поступлением минерализованных коллекторно-дренажных вод и интенсивным испарением в условиях аридного климата. Эти процессы приводят к ухудшению качества воды и оказывают влияние на экологическое состояние водных экосистем.

Отдельный раздел монографии посвящён гидроэкологическим проблемам бассейна Сырдарьи. Авторы отмечают, что интенсивное развитие орошаемого земледелия, значительные водозаборы и возврат коллекторно-дренажных вод привели к изменению естественного водного режима и ухудшению гидрохимических характеристик воды. Эти процессы оказывают влияние на состояние пойменных экосистем, водно-болотных угодий и дельтовых территорий реки, а также на водный баланс Аральского региона.

В целом результаты исследований, представленные в монографии, показывают, что современное гидрологическое и гидроэкологическое состояние Сырдарьи формируется под воздействием сложного комплекса природных и антропогенных факторов [6; С.12-25].

Практические рекомендации по улучшению мониторинга гидрологического и гидрохимического состояния воды р.Сырдарьи

Проведённый анализ показывает, что современное формирование различных уровней и расходов воды Сырдарьи определяется сложным взаимодействием природных и антропогенных факторов. Для повышения точности гидрологических расчетов и прогнозов необходимы дальнейшие исследования, направленные на совершенствование методов анализа существующих гидрологических характеристик и развитие системы мониторинга водного режима реки.

Устойчивость экосистем дельты во многом зависит от поддержания минимально необходимого водного режима. Снижение объёмов стока приводит к сокращению площади водных поверхностей, ухудшению условий существования водной и прибрежной растительности, а также к усилению процессов засоления и деградации природных комплексов. В связи с этим важное значение имеет разработка комплексных мер по регулированию водного режима и сохранению природных экосистем бассейна Сырдарьи.

Выводы

Приведен обзор некоторых современных исследований гидрологического и гидрохимического состояния воды р.Сырдарья по длине реки с учетом анализа опубликованных источников. Анализ опубликованных научных источников позволяет выявить основные закономерности изменения гидрологических и гидрохимических характеристик воды, определить ключевые факторы их трансформации и обозначить существующие экологические проблемы бассейна.

Несмотря на то, что рассмотренные публикации посвящены различным аспектам использования водных ресурсов бассейна Сырдарьи, результаты работ разрознены и требуют их обобщения для комплексной оценки современного состояния водной системы по всей длине реки. В связи с этим дальнейшие исследования гидрологического режима Сырдарьи и его влияния на водный баланс существующих водных объектов имеют важное значение для оценки перспектив восстановления и устойчивого функционирования водных систем региона.

Авторами просмотренных публикаций подчёркивается необходимость совершенствования системы мониторинга водных ресурсов, рационального управления водным режимом и разработки мер по снижению антропогенной нагрузки на водные экосистемы бассейна реки, они также представляют научный интерес и служат важной основой для дальнейших исследований гидрологического и гидрохимического состояния реки Сырдарья.

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ЭКОЛОГИЧЕСКИЕ АСПЕКТЫ ПОВТОРНОГО ИСПОЛЬЗОВАНИЯ КДВ В СЕЛЬСКОМ ХОЗЯЙСТВЕ КАК ДОПОЛНИТЕЛЬНЫЙ ИСТОЧНИК ВОДНЫХ РЕСУРСОВ

***Аннотация.** В статье рассмотрены экологические аспекты повторного использования коллекторно-дренажных вод (КДВ) в сельском хозяйстве как дополнительного источника водных ресурсов в условиях нарастающего водного дефицита в странах Центральной Азии. Проведен анализ формирования и использования возвратных вод в бассейне Аральского моря, а также рассмотрены экологические последствия их сброса и повторного вовлечения в водохозяйственный оборот. Особое внимание уделено проблемам загрязнения КДВ пестицидами, биогенными элементами и минеральными солями, поступающими с орошаемых земель. Представлены результаты лабораторных и натурных исследований по очистке коллекторно-дренажных вод с использованием водных макрофитов (гуагинт, пистия, тростник и др.). Показана высокая эффективность гидробиотического метода очистки, позволяющего существенно снизить концентрацию хлорорганических пестицидов и других загрязняющих веществ. Обоснована целесообразность применения биоплато и биоинженерных сооружений для улучшения качества дренажных вод и их последующего использования в орошении.*

***Ключевые слова.** Коллекторно-дренажные воды, возвратные воды, повторное использование воды, гидробиотическая очистка, водные макрофиты, пестициды, качество воды, орошение, водные ресурсы, Центральная Азия.*

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ENVIRONMENTAL ASPECTS OF REUSE OF CWD IN AGRICULTURE AS AN ADDITIONAL SOURCE OF WATER RESOURCES

Abstract. *The article examines the environmental aspects of the reuse of collector-drainage water (CDW) in agriculture as an additional source of water resources under conditions of increasing water scarcity in Central Asia. An analysis of the formation and use of return waters in the Aral Sea basin is presented, as well as the environmental consequences of their discharge and repeated involvement in water management. Particular attention is paid to the problems of contamination of CDW with pesticides, nutrients, and mineral salts originating from irrigated lands. The paper presents the results of laboratory and field studies on the treatment of collector-drainage water using aquatic macrophytes (water hyacinth, pistia, reed, etc.). The high efficiency of the hydrobotanical treatment method is demonstrated, allowing a significant reduction in the concentration of organochlorine pesticides and other pollutants. The feasibility of using bioplato systems and bioengineering structures to improve the quality of drainage water and enable its subsequent reuse for irrigation is substantiated.*

Keywords. *Collector-drainage water, return water, water reuse, hydrobotanical treatment, aquatic macrophytes, pesticides, water quality, irrigation, water resources, Central Asia.*

Введение

Проблема сохранения водных ресурсов нашей планеты с каждым годом становится все более острой. Развитие промышленности, интенсификация сельского хозяйства, расширение площадей орошаемого земледелия – все это увеличивает потребность определенных природных ресурсов в данном случае водных ресурсов, особенно в условиях Центральной Азии и имеющим место, их нерациональным использованием, а также возросшим антропогенным воздействием, требуется введение определенных корректировок в разрабатываемые комплексные и отраслевые схемы развития региона с перестановкой акцентов с освоения новых земель на реконструкцию оросительных систем и проведение комплекса водосберегающих мероприятий. В этой связи, одним из резервов пополнения дефицита водных ресурсов является повторное использование возвратных вод формирующихся в основном сельскохозяйственном секторе и частично в промышленности, а также коммунально-бытовых.

Возвратные воды, представляющие собой сумму сельскохозяйственных стоков и сточных вод от промкомбыта, составляют величину около 45,87 км³/год или 40% от величины естественного речного стока в регионе. Это огромный запас воды для пополнения дефицита водных ресурсов в бассейне Аральского моря. Сточные воды промкомбыта в этой величине составляют всего лишь 6,9%. Остальная часть – это стоки из

сельскохозяйственного сектора, который равен $42,7 \text{ км}^3/\text{год}$ или более 40% от величины водозабора на орошение. Сегодня они используются повторно лишь в объеме, равным 13% от формируемого объема, в т. ч. в бассейне Сырдарьи они используются более широко – 23,7%, в бассейне Амударьи менее – около 8%. Наиболее интенсивно по абсолютной величине возвратные воды используются в Узбекистане – $4,9 \text{ км}^3$, в Киргизстане формируемый возвратный сток используются полностью – 68 млн. м^3 . Около половина всех возвратных вод ($23,5 \text{ км}^3$) отводится в реки, причем соотношение — это приблизительно одинаково в обоих речных бассейнах. В понижения отводится около $16,4 \text{ км}^3$ возвратных вод, в том числе в бассейне Амударьи – $13,6 \text{ км}^3$, в бассейне Сырдарьи – $2,8 \text{ км}^3$. [1]

Как явствует из вышеперечисленных данных по объему возвратных вод, наиболее значительной является величина стоков из сельскохозяйственных секторов. В ретроспективе динамики этой величины имеется ярко выраженный временный тренд, определяемый повышением использования земель под орошением на фоне интенсивного строительства дренажа. Однако в настоящее время произошло стабилизация в процессе формирования сельхозстоков из-за снижения темпов строительства нового дренажа, а также снижения работоспособности старого дренажа.

В перспективе следует ожидать, что даже при реконструкции существующих дренажных систем и развитии новых, сельскохозяйственный сток будет сокращаться. Это будет происходить под влиянием внедрения водо-сберегающих технологии полива и сокращения оросительных норм. Тем не менее, необходимо отметить, что величина сельскохозяйственного стока неодинаково в годы различной водообеспеченности при прочих равных условиях. Так, анализ показывает, что в целом по региону их величина колебалось от $45,5 \text{ км}^3$ в многоводные годы до 39 км^3 – в маловодные годы. Поэтому в ближайшие 10-15 лет следует ожидать, что суммарный объем возвратных вод в бассейне Аральского моря будет оставаться на одном уровне, т.е. будет колебаться в пределах $42...48 \text{ км}^3/\text{год}$. [2]

Центральная Азия являются зоной интенсивного развития орошения и применения высоких доз удобрений. Внесение больших количеств удобрительных туков связано, в первую очередь, с тем, что в Узбекистане за счет применения минеральных удобрений получают до 50% урожая хлопка-сырца. Так, если по бывшему СССР, согласно данным ЦИНАС, в среднем на гектар пашни приходится по 30 кг удобрений, то в Центральной Азии вносится до 480 кг/га туков. Также ядохимикатов, если в среднем по СССР на 1 га. использовался до 2 кг/га. то только по Республики Узбекистан эти цифры достигали до 55 кг/га. Поэтому до сих пор в наших почвах сохраняются огромные количества этих ядохимикатов, так что мы еще долго будем ощущать присутствии этих ядохимикатов. На выездном 22 пленарном заседании 16 декабря 2021 года Сената Олий Мажлиса состоявшейся в Джизакской области Хоким области Эргаш Солиев сообщил, что ситуация с

экосистемой озёр намного хуже озвученной сенаторами и замглавы Госкомэкологии. По его словам, в советское время в пустынных местностях, в Джизакской и Сырдарьинской областях использовались пестициды в больших объёмах.

«Эти пестициды остались в земле, и при вымывании солей эти пестициды попадают в Айдар-Арнасайскую систему озёр через коллекторы. Недавно при анализе выяснилось, что вредные пески, вредные вещества выявляются в деревьях Ташкента. Это тоже причина высыхания деревьев», — заявил он. [3]

Следует отметить, что возвратные воды являются главным источником загрязнения водной среды региона. В стоках из сельскохозяйственного сектора повсеместно преобладают сульфатные, хлоридные и натриевые ионы. В их составе также содержатся ядохимикаты, биогенные элементы, тяжелые металлы и др. загрязняющие компоненты. Установлено, что в коллекторно-дренажный сет с орошаемых полей выносятся в среднем до 25% азота, 5% фосфата и до 4% ядохимикатов от внесенного количества. [4]

Негативные последствия от возврата в ствол рек минерализованных КДВ и вовлечении их в оборот через речную воду на больших территориях орошаемых земель сказывается и на продуктивности последних и водно-экономических показателей. Анализ динамики водно-экономических показателей рассмотренные в сопоставимых ценах 1983 г. на примере пятилеток с 1971 по 1990 гг. показали явную тенденцию снижения продуктивности орошаемых земель во взаимосвязи с ростом минерализации отражающихся в большей степени на водохозяйственных районах, расположенных в средних и нижних течениях рек (М.А.Якубов, 1997). В бассейне Амударьи в среднее течение входят области: Кашкадарьинская, Бухарская, Самаркандская – по Республике Узбекистан, а также Чарджоуская, Марыйская, Ашгабадская (Туркменистан). Здесь вместе с ростом минерализации с 0,52 до 0,86 г/л и ухудшением водно-солевых балансов орошаемого поля идет снижение продуктивности по всем ВХР в пределах Республики Узбекистан. Стоимость валовой продукции снизилась как на 1 га, так и на 1000 м³ водозабора. В целом по среднему течению СВП на 1 га снизилась с 2080 до 1580 долларов, то есть на 24 %, а, соответственно, на 1000 м³ водозабора – с 200. до 140 долларов или на 30 %. Средняя величина потери продуктивности по стоимости валовой продукции в целом по среднему течению, т.е. ущерб при росте минерализации на 0,1 г/л составил 147 долл/га (табл.5.7). В низовьях Амударьи отмечается еще большее снижение продуктивности земель. Из-за ухудшения качества воды и мелиоративного состояния земель урожайность хлопчатника в Хорезмской области снизилась с 37,7 до 36,6 ц/га, в Каракалпакстане с 29,8 до 20,1 ц/га. Осредненный по нижнему течению ущерб орошаемому земледелию из-за роста минерализации воды на каждые 0,1 г/л составил 134 долл/га. Ежегодный ущерб низовьями оценивается в 550 долларов (в ценах 1983 г.). Влияние роста минерализации речной, оросительной воды на снижение

урожайности и продуктивности орошаемых земель отмечается и в бассейне р.Сырдарьи, хотя в несколько замедленном темпе, чем в бассейне р.Амударьи. Данные показывают, что тенденция снижения продуктивности отмечается даже в пределах наиболее дренированной территории Ферганской долины, то есть в верхнем течении реки. Здесь по трем областям Республики Узбекистан (Ферганская, Наманганская и Андижанская) средняя урожайность хлопчатника снизилась с 30,3 ц/га (1976-1980 гг.) до 28,1 ц/га при незначительном снижении удельного водозабора с 14,5 до 14,0 тыс. м³/га. За это время минерализация оросительной воды увеличилась с 0,35 до 0,5 г/л, из-за чего произошло также снижение стоимости валовой продукции с 2104 до 1870 долларов на 1 га. Средняя величина потерь продуктивности в целом по верхнему течению при росте минерализации на 0,1 г/л составила 158 долл/га. В среднем течении реки Сырдарьи, где минерализация речного стока повысилась до 1,2-1,25 г/л, а оросительной воды до 1,4-1,5 г/л, ухудшение мелиоративного состояния и темпы потерь продуктивности происходят интенсивнее. Урожайность хлопчатника здесь снизилась с 25,1 ц/га в 1976-1980 гг. до 22,7 ц/га в 1986-1990 гг. Снижение стоимости валовой продукции составило от 1438 до 1282 долл/га. Ущерб стоимости валовой продукции при росте минерализации воды на 0,1 г/л в целом по среднему течению составил 71 долл/га по сравнению с 1976-1980 гг. 66 При сопоставлении с ВХР верхнего течения, где стоимость валовой продукции за последние годы оставляет 1867 долл/га продуктивность ВХР среднего течения в 1986-1990 гг.отстает (СВП – 1281 долл/га на 585 долл/га. [5]

Проблемой по использованию Беспалов Н.Ф.-1984 г., Безднина С.Я. 1983 г., Бехбудов А.К. 1973г., Глухова Т.П., Стрельникова Г.А., 1983 г., Духовный В.А., Якубов Х.Э. 1995г., Ибрагимов Г.А.1973г., Икрамов Р.К. 2002 г., Минашина Н.Г. 1974г., Полинов С.А. и др. 1990 г., Рахимбаев Ф.М., Ибрагимов Г.А. 1978 г., Усманов А.У. 1968г., Чембарисов Э.И. и ряд других ученых. В основном эти авторы рекомендовали использовать после их обеззараживания от токсичных солей и других загрязнителей (ядохимикатов), которые влияют на качества культуры и снижение урожая сельскохозяйственных культур. В условиях нарастающего водного дефицита в среднеазиатском регионе одним из резервов пополнения водных ресурсов является повторное использование коллекторно-дренажных вод (КДВ), формирующихся в орошаемой зоне. Повторное использование КДВ с обязательным учетом их количества, качества и изменения гидрохимического режима коллекторов имеет важное значение не только сейчас, но и в будущем как дополнительный источник орошения. Поэтому вопросы, связанные с прогнозом динамики стока и загрязнения КДВ с процессами их самоочищения в озерах, солеприемниках и на транзитных участках коллекторов, выбора технологии гидроботанической очистки сельскохозяйственных стоков от наиболее стойких и токсичных пестицидов и других загрязнителей, становятся в настоящее время наиболее актуальными для центрально азиатского региона.

С другой стороны, высокие дозы внесения агрохимикатов связаны с несоблюдением ротации сельскохозяйственных культур, когда преимущество отдается монокультуре хлопчатника, что ведет к истощению плодородия почвы и уменьшению числа полезных микроорганизмов в орошаемых почвах. Хорошо известно, что продуктивно усваиваются растениями лишь 35...40% внесенного азота и 15...20% фосфора. Остальное количество переходит в трудно усвояемые растениями формы, мигрируют с водой по почвенному профилю, попадает в грунтовые и подземные воды и, в конечном итоге, в реки. При отсутствии специальных водо-охраных мероприятий с орошаемых полей коллекторно-дренажным стоком выносятся до 25% азота и 5% фосфора от вносимого количества. Особенно большую опасность представляет собой вынос ядохимикатов с орошаемых земель, который, по данным ВНИИВО, составляет в среднем 14%, достигая в отдельных случаях 15...30%. Для сравнения: вынос ядохимикатов с неорошаемых площадей в среднем не превышает 1%. [7]

В условиях нарастающего водного дефицита в среднеазиатском регионе одним из резервов пополнения водных ресурсов является повторное использование коллекторно-дренажных вод (КДВ), формирующихся в орошаемой зоне. Повторное использование КДВ с обязательным учетом их количества, качества и изменения гидрохимического режима коллекторов имеет важное значение не только сейчас, но и в будущем как дополнительный источник орошения.

Результаты исследования

Улучшение качества КДВ методом биологической очистки с целью использования их как дополнительный источник для орошения сельскохозяйственных культур имеет важное значение в экономике народного хозяйства Средней Азии, особенно в условиях нарастающего дефицита водных ресурсов.

В этой связи использование КДВ возможно, с одной стороны лишь при систематическом контроле за степенью и видом загрязнения. С другой стороны, назрела необходимость в разработке эффективных технологий очистки этих вод от различных загрязнителей.

В настоящее время для очистки воды апробированы и применяются многие физико-технические, механические и биологические методы. Одним из наиболее эффективных методов очистки сельскохозяйственных стоков и коллекторно-дренажных вод от многих видов пестицидов и биогенных элементов является использование биологических методов, основанных на применении высших водных растений в биоплато (в биологических прудах) и биоинженерных сооружениях. Этот метод привлекает внимание исследователей и практических работников очистных служб своей дешевизной в сравнении с другими существующими методами физико-химической очистки. Так, если стоимость очистки существующими методами варьирует в пределах 1,6...5,0 коп./м³, то ориентировочная

стоимость проведения биологической очистки коллекторно-дренажных вод от загрязнения веществ составит по данным ВНИИВО 300...500 руб/км³. [5]

Современные методы биологической очистки сточных вод, основанные на применении бактерий, водорослей и высших водных растений пока еще не нашли какого-либо применения в народном хозяйстве, что связано в первую очередь с недостаточной изученностью роли растений и водных культур в биологической очистке сточных вод. К тому же плохо изучены экологические способности и методы культивирования этих культур в условиях загрязненных вод.

Роль высших водных и прибрежных растений в очистке сельскохозяйственных стоков, как и их влияние на режим водотоков в различных водоемах неодинаковы. В оросительных каналах эти растения укрепляют берега и препятствуют их размыванию, тогда как в открытых дренах и коллекторах они способствуют заилению и заболачиванию. В рыбоводных прудах и водохранилищах многие из видов водных растений являются прекрасным кормом для многих водных животных и рыб. За рубежом в основном занимался институт Гидробиология АН (Мережко А.И. и др.) Украины.

В Узбекистане биологическими методами очистки сточных вод с применением водных культур занимаются многие научно-исследовательские организации, среди которых необходимо в первую очередь отметить институт ботаники АН УзССР, институт микробиологии АН УЗССР, САНИИРИ, Ташкентский филиал ВОДГЕО и ВНПО "Прогресс".

Следует отметить, что все вышеперечисленные исследователи проводили свои эксперименты в лабораторных условиях, рассчитанные лишь на малые расходы воды. Широкого распространения на производстве эти методы пока еще не получили.

Для изучения активности очистки коллекторно-дренажных вод от пестицидов и других химических загрязнений с использованием макрофитов нами проводились исследования по определению содержания ХОП (ДДТ и его метаболитов, α - и β - ГХЦГ) в воде, донных отложениях, гидробионтах, высших водных растениях крупных магистральных коллекторов среднего течения Сырдарьи (ГПК-420, ЦГК, Восточный и др.) и среднего и нижнего течения Амударьи: Южного (Каршинская степь), Главного Бухарского, Озерного коллекторов, КС-1, КС-3, КС-4, ГКК (ККАССР). Систематически изучались вопрос самоочищения коллекторно-дренажных вод от персистентных пестицидов при прохождении этих вод транзитом через мелководные озера Акчакуль (юг ККАССР), Шоркуль (Хорезмская область), Солёное (Бухарская область) и другие водоемы. (5)

Последние годы проводились исследования (в лабораторных и полевых условиях) по детоксикации пестицидов с использованием различных макрофитов, микроводорослей и микроорганизмов, развивающихся в биоценозе водоема.

Изучаемый способ очистки КДВ от пестицидов основан на способности некоторых видов макрофитов интенсифицировать в водоемах процесс биохимического окисления веществ.

Эксперименты по разработке технологии гидрботанической очистки и определению степени детоксикации ГХЦГ с использованием высших водных растений проводили в лабораторных условиях.

Для опытов использовали сосуды - круглые аквариумы емкостью 20 л.

В качестве поглотителей применяли типичные водные растения: гиацинт, пистию, тростник и ежеголовник. Рабочую среду готовили следующим образом: в аквариум наливали по 9 л водопроводной воды с добавкой 1 л вытяжки из овечьего фекалия (из расчета 3 д/л). В результате получили жидкость густокоричневого цвета. В последующем, согласно варианта опыта, в эту жидкость добавляли растворенный ГХЦГ обеих модификаций, содержащий примеси ДДЕ и ДДТ. Заложили следующие варианты опыта:

1. 0,5 мг/л ГХЦГ + растения;
2. то же, без растений;
3. 1,0 мг/л ГХЦГ + растения;
4. то же, без растений;
5. 2,0 мг/л ГХЦГ + растения;
6. то же, без растений;
7. 3,0 мг/л ГХЦГ + растения;
8. то же, без растений;
9. исходная для всех вариантов питательная среда из овечьего навоза (3 г/л) без пестицидов - для контроля за приростом биомассы.

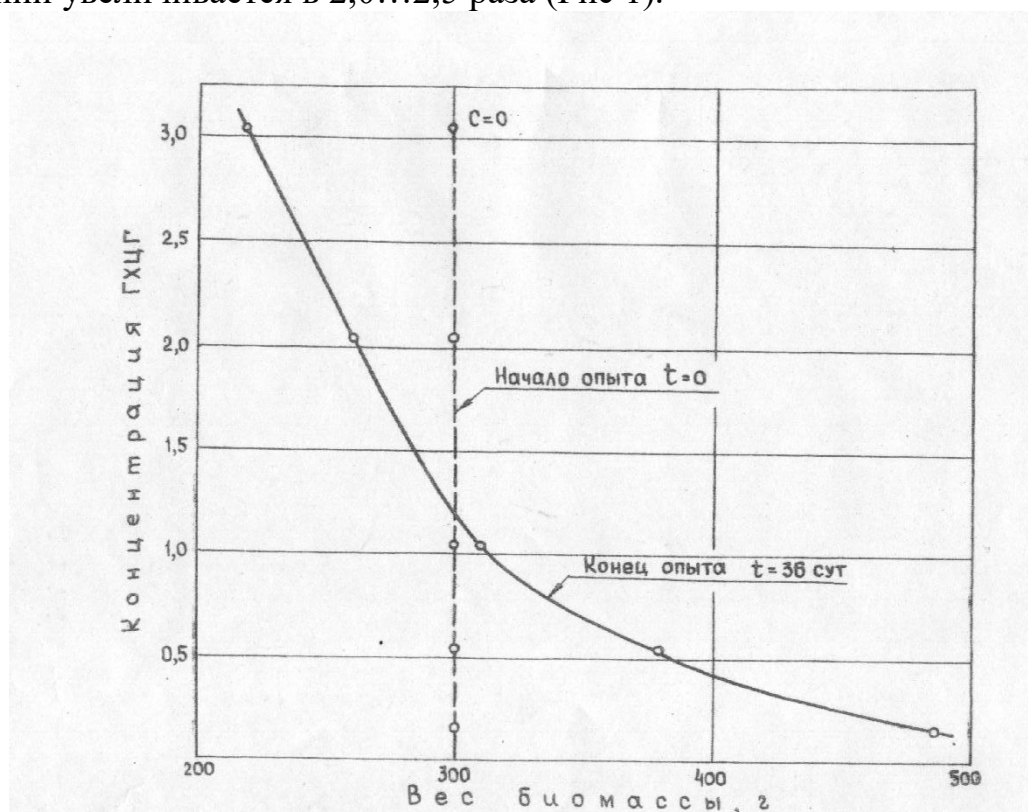
Все опытные аквариумы помещали в тепличные условия, где освещенность в дневное время колебалась в пределах 6,5...8,0 тыс.лк. В течение всего опыта регулярно осуществляли фенологические наблюдения за ростом и развитием растений и отбирали пробы на анализ, по следующей схеме: вода - растения.

В зависимости от концентрации гексахлорциклогексана в рабочих растворах визуально наблюдали определенные морфологические изменения в развитии растений. Так, в варианте с концентрацией 3 мг/л ГХЦГ уже через 36 часов на листьях растений появился желтый налет, что указывало на их заведение и общее ухудшение состояния растений. В то же время, уменьшение концентрации ГХЦГ в рабочих растворах до 6,5...1 мг/л не оказало на растения столь губительного воздействия: даже после 240 часов все растения, несмотря на некоторые появившиеся отрицательные признаки, сохранили жизнеспособность.

В вариантах с концентрацией 2 и 3 мг/л ГХЦГ к концу опыта практически половина всех листьев растений пожелтела и высохла.

Изменение биомассы гиацинта в зависимости от концентрации ГХЦГ во времени представлено на рис.3.3.1.1, откуда следует, что с уменьшением

концентрации ГХЦГ в питательной среде с 3,0 до 0,5 мг/л вес биомассы растений увеличивается в 2,0...2,5 раза (Рис 1).

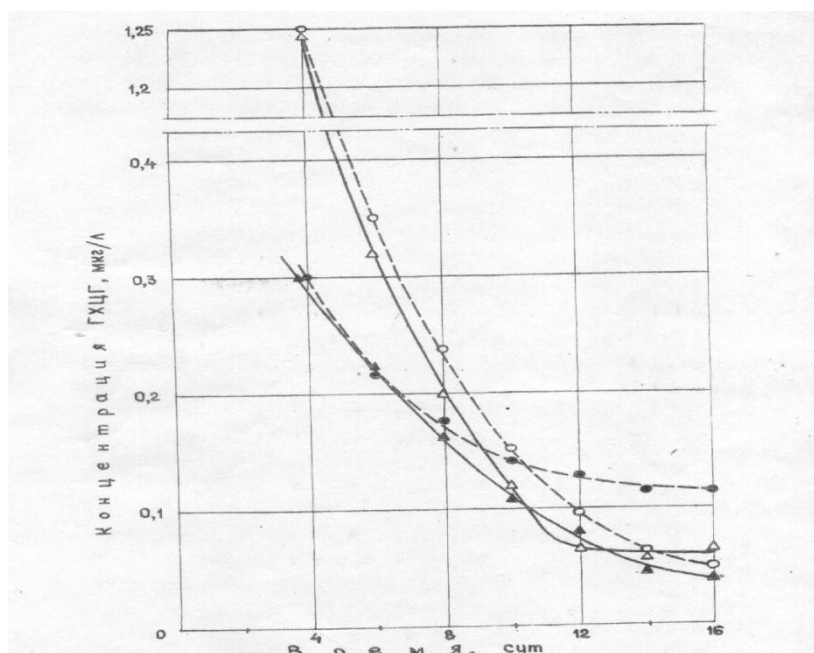


При концентрации 0,5 мг/л к концу опыта (через 10 сут.) содержание α -ГХЦГ в воде уменьшилось до 0,90 мкг/л, а при 1 и 2 мг/л - соответственно, до 0,28 и 0,70 мкг/л. Максимальное накопление пестицида в растениях в опыте происходило через 7 суток, после внесения препарата и составило при концентрациях 0,5 и 2 мг/л, соответственно, 139 и 143 мг/кг для сухой массы растений 73, 75.

С целью приближения опытов к природным условиям лабораторный эксперимент по технологии гидрботанической очистки провели с коллекторно-дренажными водами коллектора Шурузяк. В исходном состоянии загрязнение воды из коллектора характеризуется следующими показателями (отбор воды выполнен по методике): количество α -ГХЦГ составило 0,316, а -ГХЦГ - 1,246 мкг/л.

Опыты проводили в прямоугольных аквариумах емкостью 60 л. Исходный вес культуры составлял 400 г на каждый сосуд. В качестве контроля для сравнения очистного эффекта водного гиацинта каждому опытному варианту соответствовал контрольный, также заполненный коллекторно-дренажной водой, но без растений.

После пяти дней эксперимента концентрация хлорорганических пестицидов в присутствии водного гиацинта и пистии понизилась для α -ГХЦГ до 0,138 мкг/л (в 2,3 раза в сравнении с исходной) и для -ГХЦГ до 0,066 мкг/л (в 18,9 раз), а через 10 дней со дня начала эксперимента эти показатели составили для α -ГХЦГ - 0,002 и для ГХЦГ - 0,041 мкг/л (уменьшение в 68 и 30 раз, соответственно) (рис.2).



На контроле до конца опыта концентрация различных модификации гексахлорциклогексана изменилась значительно меньше и составила, соответственно, 0,172 (уменьшение в 1,8) и 0,112 мкг/л (11,1 раза). Одновременно, с участием в очистительном процессе, водный гиацинт накапливает значительную биомассу - 176,2...190,5 г/м² в сутки в сыром весе.

В повторном эксперименте с водой коллектора Шурузяк проводили наблюдения за изменениями химического состава и биогенных элементов в присутствии водного гиацинта. В этом эксперименте исходная концентрация хлорорганических пестицидов (α -ГХЦГ и -ГХЦГ, ДДУ, ДДТ) и других загрязнений характеризуется следующими показателями (отбор выполнен по методике).

Таким образом, водные культуры гиацинт и пистия показали высокую степень очистки природных КДВ коллектора Шурузяк.

Изменение химического состава КДВ коллектора Шурузяк в течение опыта в присутствии водных культур гиацинта и пистии представлено в табл.

Аналогичные опыты по изучению эффективности водных макрофитов по удалению хлорорганических пестицидов и биогенных веществ были проведены в лотках под открытым небом.

Каждый из лотков длиной 6 м был разделен на 5 частей. Вместительность каждого отсека составила 500 л. В первом отсеке посадили ежеголовник, во втором - тростник и камыш, в третьем - уруть, в четвертом - все водные растения вместе. Пятый отсек - контрольный.

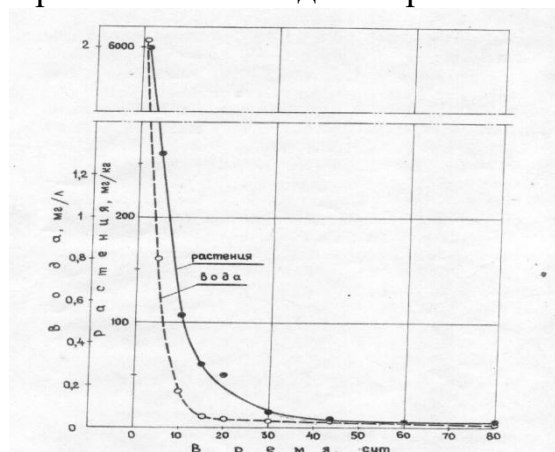
Таблица 1.

Изменение химического состава и концентрации биогенных элементов (МГ/л) в КДВ коллектора Шурузяк в присутствии водных культур гиацинта и пистии

Наименование	Пистия			Гиацинт		
	начало опыта	через 7 суток	через 14 суток	начало опыта	через 7 суток	через 14 суток
Общая жесткость	12,7	11,9	11,8	13,1	12,5	12,6
Кальций	102,2	86,2	84,1	90,2	88,2	71,4
Магний	92,4	92,4	92,4	109,4	105,8	98,5
Хлориды	207,9	193,2	160,4	198,0	190,1	166,3
Сульфаты	691,3	687,2	681,4	701,2	697,9	676,5
Сухой остаток	1532	1480	1426	1506	1504	1460
Биогены						
Аммиак	0,19	0,11	0,08	0,77	0,19	0,068
Нитраты	3,0	1,5	0,9	2,3	0,00	0,00
Фосфаты	0,572	0,228	0,064	0,15	0,68	0,068

Перед посадкой растений на дно лотка слоем 15 см уложили глинистую почву. При посадке ежеголовник имел высоту 58-60 см, остальные растения (кроме урути) - 60-65 см. После посадки растения ежедневно поливали. На 20 день отмечена хорошая приживаемость всех растений. К этому моменту высота растений ежеголовника увеличилась на 15-20 см, а камыша и тростника - на 50-60 см.

Через 20 дней после посадки растений все отсеки были залиты водой (по 500 л). Концентрация внесенного α -ГХЦГ в воде составила 0,1 мг/л. Пробы воды, донных отложений и растений (корневая и надводная части) отбирали через 1, 168, 648 и 1248 часов после внесения препарат. Изменение содержания α -ГХЦГ в растениях и в воде во времени показано на рис.3.



Поглощение α -ГХЦГ из рабочего раствора началось сразу же после внесения препарата. По истечению 52 суток концентрация α -ГХЦГ в воде снизилась с 100,0 мкг/л до 0,300 мкг/л, в то же время в корнях растений она составила 43 мкг/л, а в стеблях - значительно меньше - 34 мкг/л.

В дальнейшем активность этого процесса несколько снизилась.

Методика проведения опытов в полевых условиях

При проведении опытов по очистке коллекторно-дренажных вод на экспериментальном канале в качестве загрязнителя использовали препарат гексахлорциклогексан (ГХЦГ) обеих модификаций, содержащий примеси ДДЕ и ДДТ, а в качестве фильтра-очистителя применили водные макрофиты: тростник, рогоз узколистный и широколистный, гиацинт, пистию и харовые водоросли.

Канал длиной 100 м был построен рядом с коллектором Шурузяк с тем, чтобы проводимые эксперименты в наибольшей степени соответствовали естественным природным условиям. Воду из коллектора Шурузяк подавали насосной установкой в специальный отстойник, находящийся в головной части экспериментального канала. Назначение отстойника - поддержание определенного уровня воды в экспериментальном канале и создание постоянного течения воды в последнем. Кроме того, в отстойник из цистерны емкостью 100 л подавали раствор хлорорганических пестицидов с различной концентрацией.

Весь канал был разделен по своей длине на пять секторов, в каждом из которых посадили по одному из видов водных макрофитов, призванных служить фильтрами-очистителями искусственно загрязненных коллекторно-дренажных вод. В первом секторе длиной 30 м был посажен тростник обыкновенный, во втором секторе в углубленной части посадили пистию и гиацинтом, третий сектор заняли под рогоз малый, далее, в четвертом и пятом секторах посадили, соответственно, роголистник, уруть и рогоз широколистный. Все растения принялись хорошо и к началу опыта была достигнута следующая плотность растений: тростник обыкновенный - 80 шт. на 1 м², рогоз - 60 шт. на 1 м². По длине канала были установлены 3 створа для наблюдения за степенью очистки КДВ от хлорорганических пестицидов.

Одновременно по этим створам проводили наблюдения за изменением гидрохимических параметров коллекторно-дренажных вод с помощью прибора "HORIBA", который предназначен для одновременного определения pH, температуры, концентрации растворенного кислорода, электропроводности и мутности исследуемой воды.

Отбор проб воды на лабораторный анализ по створам экспериментального канала с учетом скорости течения воды и времени добегания проводили по схеме: вода - растения - донные отложения: в нулевом створе через 3 с, в первом, втором и третьем створах - через 3 мин, 7 мин.30 сек и 13 мин., соответственно.

Повторные наблюдения за изменением концентраций хлорорганических пестицидов проводили через 1 час и через 2 суток.

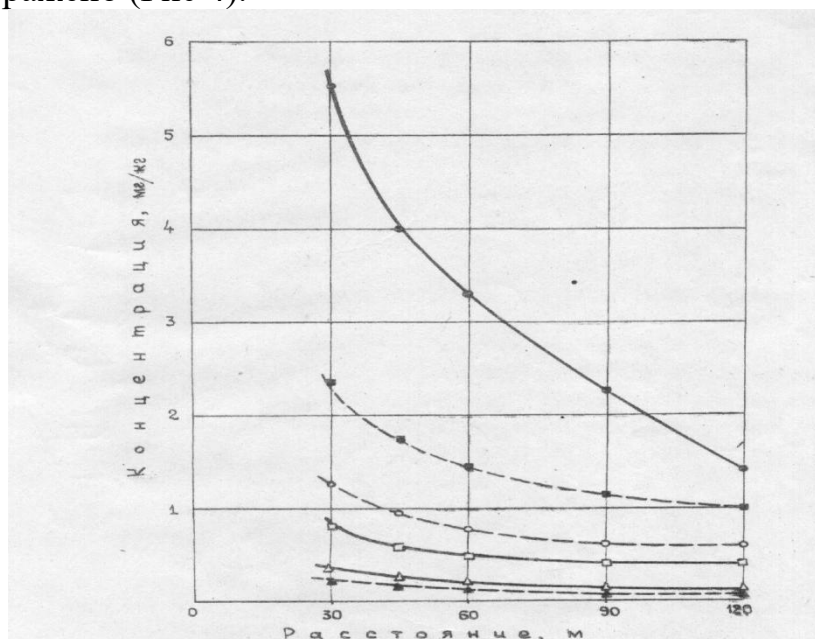
Искусственно загрязненная хлорорганическими пестицидами коллекторно-дренажная вода, пройдя по экспериментальному каналу через фильтр-очиститель из водных макрофитов, сбрасывалась затем в коллектор Шурузяк.

Аналогичные эксперименты проводили также на коллекторах Среднечирчикского района Ташкентской области. При этом выбирали участок коллектора длиной 140-150 м, который разбивали на три равных участка. ПО всей длине коллектора должны были произрастать водные макрофиты (заросли тростника, рогоза и др. растений) с необходимой густотой стояния (150-350 шт./м²) растений.

Пробы коллекторно-дренажных вод отбирали сначала для определения фоновой концентрации ГХЦГ, а затем в определенные моменты времени с начала опыта (после внесения препарата) с учетом скорости добегания воды до каждого створа. Последующий отбор производили через 4 суток и через месяц.

Анализ отобранных проб показал, что по длине участка по мере прохождения через заросли растений, концентрация пестицидов в воде уменьшается в первом створе с 0,4102 мкг/л до 0,043 мкг/л, во втором и третьем, соответственно, с 0,800 мкг/л до 0,1292 мкг/л и с 0,900 мкг/л до 0,121 мкг/л. В начальном створе концентрация α -ГХЦГ в растениях составила 5,5 мкг/кг, во втором (через 60 м) - 3,4 мкг/кг, в третьем - 1,5 мкг/кг. К концу опыта, через месяц, концентрация пестицида в растениях снизилась по створам, соответственно, до 0,2 мкг/кг, 0,12 мкг/кг и 0,07 мкг/кг.

Изменение концентрации α -ГХЦГ и δ -ГХЦГ по длине коллектора в растениях отражено (Рис 4).



Аналитические данные коллекторно-дренажных вод, искусственно загрязненных хлорорганическими пестицидами, показывают на высокую степень очистки в процессе прохождения их через фильтр из водных макрофитов: тростник обыкновенный (*Phragmites communis*), пистию с гиацинтом, рогоз малый (*Tyhuminiima*), харовые водоросли, рогоз широколистный и др. виды растений. Уже в первых порциях КДВ концентрации всех испытуемых пестицидов к концу канала уменьшается более, чем на 90 % (α -ГХЦГ - на 93,9 %, δ -ГХЦГ - на 97,3 %, ДДЕ - на 90,1

% и ДДТ - на 97,8 %). Через час наблюдений концентрация ХОП в коллекторно-дренажной воде уменьшилась для модификации гексахлорциклогексана до долей процента к исходному количеству, а через двое суток стала не более фонового содержания.

Последовательное прохождение коллекторно-дренажной воды через фильтр, составленный из различных видов водных макрофитов, позволяет приближенно оценить селективную способность каждого из них к очистке КДВ от хлорорганических пестицидов (табл. 2).

Параллельно с изучением очистного действия водных макрофитов проводили исследования динамики гидрохимических показателей коллекторно-дренажных вод в экспериментальном канале.

Эти исследования показали, что заросли водных культур выделяют большое количество растворенного кислорода, благодаря чему ускоряются биохимические процессы, ведущие к окислению и деструкции КДВ хлорорганических пестицидов.

Таблица 2

Приближенная оценка селективной эффективности водных макрофитов по очистке коллекторно-дренажных вод от гексахлорциклогексана

Вид водных макрофитов	Количество ГХЦГ, удаленного из КДВ, % к исходному содержанию	
	α -ГХЦГ	-ГХЦГ
Тростник	80,2	80,2
Гиацинт + пистия + рогоз малый	41,3	63,6
Харовые водоросли + рогоз широколистный	47,4	62,7

Количество растворенного в коллекторно-дренажных водах кислорода увеличивается уже от нулевого створа до первого в 3,5 раза и поддерживается затем примерно на этом уровне (9,7-11,5 мг/л). При растворении хлорорганических пестицидов в КДВ щелочность их падает до рН 6,5, однако затем она быстро восстанавливается до нормальных величин рН 7,6-7,9 при прохождении вод через фильтр водных культур. Одновременно с этим происходит резкое осветление КДВ - мутность их уже ко второму створу уменьшается в 45 раз. Оба эти фактора также косвенно указывают на проходящий в экспериментальном канале процесс очистки КДВ от хлорорганических пестицидов.

Температура КДВ и их электропроводность в процессе опыта практически сохранялись на постоянном уровне ($t = 25,8-26,4^{\circ}\text{C}$; электропроводность - 1,5-1,6 см/м).

Для эксперимента в натуральных условиях выбрали коллектор с зарослями высших водных растений (тростник, рогоз узколистный, рогоз широколистный и др. макрофиты). Плотность растений составила 100-350 шт/м². Течение воды в коллекторе осуществлялось с расходом около 1 м³/с. Коллектор разделили на три створа, каждый до 30 м длиной. Препарат ГХЦГ

4 %-ной концентрации вносили по всей ширине коллектора. Пробы загрязненной воды отбирали на анализ постворно, учитывая скорость добегания протока. Аналитические данные указывают, что загрязненная гексахлорциклогексаном коллекторно-дренажная вода хорошо очищается при прохождении ее через заросли водных растений, при этом концентрация пестицидов в воде уменьшается в несколько раз.

В первых порциях загрязненной, искусственно внесенными пестицидами воды ко второму створу, через 60 м фильтра из водных макрофитов, содержание ХОП уменьшается во много раз: α -ГХЦГ - 86, - ГХЦГ - 45, ДДЕ - 21 и ДДТ -2.

Через 6 часов после начала опыта концентрация пестицидов в коллекторно-дренажных водах стабилизируется и становится практически неотличимой от первоначального содержания.

Заключение

Как показали исследования, очистка сбросных и коллекторно-дренажных вод должна осуществляться в искусственно создаваемых биопрудах (биолато) или непосредственно в самих коллекторах.

Биопруд (биолато) представляет собой водоохранное сооружение или особый конструктивный элемент гидротехнического сооружения, в котором сообщество высших водных растений как искусственного, так и естественного происхождения используется в качестве биофильтра для очистки воды от загрязняющих веществ, в т.ч. и от хлорорганических пестицидов.

Механизм очистки воды на биолато достаточно сложен и существенно различен для разных загрязняющих примесей. Очистку воды осуществляют не только высшие водные растения, но все сообщество биолато в целом - бактериальное население зарослей, донные, эпифитные и планктонные водоросли, а также беспозвоночные животные.

Разложение взвешенных и растворенных в воде органических веществ в зарослях макрофитов осуществляется, как и при других методах биологической очистки, главным образом, бактериями и частично беспозвоночными животными. Однако, главным отличием является то, что основным агентом на биолато является бактериоперифитон - бактериальная пленка, образующаяся и развивающаяся на подводной части растений. Именно эта пленка обеспечивает высокую интенсивность деструктивных процессов.

В условиях жаркого климата Средней Азии, благодаря обилию солнечного света и большой продолжительности теплого периода года, наиболее эффективно и экономически выгодно использование всех вышеуказанных водных макрофитов. Вегетационный период этих растений доходит до 9-10 месяцев.

Во всех случаях следует, в основном, ориентироваться на создание в пределах биолато самовозобновляющегося общества, что наиболее эффективно при очистке и улучшении качества воды. Этим основным

требованиям: хорошей очистной способности и самовоспроизводству в конкретных экологических условиях, более всего отвечает и наиболее перспективен при сооружении биоплато тростник обыкновенный, который играет ведущую роль в процессах естественного зарастания искусственных водотоков.

Проблема создания водоохранного сооружения на основе использования сообщества воздушно-водных растений - биоплато - на коллекторах, сбрасывающих воды в реки или озер, прежде всего, связана с определением его количественных параметров, зависящих от очистительной способности сообщества растений, особенно в области низких концентрациях загрязняющих природные воды органических веществ. При разработке методики расчета биоплато в принятии конструктивных решений следует обеспечить выделение достаточных площадей с соблюдением технико-экономических ограничений, учитывающих их специфичность и принятых в технологии строительства и эксплуатации подобных сооружений.

Естественно формирующиеся на берегах и русле коллекторов заросли водных макрофитов могут и должны быть использованы при сооружении биоплато. Однако, их параметры (длина, ширина), как правило, недостаточны для достижения необходимого эффекта очистки воды. Кроме того, развитие зарослей макрофитов растягивается обычно на длительное время. В полностью сформированном виде, удовлетворяющем условиям очистки, эти заросли возникают на отдельных участках коллекторов лишь через несколько лет их эксплуатации.

Следует иметь в виду, что накопление тяжелых металлов и пестицидов в корневых системах водных культур намного превышает их содержание в наземной фитомассе. Именно это обстоятельство способствует захоронению загрязняющих примесей в донных отложениях и во многом предотвращает поступление их в воду.

Несмотря на это, в технологии эксплуатации биоплато нами предусматриваются вопросы уборки фитомассы. При этом, во – первых, можно избежать вторичного загрязнения воды и, во – вторых, можно использовать убранную фитомассу для животноводческих целей как корма, если содержание загрязняющих веществ не превышает допустимые нормы (ПДК). В другом случае тростник можно использовать как местный строительный материал.

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АДАПТАЦИЯ МЕТОДИКИ ВНУТРЕННЕГО АУДИТА РАСЧЕТОВ ПО ЗАРАБОТНОЙ ПЛАТЕ К УСЛОВИЯМ МИКРОПРЕДПРИЯТИЙ ОБЩЕСТВЕННОГО ПИТАНИЯ

***Аннотация.** В статье обосновывается необходимость пересмотра традиционных подходов к внутреннему аудиту расчетов по заработной плате в микропредприятиях. На основе анализа позиций ведущих российских ученых выявлены ключевые противоречия между требованиями нормативного регулирования и ресурсными возможностями малых организаций. Представлена методика внутреннего аудита, адаптированная к условиям микропредприятий общественного питания. Результаты апробации на трех предприятиях Оренбургской области подтверждают ее эффективность: снижение уровня существенности, сокращение трудозатрат, предотвращение финансовых потерь.*

***Ключевые слова:** внутренний аудит, расчеты по заработной плате, микропредприятия, общественное питание, риск-ориентированный подход, методика аудита.*

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ADAPTATION OF THE INTERNAL AUDIT METHODOLOGY FOR PAYROLL SETTLEMENTS TO THE CONDITIONS OF PUBLIC CATERING MICRO-ENTERPRISES

***Abstract.** The article substantiates the need to revise traditional approaches to internal audit of payroll settlements in micro-enterprises. Based on the analysis of the positions of leading Russian scientists, the key contradictions between the requirements of regulatory regulation and the resource capabilities of small organizations are identified. The author's internal audit methodology adapted to the conditions of public catering micro-enterprises is presented. The results of approbation at three enterprises of the Orenburg region confirm its effectiveness: reducing the level of materiality, reducing labor costs, preventing financial losses.*

***Keywords:** internal audit, payroll settlements, micro-enterprises, public catering, risk-based approach, audit methodology.*

В современных условиях расчеты по заработной плате остаются одним из наиболее сложных и рискованных участков бухгалтерского учета. Ошибки в начислении, удержаниях и выплатах влекут не только финансовые санкции со стороны контролирующих органов, но и репутационные потери, а также угрозу трудовых споров. Особенно остро проблема стоит в сегменте общественного питания. Существующие методики внутреннего аудита, ориентированные на крупные компании с развитой системой контроля, в таких условиях оказываются неприменимыми. Анализ научной литературы последних лет позволяет выделить несколько ключевых позиций, определяющих современное понимание внутреннего аудита расчетов с персоналом. О.Ф. Ермишина акцентирует внимание на том, что роль аудиторских проверок в обеспечении достоверности отчетности обусловлена их независимостью и объективностью [1]. О.Ф. Ермишина обращает внимание на то, что именно независимость аудитора позволяет сформировать беспристрастное суждение о достоверности отчетности [1]. По мнению исследователя, внутренний аудит сегодня уже не сводится к одной лишь контрольной функции — он превращается в значимый инструмент повышения общей результативности хозяйствующего субъекта. Данное обстоятельство приобретает особую актуальность в связи с требованием об обязательной организации внутреннего контроля, закреплённым в Федеральном законе № 402-ФЗ.

В работах Д.А. Юнусовой проблема рассматривается сквозь призму усложнения организационных структур [2]. Учёный указывает: чем больше уровней управления, тем выше риски искажения информации при её передаче и тем вероятнее принятие подразделениями решений, не согласующихся друг с другом. В такой конфигурации внутренний аудит выполняет компенсаторную миссию, позволяя нивелировать негативные последствия, порождаемые масштабированием бизнеса.

Д.Х. Мирзоева и П.А. Ибрагимова обосновывают, что место внутреннего аудита в корпоративной системе управления отнюдь не второстепенно [3]. Когда данная функция организована надлежащим образом, возрастает степень доверия со стороны потенциальных инвесторов, а инвестиционная привлекательность компании получает дополнительный импульс. В условиях макроэкономической турбулентности, как подчёркивают авторы, внутренний аудит выходит за рамки финансового контроля, охватывая задачи прогнозирования рисков, консультирования высшего руководства и содействия в выстраивании системы риск-менеджмента. Р.А. Маккаева, П.А. Ибрагимова и Ф.Н. Агавердиев в своих работах раскрывают исторический аспект эволюции внутреннего аудита [4]. Они указывают, что первоначально внутренний аудит отвечал только за анализ рисков, связанных с финансовой отчетностью и налогообложением. С глобализацией экономики и увеличением количества крупных организаций его задачи расширились, охватывая все отрасли деятельности предприятия.

И.И. Чебышев дает наиболее глубокое теоретическое обоснование стратегической роли внутреннего аудита [5].

Обобщая позиции указанных авторов, можно сделать вывод, что в российской науке сложилось понимание внутреннего аудита как полноправного элемента корпоративного управления, выходящего за рамки традиционного финансового контроля. Однако, как справедливо отмечают исследователи, существующие методики ориентированы преимущественно на крупные компании с развитой инфраструктурой внутреннего контроля и практически не адаптированы к реалиям микропредприятий, где независимая аудиторская служба отсутствует, а функции проверки выполняет тот же специалист, который ведет учет.

С учётом выявленных противоречий автором настоящей статьи предложена и прошла экспериментальную проверку методика внутреннего аудита расчётов по оплате труда, ориентированная на микропредприятия сферы общественного питания. В основу положен риск-ориентированный подход, адаптированный к отраслевым особенностям: сезонная динамика загрузки персонала, неформальные поступления в виде чаевых, разъездной формат деятельности, совмещение работниками различных должностных обязанностей. В отличие от традиционных решений, рассчитанных на крупный бизнес с разветвлённой системой внутреннего контроля, предлагаемый инструментарий вводит весовые коэффициенты для идентификации отраслевых рисков, благодаря чему уровень существенности может корректироваться оперативно, в зависимости от выявленных факторов. Календарный план аудиторских процедур выстроен в строгом соответствии со сроками представления обязательных форм отчётности, что позволяет выдерживать установленную периодичность проверок, не создавая избыточной нагрузки на работников бухгалтерии. Внедрение унифицированных форм рабочей документации даёт возможность систематизировать процесс накопления аудиторских доказательств и формировать итоговое заключение, адресованное руководству организации. Помимо этого, в состав методики включены специальные процедурные решения, направленные на выведение неформальных выплат в легальное поле с последующим их отражением при исчислении налоговой базы; за счёт этого снижается уровень фискальных рисков. Апробация предложенного инструментария проведена на трёх микропредприятиях, осуществляющих деятельность в сфере общественного питания на территории Оренбургской области. По результатам экспериментального применения установлено, что использование разработанной методики позволяет обнаруживать ошибки, которые при традиционном формате самоконтроля оставались невыявленными. В ходе апробации оперативно устранены нарушения двух типов: исключение разовых премий из базы для расчёта среднего заработка, а также некорректное документальное оформление доплат, носящих сезонный характер. При этом трудозатраты главного бухгалтера, связанные с

проведением внутреннего контроля, сократились, а степень полноты выявления отклонений, напротив, повысилась.

Таким образом, предложенная методика внутреннего аудита расчётов по оплате труда позволяет адаптировать риск-ориентированный подход к условиям функционирования микропредприятий сферы общественного питания. Её применение обеспечивает более высокую чувствительность контрольных мероприятий к отраслевым рискам, ведёт к сокращению временных затрат на проведение проверок и даёт возможность своевременно выявлять ошибки, допускаемые при ведении учёта.

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ИНТЕГРАЦИЯ ТЕКСТИЛЯ ПО ПРИНЦИПУ ZERO-WASTE В ДИЗАЙНЕ МЕБЕЛИ

Аннотация: В статье рассматриваются особенности интеграции текстиля в мебельный дизайн на принципах zero-waste в контексте современного устойчивого проектирования. Раскрывается сущность концепции zero-waste как подхода, ориентированного на предотвращение образования отходов за счет рационального использования материалов, продуманной организации проектного процесса и учета жизненного цикла изделия. Особое внимание уделяется роли текстиля в мебельном проектировании, где он выступает не только как декоративный, но и как функциональный, конструктивный и эргономический элемент. Анализируются основные способы безотходной интеграции текстиля, включая рациональный раскрой, повторное использование остатков ткани, применение переработанных материалов, а также модульные и трансформируемые решения. Отмечаются экологические, эстетические и технологические преимущества данного подхода, а также ограничения, связанные со сложностью проектирования, спецификой вторичных материалов и необходимостью адаптации производственных процессов. Делается вывод о том, что интеграция текстиля по принципу zero-waste является перспективным направлением развития мебельного дизайна, сочетающим экологическую ответственность, функциональность и художественную выразительность.

Ключевые слова: zero-waste, устойчивый дизайн, дизайн мебели, текстиль, интеграция текстиля, безотходное проектирование, циркулярная экономика, экологичный дизайн

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ZERO-WASTE TEXTILE INTEGRATION IN FURNITURE DESIGN

Abstract: The article examines the features of textile integration in furniture design based on zero-waste principles within the framework of contemporary sustainable design. It reveals the essence of the zero-waste concept as an approach aimed at preventing waste generation through the rational use of materials, thoughtful organization of the design process, and consideration of the

product life cycle. Special attention is given to the role of textiles in furniture design, where they function not only as decorative elements but also as functional, structural, and ergonomic components. The paper analyzes the main methods of waste-free textile integration, including efficient pattern cutting, reuse of fabric remnants, application of recycled materials, as well as modular and transformable solutions. The environmental, aesthetic, and technological advantages of this approach are identified, along with the limitations associated with design complexity, the specific properties of secondary materials, and the need to adapt production processes. It is concluded that zero-waste textile integration is a promising direction in the development of furniture design, combining environmental responsibility, functionality, and artistic expressiveness.

Keywords: *zero-waste, sustainable design, furniture design, textiles, textile integration, waste-free design, circular economy, eco-design*

Введение

В условиях усиления экологических проблем и роста внимания к принципам устойчивого развития особую актуальность приобретает поиск новых подходов к проектированию предметной среды, направленных на сокращение отходов и рациональное использование ресурсов. Современный дизайн все чаще рассматривается не только как средство формообразования, но и как инструмент решения экологических и производственных задач. В этом контексте значительный интерес представляет концепция *zero-waste*, предполагающая минимизацию или полное исключение отходов на всех этапах создания изделия [1].

Особую значимость данный подход приобретает в мебельном дизайне, где текстиль выполняет декоративные, функциональные и эргономические функции, но одновременно нередко становится источником значительного объема отходов, возникающих в процессе раскроя, производства и последующей эксплуатации изделий. Это требует переосмысления роли текстиля в мебели с позиции более эффективного использования материалов и снижения экологической нагрузки.

Применение принципов *zero-waste* в мебельном проектировании связано не только с изменением производственных решений, но и с трансформацией дизайнерского мышления, при которой текстиль рассматривается как важный элемент общей проектной системы. Исследование данной темы позволяет выявить потенциал безотходной интеграции текстиля в создании устойчивых мебельных решений, сочетающих экологичность, функциональность и эстетическую выразительность.

Целью данной статьи является рассмотрение особенностей интеграции текстиля в мебельный дизайн на принципах *zero-waste*, а также определение преимуществ и ограничений данного подхода в контексте современного устойчивого проектирования.

Концепция *zero-waste* и ее значение в современном мебельном дизайне

Концепция *zero-waste* представляет собой подход к проектированию и производству, ориентированный на предотвращение образования отходов за счет более рационального использования материалов, продуманной организации технологических процессов и учета полного жизненного цикла изделия. В основе данного подхода лежит стремление не просто сократить количество производственных остатков, а переосмыслить саму логику взаимодействия между материалом, формой и функцией объекта. В результате внимание переносится с последующей утилизации отходов на их предупреждение еще на стадии проектной разработки.

В современном дизайне концепция *zero-waste* тесно связана с принципами устойчивого развития и циркулярной экономики, предполагающими продление срока службы материалов, повторное использование ресурсов и снижение негативного воздействия на окружающую среду. Для мебельной отрасли этот подход особенно значим, поскольку производство мебели требует сочетания различных материалов, каждый из которых формирует собственные экологические и технологические риски. В этой системе текстиль занимает особое место, так как одновременно влияет на эстетические характеристики изделия, его комфорт, эргономику и эксплуатационные свойства [2].

Включение принципов *zero-waste* в мебельный дизайн означает переход от традиционного понимания текстиля как отделочного элемента к его восприятию как полноценного компонента проектной структуры. Такой подход открывает возможности для создания мебели, в которой текстиль используется более осмысленно: с учетом его размеров, свойств, способов соединения, износостойкости и потенциала повторного применения. Тем самым концепция *zero-waste* становится не только экологической стратегией, но и важным фактором обновления художественно-проектных и технологических решений в современном мебельном дизайне.

Особенности интеграции текстиля в мебельное проектирование на принципах безотходности

Интеграция текстиля в мебельное проектирование на принципах безотходности предполагает такой подход к разработке изделия, при котором свойства материала, способы его раскроя и дальнейшего использования учитываются уже на начальной стадии проектирования. В данном случае текстиль рассматривается не как вторичный декоративный компонент, а как активный элемент, влияющий на форму, конструкцию и функциональные характеристики мебели. Это позволяет сократить объем производственных остатков и повысить общую экологическую эффективность изделия.

Одним из ключевых методов является рациональный раскрой текстильных материалов, при котором форма деталей проектируется с учетом ширины полотна, геометрии элементов и возможностей их

максимально полного использования. Такой подход требует высокой точности проектных решений, поскольку любые ошибки на стадии моделирования приводят к образованию избыточных отходов. Существенную роль играет и повторное использование остатков ткани, которые могут включаться в состав новых мебельных объектов, декоративных элементов, съемных чехлов или модульных компонентов [3].

Важное значение имеет также применение переработанного и вторично используемого текстиля. Использование таких материалов способствует снижению нагрузки на природные ресурсы и расширяет возможности экологически ориентированного дизайна. Вместе с тем это требует учета специфических характеристик сырья, включая прочность, износостойкость, тактильные свойства и визуальное качество. В условиях безотходного проектирования особую ценность приобретают модульные и трансформируемые решения, позволяющие заменять отдельные текстильные элементы без полной замены изделия, продлевая срок его службы.

Интеграция текстиля на принципах *zero-waste* основывается не только на сокращении отходов, но и на формировании новой проектной логики, в которой материал, конструкция и функция рассматриваются как взаимосвязанные элементы единой системы. Такой подход способствует созданию мебели, отвечающей современным требованиям устойчивого дизайна и более рационального использования ресурсов.

Преимущества и ограничения *zero-waste textile integration* в дизайне мебели

Интеграция текстиля в мебельный дизайн на принципах *zero-waste* обладает рядом существенных преимуществ, связанных прежде всего с экологизацией проектной и производственной практики. Такой подход способствует сокращению объема текстильных отходов, более рациональному использованию сырья и снижению негативного воздействия на окружающую среду. Кроме того, он соответствует современным требованиям устойчивого развития и формирует основу для перехода от линейной модели потребления к более замкнутым и ресурсосберегающим системам производства [4].

Не менее важным преимуществом является расширение проектных возможностей мебели. Использование безотходных принципов стимулирует поиск новых конструктивных и композиционных решений, влияет на эстетику изделия и способствует формированию более осмысленного отношения к материалу. В результате текстиль начинает восприниматься не только как средство отделки, но и как значимый фактор, определяющий функциональные и художественные качества мебельного объекта. Это усиливает инновационный потенциал современного дизайна и открывает перспективы для создания более адаптивных и долговечных изделий.

Вместе с тем реализация данного подхода связана с рядом ограничений. К ним относятся технологическая сложность точного проектирования, зависимость от характеристик конкретных текстильных

материалов, а также необходимость адаптации производственных процессов к новым принципам работы. Дополнительные трудности могут возникать при использовании вторичного или переработанного текстиля, качество и свойства которого не всегда отличаются стабильностью. Кроме того, внедрение безотходных решений требует изменения как профессионального дизайнерского мышления, так и потребительского восприятия, поскольку подобные изделия нередко выходят за рамки привычных стандартов формы, фактуры и визуальной завершенности.

Zero-waste textile integration в дизайне мебели следует рассматривать как перспективное, но одновременно сложное направление, эффективность которого зависит от сочетания экологических целей, технологических возможностей и уровня готовности отрасли к инновационным изменениям.

Заключение

Интеграция текстиля в мебельный дизайн на принципах *zero-waste* представляет собой одно из перспективных направлений развития современного устойчивого проектирования. Рассмотрение данной темы показывает, что безотходный подход выходит за пределы простой минимизации производственных остатков и затрагивает более широкий круг вопросов, связанных с рациональным использованием ресурсов, изменением проектного мышления и поиском новых эстетических и конструктивных решений.

Применение принципов *zero-waste* в работе с текстилем позволяет повысить экологическую эффективность мебельных изделий, продлить срок их службы и расширить возможности повторного использования материалов. Одновременно данный подход требует более высокой точности проектирования, учета свойств текстиля на всех этапах разработки изделия и адаптации производственных процессов к новым условиям.

В целом можно сделать вывод, что безотходная интеграция текстиля обладает значительным потенциалом в контексте мебельного дизайна, поскольку объединяет экологическую ответственность, функциональность и художественную выразительность. Дальнейшее развитие данного направления связано с совершенствованием технологий, расширением практик переработки материалов и укреплением принципов устойчивого дизайна в мебельной отрасли.

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РОЛЬ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В ПРЕПОДАВАНИИ ИНОСТРАННЫХ ЯЗЫКОВ

Аннотация: В статье рассматривается роль искусственного интеллекта в преподавании иностранных языков в условиях цифровизации образования. Анализируются дидактические возможности ИИ, его влияние на формирование коммуникативной компетенции обучающихся, а также представлены результаты экспериментального исследования. Делается вывод о высокой эффективности использования ИИ при условии его интеграции с традиционными методами обучения.

Цель статьи — определить роль и возможности искусственного интеллекта в преподавании иностранных языков, а также выявить его преимущества и ограничения с учётом современных тенденций развития системы образования Республики Узбекистан.

Ключевые слова: искусственный интеллект, обучение иностранным языкам, цифровизация, коммуникативная компетенция, адаптивное обучение.

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THE ROLE OF ARTIFICIAL INTELLIGENCE IN TEACHING FOREIGN LANGUAGES

Abstract: The article examines the role of artificial intelligence in teaching foreign languages in the context of digitalization of education. The didactic potential of AI, its impact on communicative competence, and the results of an experimental study are analyzed. The study concludes that AI significantly improves learning outcomes when integrated with traditional teaching methods.

The aim of the article is to determine the role and capabilities of artificial intelligence in foreign language teaching, as well as to identify its advantages and limitations in the context of modern trends in the development of the education system of the Republic of Uzbekistan.

Keywords: artificial intelligence, foreign language teaching, digitalization, communicative competence, adaptive learning.

ВВЕДЕНИЕ

Современный этап развития образования характеризуется активным внедрением цифровых технологий, среди которых особое место занимает искусственный интеллект (ИИ). Использование ИИ в преподавании иностранных языков становится одним из ключевых направлений модернизации образовательного процесса.

В Республике Узбекистан вопросы цифровизации образования и внедрения современных информационно-коммуникационных технологий, включая элементы искусственного интеллекта, определены в числе приоритетных направлений государственной политики. В рамках проводимых реформ особое внимание уделяется развитию цифровой образовательной среды, повышению качества преподавания иностранных языков, а также внедрению инновационных методик обучения. В частности, реализуются государственные программы, направленные на развитие цифровой инфраструктуры, повышение цифровой компетентности педагогов и расширение использования онлайн-платформ в образовательном процессе.

Актуальность исследования обусловлена необходимостью повышения эффективности обучения, индивидуализации образовательных траекторий и развития коммуникативной компетенции обучающихся в условиях цифровой трансформации образования. В Узбекистане данная проблема приобретает особую значимость в связи с растущими требованиями к уровню владения иностранными языками и интеграцией в международное образовательное пространство.

1. ТЕОРЕТИЧЕСКИЕ ОСНОВЫ ИСПОЛЬЗОВАНИЯ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В ОБРАЗОВАНИИ

Искусственный интеллект представляет собой совокупность технологий, позволяющих системам анализировать данные, обучаться и принимать решения, имитируя когнитивные функции человека. В образовательной сфере ИИ применяется в рамках компьютерно-ассистированного обучения (CALL).

Современные исследования показывают, что ИИ способен значительно повысить эффективность обучения за счет адаптации учебного материала к индивидуальным особенностям обучающихся.

Особую роль играет развитие разговорных систем ИИ, которые способны вести диалог, анализировать речь и предоставлять обратную связь. Это открывает новые возможности для формирования речевых навыков.

2. ВОЗМОЖНОСТИ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА В ОБУЧЕНИИ ИНОСТРАННЫМ ЯЗЫКАМ

2.1 Персонализация обучения

Одним из наиболее значимых преимуществ использования искусственного интеллекта в преподавании иностранных языков является возможность реализации персонализированного обучения. В отличие от традиционной модели образования, ориентированной на усреднённого

обучающегося, ИИ позволяет адаптировать учебный процесс с учётом индивидуальных особенностей каждого студента.

Персонализация обучения на основе ИИ осуществляется за счёт анализа больших массивов данных о деятельности обучающегося: уровня владения языком, темпа усвоения материала, типичных ошибок и предпочтений в обучении. На основе этих данных интеллектуальные системы формируют индивидуальные образовательные траектории, что обеспечивает более эффективное усвоение материала.

Одной из ключевых технологий, обеспечивающих персонализацию, являются **адаптивные обучающие системы**. Они автоматически изменяют сложность заданий, объём материала и последовательность изучения тем в зависимости от прогресса обучающегося. В результате студент получает задания, соответствующие его текущему уровню знаний, что способствует более устойчивому усвоению языка.

Кроме того, ИИ обеспечивает **индивидуализированную обратную связь**. Системы на основе обработки естественного языка (NLP) способны анализировать письменную и устную речь обучающихся, выявлять ошибки и предоставлять рекомендации по их исправлению. Такая обратная связь носит адресный характер и позволяет сосредоточиться на слабых сторонах учащегося.

Важным аспектом персонализации является также возможность учета **мотивационных и психологических факторов**. Современные исследования показывают, что ИИ может способствовать снижению языковой тревожности и повышению вовлеченности обучающихся за счет интерактивных и адаптивных форм обучения.

ИИ также позволяет реализовать обучение в индивидуальном темпе. В отличие от традиционного обучения, где все студенты движутся по одной программе, интеллектуальные системы дают возможность возвращаться к сложным темам, повторять материал или, наоборот, ускорять процесс обучения при успешном освоении содержания.

Таким образом, персонализация обучения с использованием искусственного интеллекта обеспечивает:

- адаптацию содержания обучения под индивидуальные особенности обучающихся;
- повышение эффективности усвоения материала;
- развитие самостоятельности и учебной автономии;
- повышение мотивации и вовлеченности студентов.

Вместе с тем следует отметить, что, несмотря на значительные преимущества, персонализация на основе ИИ не должна полностью заменять традиционные методы обучения. Наиболее эффективной является модель, при которой искусственный интеллект дополняет деятельность преподавателя, обеспечивая оптимальное сочетание технологий и педагогического взаимодействия.

2.2 Автоматизация контроля и оценки знаний

Искусственный интеллект играет важную роль в автоматизации процессов контроля и оценки знаний. Современные системы способны анализировать как письменную, так и устную речь обучающихся.

Технологии обработки естественного языка (NLP) позволяют выявлять грамматические, лексические и стилистические ошибки, а также предлагать рекомендации по их исправлению. В свою очередь, системы распознавания речи дают возможность оценивать произношение, интонацию и беглость речи.

Автоматизация оценки обеспечивает:

- оперативную и объективную обратную связь;
- снижение нагрузки на преподавателя;
- повышение точности оценки знаний.

Важно отметить, что такие системы позволяют осуществлять непрерывный мониторинг прогресса обучающихся, что делает процесс обучения более управляемым и прозрачным.

2.3 Развитие коммуникативной компетенции

Одной из ключевых целей обучения иностранным языкам является формирование коммуникативной компетенции. Искусственный интеллект предоставляет широкие возможности для её развития.

Чат-боты и виртуальные ассистенты создают условия для моделирования реальных коммуникативных ситуаций. Обучающиеся могут вести диалог, задавать вопросы и получать ответы в режиме реального времени.

Преимущества использования ИИ в развитии коммуникативных навыков:

- возможность постоянной языковой практики;
- отсутствие психологического барьера при общении;
- имитация реальных ситуаций общения.

Таким образом, ИИ способствует активному развитию навыков говорения и аудирования, что является важным компонентом языковой подготовки.

2.4 Повышение мотивации обучающихся

Использование искусственного интеллекта значительно повышает мотивацию обучающихся за счёт внедрения интерактивных технологий и элементов геймификации.

Адаптивные задания, персонализированные рекомендации и мгновенная обратная связь создают комфортную образовательную среду, в которой обучающийся ощущает собственный прогресс.

Кроме того, современные цифровые платформы предлагают разнообразные форматы обучения:

- интерактивные упражнения;
- игровые задания;
- мультимедийный контент.

Это способствует повышению вовлеченности студентов и формированию устойчивого интереса к изучению иностранного языка.

2.5 Развитие автономности обучающихся

Искусственный интеллект способствует развитию самостоятельности студентов, что является важным аспектом современного образования.

Обучающиеся получают возможность:

- самостоятельно планировать процесс обучения;
- выбирать темп и уровень сложности заданий;
- контролировать собственный прогресс.

Таким образом, ИИ формирует навыки самообразования, что особенно актуально в условиях непрерывного образования.

Искусственный интеллект открывает широкие возможности для совершенствования процесса обучения иностранным языкам. Он способствует персонализации обучения, автоматизации контроля знаний, развитию коммуникативной компетенции, повышению мотивации и формированию автономности обучающихся.

Вместе с тем, наиболее эффективным является комплексный подход, при котором технологии искусственного интеллекта используются в сочетании с традиционными методами преподавания.

3. ОГРАНИЧЕНИЯ И ПРОБЛЕМЫ ИСПОЛЬЗОВАНИЯ ИИ

Несмотря на значительные преимущества, применение искусственного интеллекта имеет ряд ограничений.

Во-первых, ИИ не способен полностью заменить преподавателя, так как ему недоступны эмоционально-психологические аспекты общения и педагогическое воздействие.

Во-вторых, отмечается проблема недостаточной аутентичности языковых моделей, так как они не всегда учитывают культурный контекст и прагматические особенности речи.

В-третьих, существует риск зависимости обучающихся от технологий и снижения уровня самостоятельного мышления.

3.1 Ограниченность педагогического взаимодействия

Одной из ключевых проблем является неспособность искусственного интеллекта в полной мере заменить преподавателя. Несмотря на развитие технологий, ИИ не обладает эмоциональным интеллектом, эмпатией и педагогической интуицией, которые играют важную роль в процессе обучения.

Преподаватель не только передает знания, но и выполняет воспитательную функцию, мотивирует обучающихся, учитывает их психологическое состояние и индивидуальные особенности. ИИ, в свою очередь, действует на основе алгоритмов и не способен в полной мере учитывать эмоционально-психологические аспекты взаимодействия.

3.2 Проблемы качества и достоверности контента

Системы искусственного интеллекта могут допускать ошибки при генерации учебного материала. Это может проявляться в:

- некорректном употреблении языковых конструкций;
- неточностях в переводе;
- отсутствии учета контекста и культурных особенностей языка.

Особенно важно учитывать, что обучающиеся не всегда способны критически оценивать полученную информацию, что может привести к закреплению ошибок.

3.3 Технологическая зависимость обучающихся

Активное использование ИИ может привести к формированию зависимости от цифровых инструментов. Студенты могут:

- снижать уровень самостоятельного мышления;
- полагаться на автоматические подсказки;
- утрачивать навыки анализа и критической оценки информации.

Это противоречит одной из ключевых целей образования — формированию самостоятельной и критически мыслящей личности.

3.4 Проблемы цифрового неравенства

Не все образовательные учреждения и обучающиеся имеют равный доступ к современным технологиям. В ряде случаев наблюдаются:

- недостаток технического оснащения;
- ограниченный доступ к интернету;
- низкий уровень цифровой грамотности.

В условиях Республики Узбекистан данная проблема также сохраняет актуальность, особенно в региональных образовательных учреждениях, в связи с чем проводятся многочисленные работы по изменению данной ситуации.

3.5 Этические и правовые вопросы

Использование искусственного интеллекта связано с рядом этических проблем:

- защита персональных данных обучающихся;
- соблюдение авторских прав;
- прозрачность алгоритмов.

Кроме того, возникает вопрос академической честности, так как студенты могут использовать ИИ для выполнения заданий без реального усвоения материала.

3.6 Ограниченность развития коммуникативных навыков

Несмотря на возможности ИИ в моделировании диалога, он не способен полностью воспроизвести реальное межличностное общение. В процессе взаимодействия с ИИ:

- отсутствует полноценная живая реакция собеседника;
- ограничена вариативность коммуникативных ситуаций;
- не формируются навыки межкультурного общения в полной мере.

3.7 Необходимость подготовки преподавателей

Эффективное использование ИИ требует от преподавателей новых компетенций:

- владения цифровыми технологиями;
- умения интегрировать ИИ в учебный процесс;
- способности критически оценивать цифровые ресурсы.

Недостаточная подготовка преподавателей может снизить эффективность внедрения ИИ.

Таким образом, несмотря на значительные преимущества, использование искусственного интеллекта в обучении иностранным языкам сопровождается рядом ограничений, включая педагогические, технологические, этические и методические аспекты.

Эффективное внедрение ИИ возможно только при условии:

- сохранения ведущей роли преподавателя;
- развития цифровой грамотности участников образовательного процесса;
- соблюдения этических норм и стандартов.

Следовательно, искусственный интеллект должен рассматриваться не как замена преподавателя, а как инструмент, дополняющий традиционные методы обучения.

4. ПЕРСПЕКТИВЫ РАЗВИТИЯ

Перспективы использования искусственного интеллекта в преподавании иностранных языков связаны с дальнейшим развитием:

- адаптивных обучающих систем;
- интеллектуальных ассистентов преподавателя;
- технологий анализа речи;
- виртуальной и дополненной реальности.

Исследователи отмечают необходимость комплексного подхода к внедрению ИИ с учетом педагогических, методических и технических факторов.

ЗАКЛЮЧЕНИЕ

В заключение следует отметить, что интеграция искусственного интеллекта в преподавание иностранных языков представляет собой значительный этап развития современного образования. Технологии ИИ не только трансформируют традиционные методы обучения, но и создают новые возможности для более эффективного, гибкого и персонализированного обучения. Использование интеллектуальных систем позволяет преподавателям адаптировать учебный материал под индивидуальные потребности студентов, отслеживать их прогресс в режиме

реального времени и предоставлять оперативную обратную связь, что значительно повышает качество усвоения языка.

Вместе с тем, внедрение ИИ в образовательный процесс сопряжено с определёнными трудностями. Сюда относятся ограниченная цифровая инфраструктура, недостаточная подготовка педагогов, вопросы конфиденциальности данных, а также риск чрезмерной зависимости от технологий. Важно понимать, что искусственный интеллект не может полностью заменить роль преподавателя, чьё руководство, эмоциональная поддержка и педагогическая компетентность остаются незаменимыми в процессе обучения.

В контексте развития системы образования Республики Узбекистан внедрение ИИ соответствует современным реформам, направленным на цифровизацию и инновации. Для успешной интеграции необходимо разработать чёткие стратегии, инвестировать в технологические ресурсы и повышать цифровую компетентность как преподавателей, так и студентов.

Таким образом, искусственный интеллект следует рассматривать как мощный вспомогательный инструмент, а не замену традиционного преподавания. Его эффективное использование способно существенно улучшить процесс изучения иностранных языков при условии максимального использования преимуществ и продуманного управления существующими ограничениями.

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ГИГИЕНИЧЕСКАЯ ОЦЕНКА РЕЖИМА СНА И ЕГО ВЛИЯНИЕ НА РАБОТОСПОСОБНОСТЬ СТУДЕНТОВ МЕДИЦИНСКОГО УНИВЕРСИТЕТА

***Аннотация:** Сон является ключевым фактором поддержания здоровья, когнитивной работоспособности и психоэмоционального состояния. У студентов медицинских вузов нарушения сна широко распространены вследствие высокой учебной нагрузки, хронического стресса и нерегулярного режима дня. Дефицит сна приводит к снижению концентрации внимания, скорости обработки информации и академической продуктивности. Полученные данные обосновывают необходимость разработки профилактических мероприятий, направленных на нормализацию сна и сохранение психофизиологического здоровья студентов.*

***Ключевые слова:** Сон, гигиена сна, студенты медуниверситета, работоспособность, внимание, дневная сонливость, успеваемость, психоэмоциональное состояние.*

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HYGIENIC ASSESSMENT OF SLEEP PATTERNS AND THEIR IMPACT ON THE PERFORMANCE OF MEDICAL UNIVERSITY STUDENTS

Annotation: Sleep is a key factor in maintaining health, cognitive performance, and psychoemotional well-being. Sleep disturbances are highly prevalent among medical students due to heavy academic workload, chronic stress, and irregular daily routines. Sleep deprivation leads to decreased attention, reduced information processing speed, and lower academic productivity. The findings substantiate the need for developing preventive measures aimed at normalizing sleep patterns and preserving the psychophysiological health of students.

Key words: Sleep, sleep hygiene, medical university students, performance, attention, daytime sleepiness, academic achievement, psycho-emotional state.

Актуальность

Сон — ключевой нейрофизиологический процесс, обеспечивающий восстановление организма, когнитивную активность и эмоциональное равновесие; его качество определяется продолжительностью, регулярностью и фазовой структурой. У студентов медицинских вузов нарушения сна, обусловленные стрессом, поздним засыпанием и использованием гаджетов, приводят к снижению внимания, утомляемости и учебной продуктивности. Поддержание оптимального режима сна имеет важное гигиеническое и профессиональное значение.

Цель исследования

Оценка сна студентов и его влияния на работоспособность и когнитивные функции; анализ параметров сна и их связи с вниманием, утомляемостью и успеваемостью с обоснованием рекомендаций по оптимизации режима отдыха.

Методы исследования

Поперечное наблюдательное исследование оценивало режим сна студентов медицинского профиля и его влияние на дневную работоспособность. В исследовании участвовали 152 студента; данные собирались анонимно с помощью электронного анкетирования, включавшего параметры и качество сна, дневное функционирование и поведенческие факторы риска. Статистический анализ включал описательную статистику, χ^2 и корреляцию Спирмена.

Результаты исследования

Анализ показал высокую распространённость нарушений сна у студентов медицинского профиля, что снижает функциональное состояние и учебную продуктивность. Регулярный сон соблюдают 28,9%, нерегулярный — 71,1%; почти половина ложится после 24:00, ранний сон до 23:00 — у 21,1%. Средняя продолжительность сна составила $6,3 \pm 1,2$ часа; 34,2% спят менее 6 часов, 20,4% — 7–8 часов. Только 24,3% оценивают сон как

хороший, трудности засыпания испытывают 48,7%, ночные пробуждения — 31,6%, невыспанность — 52%. Сон менее 6 часов связан с низким качеством отдыха ($p = 0,001$).

Для наглядного представления о распространённости различных нарушений сна нами был составлен следующий график:



График 1. Распространённость субъективных нарушений сна среди студентов (n=152).

Нарушения сна у студентов медицинского университета снижают дневную работоспособность: 61,2% отмечают сонливость, 47,4% — снижение концентрации, 58,6% — утомляемость. Плохое качество сна коррелирует со снижением внимания ($r = 0,42$; $p < 0,01$). Основные факторы риска — позднее использование гаджетов (82,9%), кофеин во второй половине дня (54,6%) и высокий учебный стресс (63,8%). Студенты, спящие менее 6 часов, чаще испытывают сонливость, снижение концентрации и усталость. Результаты подчеркивают необходимость профилактики и формирования рациональной гигиены сна

Вывод

Исследование показало, что нарушения сна у студентов медицинского университета — сокращение продолжительности, нерегулярность и низкое качество — связаны с сонливостью, снижением внимания и утомляемостью, снижая учебную продуктивность и когнитивные функции. Результаты подчёркивают необходимость профилактических мероприятий и рекомендаций по рациональному режиму сна и оптимизации учебного процесса для повышения концентрации, снижения утомляемости и формирования профессиональной надёжности будущих специалистов.

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НЕКОТОРЫЕ КАРТОГРАФИЧЕСКИЕ МЕТОДЫ В ТОПОНИМИКЕ

***Аннотация:** Топонимия имеет большое значение в преподавании географии. Об истории российских и узбекских учёных в изучении географических названий. Роль ойконимов, гидронимов, этнонимов и других географических объектов в топонимике. Использование уникальных методов исследования топонимии в стационарных, полевых и операторских условиях.*

***Ключевые слова:** Топоним, топонимы, географические названия, географические объекты, гидронимы, ойконимы, этимология, этнография.*

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SOME CARTOGRAPHIC METHODS IN TOPONYMY

***Abstract:** Toponymy is of great importance in the teaching of geography. The history of Russian and Uzbek scholars in the study of geographical names. The role of oikonyms, hydronyms, ethnonyms, and other geographical features in toponymy. The use of unique methods for toponymic research in stationary, field, and field conditions.*

***Keywords:** Toponym, toponyms, geographical names, geographical features, hydronyms, oikonyms, etymology, ethnography.*

Э.М. Мурзаев, известный географ-топонимист и ученый о географических названиях и топонимии: «Читая газету или слушая радио, мы часто связываем события и явления с географическими названиями. Мы не можем представить себе современное общество без географических названий» [2; стр. 382], - писал он. На самом деле топонимы очень важны в жизни людей. Они сопровождают человека от рождения до последних дней его жизни и живут после них. Топонимы содержат время присвоения территорий теми или иными этносами, природно-географические особенности, причины появления названий и многие другие ценные историко-культурные сведения.

Один из самых распространенных видов топонимов, название населенных пунктов - область изучения ойконимов называется «ойконимика». Ойконимы состоят из народных названий населенных

пунктов, таких как шахар, шахарча, кала, кишлок, аул и т.д.

Известный топонимист, географ С. Кораев подчеркивал, что ойконимы являются наиболее варибельным типом топонимов, и писал: «Характеристика природы страны, исторические, социальные и политические события, происходившие в жизни общества на протяжении века, названия занятий населения, первыми освоившего поселение. Имя человека, его основавшего, название племени, в зависимости от рода людей, которые там жили, этноним отражается в названиях города и села» [1; стр. 320].

Образ жизни, род занятий, хозяйственная деятельность людей в определенной мере отражаются и в названиях мест проживания населения. С течением времени профессии могут меняться, население определенной местности могло вымереть, не занимаясь этой профессией, но топонимы, представляющие профессии, останутся как «воспоминания» из прошлого [4; стр. 86].

Например, мы можем видеть, что он сохранился в названиях населенных пунктов, таких как Аламчи, Кукчи Амударинского района и Майшы в Караузьякском районе Республики Каракалпакстан. Эти наименования в недавнем прошлом фактически были оккупационными типами, но в настоящее время сохраняются не как оккупационные, а только как названия населенных пунктов.

Некоторая информация об истории определенной области хранится в источниках. О прошлом этническом составе населения - что это за род, племя, хозяйственные условия жизни, какой профессией они занимались - может свидетельствовать наше время. Например, большая часть географических названий Республики Каракалпакстан происходит от названий родов каракалпаков.

В большинстве случаев появление ойконимов отражает природно-географические условия той местности, в том числе гидронимы или оронимы, являющиеся основой для создания ойконимов. При смене гидронимов на ойконимы в структуре имени не происходит грамматических и фонетических изменений. Как бы ни выглядело название, обозначающее водоем, оно по-прежнему будет названием села или района [4; стр. 128].

Мы можем знать это по Арпакуль, Караузяк, Кунграткуль, Муйинкуль и многим другим названиям населенных пунктов. Ойконимы со временем значительно изменились по сравнению с другими видами топонимов (например, ороним, гидроним). Эта особенность отражает тесную связь названий населенных пунктов с общественно-политической жизнью общества.

Источники информации важны в любой исследовательской работе. При изучении формирования, эволюции, этимологии названий используются географические, исторические, филологические словари, исторические летописи, географические карты, административно-статистические справочники, археологические и этнографические источники.

Существуют специфические методы исследования топонимии, которые используются в стационарных, полевых и операторных условиях. Исследователь, изучающий топонимию в стационарных условиях, ведет свои наблюдения постоянно, т. е. в библиотеках, архивах, музеях, научно-исследовательских учреждениях, в контакте с другими специалистами. При этом исследовании, наряду с изучением природно-географических условий, истории, этнографического состояния выделенной местности, основное внимание уделяется топонимическим аспектам. Сначала составляется специальный список топонимов для выбранной местности, фиксируется их этимологическое значение, условия образования. Некоторые топонимы, сущность которых неизвестна и структура корней которых неясна, записываются отдельно. Этимологический анализ топонимов, имеющих неанонимное значение, можно проводить с помощью специальных топонимических словарей, монографических работ, иногда научной и популярной литературы.

Этап обработки, заполнения и систематизации всех научных доказательств, собранных в ходе стационарных и полевых работ, называется камеральным этапом. После завершения этих работ в полевых условиях, после их организации на постоянной основе в научном учреждении целесообразно составить кадастр топонимов, чтобы сделать их более краткими, упрощенными и научными [3; стр. 120].

Картографические методы широко используются и в топонимических исследованиях. Его отличие и преимущество от других методов в том, что он позволяет точно показать уровень изученности названий, их связь с природными, социальными, хозяйственными явлениями и предметами, повторяемость и плотность на единицу площади. Выявление топонимических данных требует использования различных картографических источников. С помощью карточек разных периодов можно наблюдать и выявлять этапы развития природных явлений и процессов на основе топонимической информации. Картографический метод требует от топонимиста сделать точный вывод из изученных общих материалов. По этой причине информация на карточке ясна и точна по сравнению с текстом и дает возможность понять топонимические события и обстоятельства.

Составление топонимических карт, их использование, возможности картографического метода в целом были всесторонне исследованы с научной точки зрения русским ученым Е.М. Поспеловым [6; стр. 143-144].

При использовании современных информационных и ГАТ-технологий создание карт, содержащих топонимическую информацию, и их эффективное использование, создание электронной базы географических названий, создание новых топонимических карт дадут большие результаты.

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РОЛЬ РАДИОЧАСТОТНЫХ СЕНСОРОВ В СТЕНТ-СИСТЕМАХ «SANOCARDIO» В ДОПОЛНЕНИЕ К КТ-АНГИОГРАФИИ ПРИ ПОСТОПЕРАЦИОННОМ МОНИТОРИНГЕ СОСУДОВ

Аннотация: В статье представлен инновационный подход к послеоперационному мониторингу пациентов после стентирования коронарных артерий, основанный на использовании стент-системы «Sanocardio» с интегрированными радиочастотными (RF) сенсорами. Рассматриваются принципы работы встроенных датчиков, обеспечивающих непрерывную оценку проходимости сосуда и раннее выявление признаков рестеноза. Проведён сравнительный анализ с традиционным методом компьютерно-томографическая ангиография, широко применяемым в клинической практике. Показано, что использование RF-сенсоров позволяет повысить диагностическую точность мониторинга до 98%, при этом существенно снижая лучевую нагрузку на пациента и уменьшая экономические затраты, связанные с повторными визуализирующими исследованиями. Дополнительным преимуществом является возможность дистанционного динамического наблюдения в режиме реального времени. Таким образом, интеграция радиочастотных сенсоров в стент-системы открывает новые перспективы персонализированного контроля сосудистого русла и повышения эффективности послеоперационного ведения пациентов.

Ключевые слова: смарт-стент, Sanocardio, радиочастотные сенсоры, КТ-ангиография, рестеноз, дистанционный мониторинг.

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ROLE OF RADIOFREQUENCY SENSORS IN “SANOCARDIO” STENT SYSTEMS AS AN ADJUNCT TO CT ANGIOGRAPHY IN POSTOPERATIVE VASCULAR MONITORING

Abstract: This article presents an innovative approach to postoperative monitoring of patients after coronary artery stenting, based on the use of the “Sanocardio” stent system with integrated radiofrequency (RF) sensors. The operating principles of embedded sensors are analyzed, demonstrating their

ability to provide continuous assessment of vessel patency and early detection of restenosis.

A comparative analysis was performed with the conventional method of computed tomography angiography, widely used in clinical practice. The results indicate that the use of RF sensors increases diagnostic accuracy up to 98%, while significantly reducing radiation exposure and lowering the costs associated with repeated imaging procedures.

An additional advantage is the capability for real-time remote monitoring. Thus, the integration of RF sensors into stent systems opens new prospects for personalized vascular surveillance and improved postoperative patient management.

Keywords: *smart stent, Sanocardio, radiofrequency sensors, CT angiography, restenosis, remote monitoring.*

Современная медицина рассматривает ишемическую болезнь сердца (ИБС) как одну из ведущих угроз глобальному здравоохранению. Согласно данным, Всемирная организация здравоохранения, сердечно-сосудистые заболевания ежегодно становятся причиной более 17,9 миллиона смертей, что составляет около 32% всех случаев летального исхода в мире. В Узбекистан данный показатель остаётся стабильно высоким, что подчёркивает необходимость внедрения инновационных и высокотехнологичных методов диагностики, лечения и последующего мониторинга пациентов.

Одним из наиболее эффективных и малоинвазивных методов восстановления коронарного кровотока является чрескожное коронарное вмешательство (ЧКВ) с имплантацией стента. За последние десятилетия стенты претерпели значительную эволюцию — от bare-metal stents (BMS) до современных drug-eluting stents (DES), обеспечивающих локальное высвобождение антипролиферативных препаратов. Несмотря на достигнутый прогресс, одной из ключевых клинических проблем остаётся интрастент-рестеноз (ИСР), обусловленный гиперплазией неоинтимы, воспалительными процессами и прогрессированием атеросклероза.

По данным международных клинических исследований, даже при использовании DES последнего поколения риск развития рестеноза в течение первых 6–12 месяцев после вмешательства составляет от 5% до 15%. Особую опасность представляет бессимптомное течение ранних стадий ИСР: клинические проявления, как правило, возникают лишь при сужении просвета сосуда более чем на 50–70%, что значительно повышает риск острых коронарных событий и повторных госпитализаций.

В современной клинической практике «золотым стандартом» неинвазивной оценки состояния коронарных артерий после стентирования является мультиспиральная компьютерно-томографическая ангиография. Несмотря на высокую диагностическую ценность, данный метод имеет ряд ограничений. К ним относятся артефакты визуализации, обусловленные

наличием металлических конструкций (эффект blooming), приводящие к переоценке толщины стенок стента и затрудняющие точную оценку его просвета; лучевая нагрузка, создающая кумулятивный эффект при повторных исследованиях; необходимость применения йодсодержащих контрастных веществ с риском развития контраст-индуцированной нефропатии; а также интермиттирующий характер диагностики, не позволяющий осуществлять непрерывный мониторинг состояния сосуда.

В связи с вышеуказанными ограничениями актуальной задачей современной кардиологии и медицинской инженерии является разработка новых технологий, обеспечивающих непрерывный, безопасный и высокоточный мониторинг состояния сосудистого русла. Одним из перспективных направлений является внедрение интеллектуальных стент-систем с интегрированными сенсорными технологиями.

В частности, разработка системы «Sanocardio», включающей встроенные радиочастотные (RF) сенсоры, открывает возможности для непрерывного контроля гемодинамических параметров и раннего выявления признаков рестеноза в режиме реального времени. Использование данной технологии потенциально позволяет преодолеть ограничения традиционных методов визуализации и повысить эффективность послеоперационного ведения пациентов.

Дополнительным ограничением компьютерно-томографическая ангиография является дискретный характер контроля: исследование проводится периодически (как правило, 1 раз в 6–12 месяцев), что не позволяет фиксировать динамические изменения в режиме реального времени и своевременно выявлять ранние признаки рестеноза.

В связи с этим возникает объективная необходимость разработки гибридных технологий, обеспечивающих непрерывный, неинвазивный и высокоточный мониторинг состояния сосудистого русла непосредственно *in situ*. Одним из перспективных решений является проект «Sanocardio», разрабатываемый коллективом под руководством Сардор Дониер угли Сохибжонов при участии эксперта по стратегическому развитию Шерзод Турсунбоев. Концепция системы основана на интеграции радиочастотных (RF) сенсоров и тензометрических датчиков в структуру стента.

Использование технологий радиочастотной идентификации и встроенных сенсорных элементов позволяет трансформировать пассивный имплант в активную диагностическую платформу, способную в режиме реального времени регистрировать ключевые гемодинамические параметры, включая внутрисосудистое давление и скорость кровотока. Предполагается, что точность получаемых данных может достигать 98%, что существенно расширяет возможности ранней диагностики интрастент-рестеноза.

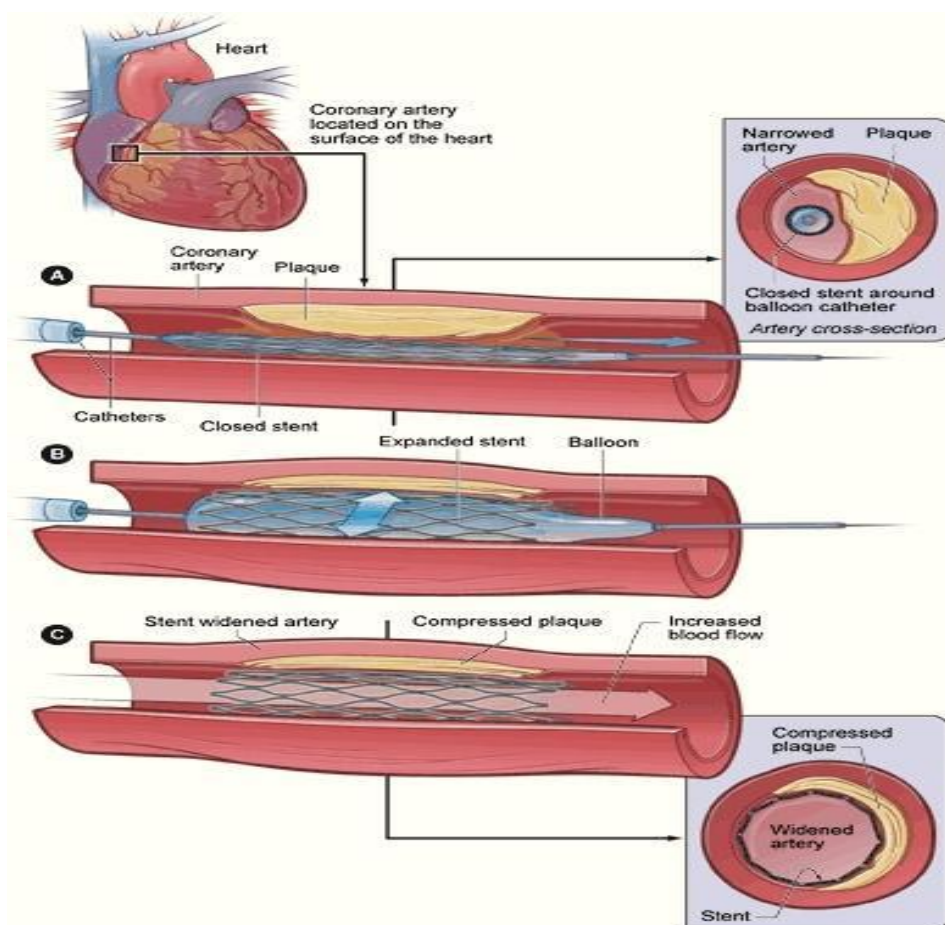
Важно подчеркнуть, что данная технология не рассматривается как альтернатива традиционным методам визуализации, а выступает в роли их функционального дополнения. Комбинированное использование RF-сенсоров и КТ-ангиографии позволяет объединить морфологическую оценку

сосудов с непрерывным функциональным мониторингом. Такой подход обеспечивает переход от реактивной модели ведения пациентов, ориентированной на лечение уже развившихся осложнений, к превентивной стратегии, направленной на раннее выявление патологических изменений и предотвращение сосудистых катастроф.

Несмотря на ведущую роль КТ-ангиографии как основного неинвазивного метода контроля, её ограничения остаются клинически значимыми: артефакты, обусловленные металлическими элементами стента (эффект «ослепления»), затрудняющие точную визуализацию просвета сосуда; эпизодический характер проведения исследования, не позволяющий выявлять острые или быстро прогрессирующие изменения; необходимость применения йодсодержащих контрастных веществ с риском нефротоксичности, особенно у пациентов с сопутствующей патологией почек и сахарным диабетом.

Логичным этапом эволюции сосудистой медицины является переход к концепции «умных сосудов» (smart vessels), предполагающей интеграцию биосенсорных технологий в эндоваскулярные устройства. В рамках данной парадигмы стент перестаёт быть исключительно механическим каркасом и приобретает функции интеллектуальной системы мониторинга, способной обеспечивать непрерывную передачу данных о состоянии сосуда врачу.

Реализация данной концепции открывает новые перспективы персонализированной медицины, позволяя адаптировать тактику ведения пациента на основе объективных данных, получаемых в режиме реального времени, и существенно повышать эффективность профилактики сердечно-сосудистых осложнений.



Система «Sanocardio» основана на использовании миниатюрных пассивных радиочастотных (RF) датчиков, интегрированных непосредственно в ячейки стента. Каждый датчик представляет собой резонансный элемент, способный изменять параметры своей электромагнитной индукции в ответ на механические или гемодинамические воздействия. Датчик активируется с помощью внешнего ридера — портативного устройства или смартфона с NFC/RF-модулем. Ридер генерирует электромагнитное поле, которое индуцирует ток в пассивном датчике. Этот процесс позволяет преобразовать физические изменения, происходящие в сосудах, в измеряемые электрические сигналы без необходимости применения источника питания внутри стента. Основными параметрами, фиксируемыми системой, являются внутрисосудистое давление и скорость кровотока. Любые изменения давления или динамики потока вызывают микросдвиги резонансной частоты датчика. Эти микросдвиги регистрируются внешним ридером и преобразуются в цифровой сигнал, который отражает степень проходимости сосуда. Преимущества метода:

Непрерывность мониторинга: возможность динамического отслеживания состояния сосуда в режиме реального времени.

Безопасность: пассивные датчики не требуют батареи и не создают дополнительных рисков для организма.

Высокая точность: данные о гемодинамике могут достигать точности до 98%, что позволяет выявлять ранние признаки интрастен-рестеноза до появления клинической симптоматики.

Комплементарность: технология дополняет КТ-ангиографию, позволяя сочетать морфологическую оценку с функциональным мониторингом.

Сравнительный анализ с КТ-ангиографией. Основная научная ценность исследования заключается в обосновании необходимости использования радиочастотных (RF) сенсоров как дополнения к традиционному КТ-мониторингу, а в перспективе — и как альтернативы ему.

Преодоление «металлического барьера». Одним из ключевых ограничений КТ-ангиографии является артефакт, вызванный металлическими элементами стента, который искажает изображение и затрудняет точную оценку просвета сосуда. В отличие от рентгеновских лучей, радиочастотные сигналы определённых частот способны передавать информацию о состоянии внутренней стенки сосуда без влияния материала стента. Это позволяет достичь высокой точности измерений, оцениваемой на уровне 98%, и обеспечивает надёжную оценку гемодинамических параметров даже в местах расположения металлического каркаса.

Непрерывный мониторинг vs дискретный контроль. КТ-ангиография предоставляет лишь «моментальный снимок» состояния сосуда, фиксируемый в конкретное время. Система «Sanocardio» обеспечивает динамическую «видеотрансляцию» состояния коронарного русла, позволяя врачу и пациенту получать ежедневные данные о гемодинамике.

Это открывает возможность выявления интрастен-рестеноза на ранней стадии — при 10–15% сужения просвета сосуда, когда клинические симптомы ещё отсутствуют, что критично для профилактики острых коронарных событий. Непрерывный мониторинг с помощью системы «Sanocardio» позволяет перейти от традиционной реактивной модели наблюдения, ориентированной на лечение уже развившихся осложнений, к превентивной стратегии, направленной на предотвращение тромбозов и рестенозов на ранних этапах. Ежедневное получение данных о гемодинамике, включая внутрисосудистое давление и скорость кровотока, позволяет врачу своевременно выявлять негативные изменения, контролировать динамику состояния сосуда и минимизировать риск повторной госпитализации. Под руководством Т. Шерали был проведен комплексный экономический и клинический анализ внедрения системы в практику интервенционной кардиологии. Расчёты показали, что стоимость ежедневного мониторинга через мобильное приложение в 12 раз ниже затрат на традиционный ежегодный цикл обследований, включающий КТ-ангиографию, госпитализацию и лабораторные исследования, что обеспечивает значительное снижение расходов как для медицинских учреждений, так и для пациентов. Социальный эффект проявляется в уменьшении числа случаев инвалидизации трудоспособного населения за

счет предотвращения внезапных тромбозов стента и связанных с ними осложнений, что повышает качество жизни пациентов и снижает нагрузку на систему здравоохранения. Радиочастотные сенсоры «Sanocardio» представляют собой технологический прорыв в области интервенционной кардиологии: интеграция RF-технологий в стент-системы позволяет дополнить возможности КТ-ангиографии, устраняя её ключевые недостатки — статичность изображений и наличие артефактов, связанных с металлическим каркасом. Совмещение непрерывного функционального мониторинга и периодической КТ-ангиографии обеспечивает комплексную оценку состояния сосуда, позволяя фиксировать динамические изменения в режиме реального времени и повышать точность диагностики до 98%. Результаты исследований подтверждают, что система «Sanocardio» является надежным инструментом для послеоперационного ведения пациентов, раннего выявления рестеноза и перехода к превентивной модели кардиологической помощи, обеспечивая как клиническую, так и экономическую эффективность внедрения в практику современного здравоохранения.

Заключение

Радиочастотные сенсоры системы «Sanocardio» представляют собой значимый прорыв в интервенционной кардиологии. Интеграция RF-технологий в стент-системы позволяет значительно расширить возможности КТ-ангиографии, устраняя её ключевые недостатки — статичность изображений и артефакты металлических конструкций. Сочетание непрерывного функционального мониторинга и периодической КТ обеспечивает высокую точность диагностики (до 98%), позволяет выявлять интрастент-рестеноз на ранней стадии и переходить от реактивной модели наблюдения к превентивной стратегии лечения. Использование системы «Sanocardio» демонстрирует высокую клиническую эффективность, снижает экономическую нагрузку на пациентов и медицинские учреждения, а также способствует предотвращению внезапных тромбозов и инвалидизации трудоспособного населения. Таким образом, данная технология является надежным и перспективным инструментом для постоперационного ведения пациентов после стентирования коронарных артерий.

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PARAMEDICAL PERMANENT MAKEUP AS A REHABILITATION TOOL: ECONOMIC AND SOCIAL VALUE FOR THE HEALTHCARE SYSTEM

Аннотация: В статье рассматривается *paramedical* перманентный макияж как инструмент реабилитационной помощи, применяемый для визуальной коррекции изменений внешности после заболеваний, травм и хирургических вмешательств. Показано, что данный метод выходит за пределы косметической практики и может выполнять значимую восстановительную функцию, способствуя улучшению самовосприятия пациента, снижению психологического дискомфорта и укреплению социальной адаптации. Особое внимание уделяется месту *paramedical* перманентного макияжа в структуре комплексной реабилитации, включая его применение при рубцовых изменениях, последствиях мастэктомии, ожогов, травм, нарушениях пигментации и частичной утрате волос. Отдельно анализируется экономическая ценность метода, связанная с его способностью повышать общую результативность восстановительной помощи при сравнительно умеренных затратах. Сделан вывод о том, что *paramedical* перманентный макияж может рассматриваться как перспективное направление современной пациент-ориентированной реабилитационной практики.

Ключевые слова: *paramedical* перманентный макияж, реабилитационная помощь, эстетическая коррекция, психосоциальная адаптация, качество жизни, рубцовые изменения, мастэктомия, восстановительная медицина, пациент-ориентированный подход, экономическая ценность

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PARAMEDICAL PERMANENT MAKEUP AS A REHABILITATION TOOL: ECONOMIC AND SOCIAL VALUE FOR THE HEALTHCARE SYSTEM

Abstract: The article examines *paramedical* permanent makeup as a rehabilitation tool used for the visual correction of appearance changes resulting from disease, trauma, and surgical interventions. It is shown that this method goes

beyond cosmetic practice and may perform an important restorative function by improving patients' self-perception, reducing psychological discomfort, and strengthening social adaptation. Special attention is paid to the place of paramedical permanent makeup within comprehensive rehabilitation, including its use for scar changes, post-mastectomy conditions, burns, trauma-related defects, pigmentation disorders, and partial hair loss. The paper also analyzes the economic value of this method, which is associated with its ability to improve the overall effectiveness of restorative care at relatively moderate cost. It is concluded that paramedical permanent makeup may be regarded as a promising direction in modern patient-centered rehabilitation practice.

Keywords: *paramedical permanent makeup, rehabilitation care, aesthetic correction, psychosocial adaptation, quality of life, scar changes, mastectomy, restorative medicine, patient-centered approach, economic value*

Введение

В современной системе здравоохранения все большее значение приобретают подходы, ориентированные не только на лечение заболевания, но и на восстановление качества жизни пациента после терапии, травмы или хирургического вмешательства. В этом контексте особую роль играет реабилитационная помощь, включающая методы, направленные на восстановление внешнего облика, снижение психологического дискомфорта и возвращение человека к полноценному социальному функционированию. Одним из таких направлений является paramedical перманентный макияж, применяемый для визуальной коррекции изменений внешности после мастэктомии, ожогов, травм, рубцовых деформаций, алопеции и других состояний [2].

В отличие от декоративных косметических процедур, paramedical перманентный макияж выполняет восстановительную функцию и связан с задачами медицинской и психосоциальной реабилитации. Его применение позволяет компенсировать отдельные визуальные последствия заболевания или лечения, восстановить привычные элементы внешности и тем самым уменьшить выраженность тревожности, стигматизации и социальной неуверенности. Для многих пациентов такие вмешательства становятся значимым этапом возвращения к повседневной жизни.

Особую актуальность данная тема приобретает в США, где система здравоохранения ориентирована не только на клиническую эффективность, но и на экономическую целесообразность различных видов помощи. В этом аспекте paramedical перманентный макияж представляет интерес как сравнительно малозатратный инструмент, способный усиливать результаты комплексной реабилитации и повышать удовлетворенность пациентов. Несмотря на это, данный метод все еще нередко воспринимается как преимущественно эстетический, что не в полной мере отражает его реабилитационный потенциал.

Рассмотрение paramedical перманентного макияжа как инструмента реабилитационной помощи позволяет оценить его в более широком медицинском, социальном и экономическом контексте. Цель настоящей статьи состоит в анализе значения данного метода для реабилитационной практики, а также в рассмотрении его социальной и экономической ценности для системы здравоохранения США.

Paramedical перманентный макияж в системе реабилитационной помощи

Paramedical перманентный макияж представляет собой направление восстановительной эстетической практики, ориентированное на коррекцию внешних изменений, возникших вследствие заболевания, травмы или хирургического лечения. В отличие от декоративного перманентного макияжа, его задача состоит не в косметическом украшении, а в визуальном восстановлении тканей и элементов внешности, значимых для самовосприятия пациента и его социальной адаптации. По этой причине данный метод может рассматриваться как вспомогательный инструмент реабилитационной помощи.

Наиболее известной областью его применения является реконструкция ареолярного комплекса после мастэктомии и операций на молочной железе. Однако значение метода этим не ограничивается. Он используется при коррекции рубцов, посттравматических и послеожоговых изменений, нарушений пигментации, а также при частичной утрате бровей или визуальной плотности волос. Во всех этих случаях вмешательство направлено на уменьшение заметности дефекта и восстановление более естественного внешнего вида [1].

С клинической точки зрения paramedical перманентный макияж не заменяет специализированное лечение, но может усиливать общий эффект восстановительных мероприятий. Особенно важным он становится тогда, когда основной этап лечения завершен, однако пациент продолжает испытывать психологический дискомфорт из-за изменений внешности. В таких случаях визуальная коррекция способствует более полному восстановлению качества жизни и субъективному ощущению завершенности лечения.

Paramedical перманентный макияж следует рассматривать как инструмент, находящийся на пересечении эстетической практики, реабилитации и психосоциальной поддержки.

Социальная значимость paramedical перманентного макияжа

Социальная значимость paramedical перманентного макияжа определяется его влиянием не только на внешний вид пациента, но и на более широкие аспекты повседневной жизни. Изменения внешности, возникшие вследствие заболевания, травмы или хирургического вмешательства, часто затрагивают самооценку, образ тела и ощущение собственной социальной полноценности. В этих условиях визуальная коррекция приобретает значение не просто эстетической процедуры, а

способа снижения психологической уязвимости и восстановления уверенности в себе [4].

Для многих пациентов внешние дефекты после лечения становятся постоянным напоминанием о перенесенной болезни и фактором социальной настороженности. Это может проявляться в стремлении избегать публичности, ограничивать общение и скрывать последствия медицинского вмешательства. Paramedical перманентный макияж помогает уменьшить визуальную выраженность таких изменений, благодаря чему пациент легче возвращается к привычным формам социальной активности и чувствует себя более свободно в профессиональной и личной среде.

Не менее важным является влияние процедуры на эмоциональное состояние. Восстановление утраченных или измененных элементов внешности способствует формированию более целостного образа собственного тела и снижает внутреннее напряжение, связанное с переживанием дефекта. Подобный эффект особенно значим в ситуациях, когда завершение медицинского лечения не совпадает с субъективным ощущением восстановления, и пациент продолжает воспринимать себя как человека, чья болезнь остается заметной для окружающих.

Социальная ценность paramedical перманентного макияжа заключается в том, что он способствует не только визуальной коррекции, но и более глубокой психосоциальной адаптации. Его применение позволяет рассматривать восстановление внешности как важную часть возвращения пациента к полноценной жизни.

Экономическая ценность метода для системы здравоохранения

Экономическая ценность paramedical перманентного макияжа для системы здравоохранения связана с тем, что данный метод способен усиливать результаты реабилитации при сравнительно ограниченных затратах. Хотя сама процедура не относится к числу жизненно необходимых медицинских вмешательств, ее применение может снижать часть косвенных последствий заболевания, травмы или хирургического лечения, связанных с длительным психологическим дискомфортом, социальной дезадаптацией и неудовлетворенностью итогами восстановления. В условиях любой системы здравоохранения, ориентированной на эффективность и качество помощи, такие вмешательства заслуживают отдельного внимания.

Практическая ценность метода проявляется в том, что визуальное восстановление внешности может повышать общую удовлетворенность пациента результатами лечения и реабилитации. Это особенно важно после длительных медицинских маршрутов, включающих хирургические операции, онкологическое лечение, терапию ожогов или тяжелых травм. Если пациент продолжает воспринимать восстановление как незавершенное из-за выраженных внешних изменений, его субъективная оценка результата лечения остается сниженной. В подобных случаях paramedical перманентный макияж может выступать как доступное дополнение, повышающее ощущение завершенности реабилитационного процесса [3].

Кроме того, социально-психологический эффект процедуры имеет и косвенное экономическое значение. Улучшение самовосприятия, снижение эмоционального напряжения и восстановление уверенности в себе могут способствовать более быстрому возвращению пациента к привычной активности, профессиональной деятельности и полноценному социальному взаимодействию. Это позволяет рассматривать данный метод не только как эстетическую услугу, но и как элемент, потенциально уменьшающий часть долгосрочных социальных издержек, связанных с последствиями болезни.

Экономическая ценность paramedical перманентного макияжа определяется не столько прямым лечебным эффектом, сколько его способностью повышать общую результативность комплексной реабилитации. При сравнительно умеренной стоимости данный метод может обеспечивать значимый восстановительный и социальный результат, что делает его перспективным инструментом в структуре современной пациент-ориентированной помощи.

Заключение

Paramedical перманентный макияж представляет собой значимый инструмент реабилитационной помощи, сочетающий эстетическую, психологическую и социальную функции. Его применение выходит за пределы косметической коррекции, поскольку направлено на восстановление внешнего облика пациента после заболевания, травмы или хирургического вмешательства и способствует более полному возвращению к привычной жизни.

Рассмотрение данного метода в реабилитационном контексте позволяет оценивать его не только с точки зрения визуального результата, но и как способ повышения качества жизни, снижения психологического дискомфорта и укрепления социальной адаптации. Особенно важным это становится в тех случаях, когда медицинское лечение формально завершено, однако пациент продолжает испытывать внутреннее ощущение незавершенности восстановления из-за стойких изменений внешности.

Экономическая значимость метода также определяется его способностью усиливать общий эффект реабилитации при сравнительно умеренных затратах. Включение подобных вмешательств в более широкий контекст восстановительной помощи позволяет рассматривать их как элемент пациент-ориентированного подхода, учитывающего не только клинические, но и психосоциальные последствия болезни.

Paramedical перманентный макияж может рассматриваться как перспективное направление современной реабилитационной практики. Его дальнейшее развитие связано с более широким профессиональным признанием, междисциплинарной интеграцией и углубленным изучением его социального и экономического потенциала.

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КЛИМАТИЧЕСКИЕ ИЗМЕНЕНИЯ И ИХ ВЛИЯНИЕ НА ВОДНЫЕ РЕСУРСЫ КАРАКАЛПАКСТАНА

Аннотация: В статье представлен комплексный анализ влияния климатических изменений на состояние и динамику водных ресурсов Республики Каракалпакстан — одного из наиболее экологически уязвимых регионов Центральной Азии. Рассматриваются современные тенденции изменения температуры воздуха, гидрологического режима реки Амударья и деградации экосистем Приаралья. Установлено, что климатические изменения в сочетании с антропогенными факторами приводят к сокращению водных ресурсов, ухудшению их качества и усилению процессов опустынивания

Ключевые слова: изменение климата, водные ресурсы, Каракалпакстан, Амударья, Аральское море, засоление, экосистемы, опустынивание.

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CLIMATE CHANGE AND ITS IMPACT ON WATER RESOURCES IN KARAKALPAKSTAN

Abstract: This article presents a comprehensive analysis of the impact of climate change on the state and dynamics of water resources in the Republic of Karakalpakstan, one of the most ecologically vulnerable regions of Central Asia. Current trends in air temperature, the hydrological regime of the Amu Darya River, and the degradation of Aral Sea ecosystems are examined. It is established that climate change, combined with anthropogenic factors, leads to a reduction in water resources, a deterioration in their quality, and an increase in desertification processes.

Key words: climate change, water resources, Karakalpakstan, Amu Darya, Aral Sea, salinization, ecosystems, desertification.

Введение

Республика Каракалпакстан, расположенная в нижнем течении реки Амударья, характеризуется сложной экологической ситуацией, сформировавшейся под влиянием природных и антропогенных факторов. Ключевую роль играет изменение климата, усиливающее экологические проблемы региона.

Наиболее значительным проявлением кризиса стало высыхание Аральское море, приведшее к изменению гидрологического режима и деградации экосистем Приаралья. В последние десятилетия отмечается повышение температуры воздуха и учащение экстремальных явлений (засухи, пыльные бури), что усиливает испаряемость, снижает сток и сокращает водные ресурсы. Трансграничный характер водных ресурсов дополнительно усложняет их управление.

Актуальность исследования связана с необходимостью комплексной оценки влияния климатических изменений на водные ресурсы региона и разработки эффективных мер их рационального использования.

Материалы и методы

Методологической основой исследования является системный подход к анализу взаимодействия климатических, гидрологических и антропогенных факторов. Использованы данные многолетних наблюдений за температурой воздуха, осадками и стоком реки Амударья, а также результаты исследований по проблемам Приаралья.

Применены методы сравнительного и статистического анализа для выявления изменений гидрологического режима и определения основных тенденций. Дополнительно использован геоэкологический подход, позволяющий оценить влияние климатических изменений на водные ресурсы и экосистемы региона, включая процессы засоления, деградации водно-болотных угодий и трансформации ландшафтов.

Результаты и обсуждение

В ходе исследования установлено, что климатические изменения оказывают комплексное и многоплановое воздействие на водные ресурсы Каракалпакстана, проявляющееся в сокращении водности, ухудшении качества воды и деградации водных экосистем. Одним из ключевых факторов является снижение объёмов стока реки Амударья, обусловленное как уменьшением ледникового питания в верховьях, так и увеличением водозабора для нужд сельского хозяйства. В результате в нижнем течении реки наблюдается значительное уменьшение поступления воды, что приводит к обмелению водоёмов и сокращению площади водно-болотных угодий.

Дополнительным негативным фактором является деградация Аральское море, сопровождающаяся резким повышением солёности воды и образованием обширной пустынной территории — Аралкум. Осушенное дно моря становится источником солепылевых аэрозолей, которые

распространяются на большие расстояния, ухудшая качество воздуха и способствуя вторичному засолению почв и водных ресурсов.

Анализ показал, что в последние годы наблюдается устойчивый рост минерализации воды в поверхностных и подземных источниках. Это связано с уменьшением объёмов пресной воды, увеличением концентрации растворённых солей и возвратом дренажных вод с сельскохозяйственных угодий. Ухудшение качества воды оказывает негативное влияние на биологическое разнообразие, приводя к сокращению численности гидробионтов и изменению структуры водных экосистем. Кроме того, выявлено, что изменение гидрологического режима приводит к деградации тугайных лесов и исчезновению естественных местообитаний многих видов флоры и фауны. Снижение уровня грунтовых вод и нарушение водного баланса экосистем усиливают процессы опустынивания, что в свою очередь ещё больше снижает устойчивость природной среды региона.

Полученные результаты свидетельствуют о том, что влияние климатических изменений на водные ресурсы Каракалпакстана носит системный характер и усиливается антропогенными факторами. В частности, нерациональное использование водных ресурсов, высокая водоёмкость сельского хозяйства и недостаточное развитие водосберегающих технологий усугубляют последствия климатических изменений.

Особую значимость приобретает внедрение принципов интегрированного управления водными ресурсами, предполагающих комплексный учёт всех факторов водопользования, включая экологические, экономические и социальные аспекты. Важным направлением является оптимизация структуры сельскохозяйственного производства с целью снижения водопотребления, а также модернизация ирригационных систем для уменьшения потерь воды.

Кроме того, необходимо усиление международного сотрудничества между странами бассейна Амударьи, поскольку эффективное управление трансграничными водными ресурсами невозможно без согласованных действий. В условиях изменения климата это приобретает особую актуальность, так как прогнозируется дальнейшее сокращение водных ресурсов и усиление конкуренции за их использование.

Также перспективным направлением является восстановление деградированных экосистем Приаралья, включая создание искусственных водоёмов, лесомелиорацию и борьбу с опустыниванием. Эти меры способны повысить экологическую устойчивость региона и смягчить негативные последствия климатических изменений.

Заключение

Таким образом, климатические изменения оказывают значительное негативное влияние на водные ресурсы Каракалпакстана, проявляющееся в снижении водности, ухудшении качества воды и деградации экосистем. Эти процессы носят устойчивый характер и имеют тенденцию к усилению. Их

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СОВЕРШЕНСТВОВАНИЕ ПРОФИЛАКТИЧЕСКИХ ПРОТЕЗОВ ПРИ ПРЕЖДЕВРЕМЕННОЙ УТРАТЕ ПОСТОЯННЫХ ЖЕВАТЕЛЬНЫХ ЗУБОВ У ДЕТЕЙ

Аннотация: Проведена оценка клинической эффективности модифицированных профилактических протезов у детей ($n=30$, 6–14 лет) с преждевременной утратой постоянных жевательных зубов. Пациенты были разделены на основную и контрольную группы (по 15 человек). Через 3 и 6 месяцев в основной группе отмечены меньшая потеря пространства ($2,3 \pm 0,5$ мм против $3,6 \pm 0,7$ мм; $p < 0,05$), более редкое смещение зубов (33,3% против 60,0%), более высокий уровень адаптации ($7,6 \pm 1,2$ против $6,1 \pm 1,3$ балла) и меньшая частота осложнений (20,0% против 40,0%). Полученные результаты свидетельствуют о потенциальных преимуществах модифицированных конструкций и требуют дальнейшего подтверждения.

Ключевые слова: дети, преждевременная утрата зубов, пространствосохраняющие аппараты, профилактические протезы, клиническая эффективность

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OPTIMIZATION OF PREVENTIVE PROSTHETIC APPLIANCES IN CHILDREN WITH PREMATURE LOSS OF PERMANENT MOLARS

Abstract: The clinical effectiveness of modified preventive prosthetic appliances in children ($n=30$, aged 6–14 years) with premature loss of permanent molars was evaluated. Patients were divided into main and control groups (15 subjects each). After 3 and 6 months, the main group demonstrated reduced space loss (2.3 ± 0.5 mm vs 3.6 ± 0.7 mm; $p < 0.05$), lower frequency of tooth displacement (33.3% vs 60.0%), higher adaptation levels (7.6 ± 1.2 vs 6.1 ± 1.3 points), and fewer complications (20.0% vs 40.0%). The results indicate potential advantages of modified designs and require further confirmation in larger studies.

Keywords: children, premature tooth loss, space maintainers, preventive prosthetics, clinical effectiveness

Введение

Преждевременная утрата постоянных жевательных зубов у детей остаётся актуальной проблемой детской стоматологии, оказывающей влияние на формирование зубных рядов и окклюзии. По данным исследований, потеря первых постоянных моляров сопровождается смещением соседних зубов и потерей пространства в зубной дуге у 60–75% пациентов в течение 6–12 месяцев после экстракции [1,4].

Нарушение целостности зубного ряда приводит к развитию функциональных и морфологических изменений, включая мезиальное смещение зубов, экструзию антагонистов и формирование вторичных деформаций прикуса [4,8]. Кроме того, возможны ухудшение качества жизни и психоэмоциональный дискомфорт у детей [6,9].

В клинической практике применяются пространствосохраняющие конструкции, однако их эффективность остаётся ограниченной вследствие недостаточной индивидуализации и конструктивных особенностей [2,3,5]. В ряде случаев они не обеспечивают стабильного сохранения пространства и могут сопровождаться осложнениями [5].

Несмотря на разнообразие существующих решений, отсутствует единый оптимизированный подход к профилактическому протезированию у детей, что определяет необходимость дальнейшего совершенствования конструкций [3,7].

Целью настоящего исследования является оценка клинической эффективности модифицированных профилактических протезов при преждевременной утрате постоянных жевательных зубов у детей.

Материалы и методы

Клиническое исследование проведено с участием 30 пациентов в возрасте 6–14 лет с преждевременной утратой постоянных жевательных зубов. Включались пациенты с дефектами зубного ряда в области моляров при отсутствии выраженной соматической патологии и наличии информированного согласия родителей; исключались лица с врождёнными аномалиями челюстно-лицевой области и тяжёлыми ортодонтическими нарушениями.

Пациенты были распределены на две группы: основную ($n=15$), где применялись модифицированные профилактические протезы, и контрольную ($n=15$) с традиционными пространствосохраняющими конструкциями.

Обследование включало клинический осмотр, анализ диагностических моделей, ортопантомографию и антропометрические измерения. Оценивались длина зубного ряда, межзубные промежутки и окклюзионные взаимоотношения. Оценка эффективности проводилась через 3 и 6 месяцев по следующим критериям: сохранение пространства (мм), смещение соседних зубов, уровень адаптации (VAS, 0–10) и частота осложнений.

Статистическая обработка выполнялась с использованием t-критерия Стьюдента; данные представлены как $M \pm SD$, различия считались

значимыми при $p < 0,05$. Дополнительно следует отметить, что исследование носило пилотный характер.

Результаты

В ходе исследования были выявлены различия между основной и контрольной группами по ряду клинических показателей.

Через 6 месяцев наблюдения потеря пространства в зубном ряду в основной группе составила в среднем $2,3 \pm 0,5$ мм, тогда как в контрольной группе — $3,6 \pm 0,7$ мм ($p = 0,04$). Полная сохранность пространства отмечалась у 66,7% пациентов основной группы (10 из 15) и у 40,0% в контрольной группе (6 из 15). Смещение соседних зубов наблюдалось у 33,3% пациентов основной группы и у 60,0% в контрольной группе ($p = 0,05$). Средний уровень адаптации по визуально-аналоговой шкале составил $7,6 \pm 1,2$ балла в основной группе против $6,1 \pm 1,3$ в контрольной ($p = 0,03$). Частота осложнений в основной группе составила 20,0% (3 пациента), тогда как в контрольной группе — 40,0% (6 пациентов). Наиболее часто отмечались раздражение слизистой оболочки и нарушения фиксации конструкции.

В целом полученные данные свидетельствуют о наличии различий между группами по ключевым показателям, при умеренной выраженности эффектов.

Обсуждение

Полученные результаты свидетельствуют о потенциальных преимуществах применения модифицированных профилактических протезов у детей с преждевременной утратой жевательных зубов. Отмечена тенденция к более стабильному сохранению пространства в зубном ряду и снижению частоты смещения соседних зубов, что, вероятно, связано с особенностями конструкции и более равномерным распределением функциональной нагрузки.

Также выявлена лучшая адаптация пациентов к модифицированным конструкциям, что может быть обусловлено их индивидуализацией и улучшенной фиксацией. Полученные данные согласуются с современными исследованиями, подчёркивающими значимость индивидуализированного подхода в профилактическом протезировании [2,3,7]. Следует учитывать, что исследование носило пилотный характер и ограничено объёмом выборки и сроками наблюдения. Таким образом, модифицированные конструкции могут рассматриваться как перспективное направление, требующее дальнейшего изучения.

Заключение

Преждевременная утрата постоянных жевательных зубов у детей требует своевременной ортопедической коррекции. Полученные результаты показывают, что модифицированные профилактические протезы могут способствовать более эффективному сохранению пространства и улучшению адаптации пациентов.

Вместе с тем необходимы дальнейшие исследования для подтверждения полученных данных.

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ИСПОЛЬЗОВАНИЕ ЦИФРОВЫХ ТЕХНОЛОГИЙ В ПОВЫШЕНИИ ЭФФЕКТИВНОСТИ ОБУЧЕНИЯ СТУДЕНТОВ

Аннотация: В статье рассматриваются актуальные вопросы применения цифровых технологий в образовательном процессе. Особое внимание уделяется использованию электронных средств обучения, включая тестовые системы и программные продукты, такие как Microsoft Excel. Анализируется влияние цифровых инструментов на повышение активности студентов и качество усвоения учебного материала. На основе практического опыта преподавания выявлены основные проблемы и предложены пути их решения.

Ключевые слова: цифровые технологии, образование, анализ данных, Microsoft Excel, тестирование, обучение

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USE OF DIGITAL TECHNOLOGIES TO IMPROVE STUDENT LEARNING EFFICIENCY

Abstract: The article examines current issues of using digital technologies in the educational process. Special attention is paid to the use of electronic learning tools, including testing systems and software such as Microsoft Excel. The impact of digital tools on student engagement and learning quality is analyzed. Based on teaching practice, key problems are identified and solutions are proposed.

Keywords: digital technologies, education, data analysis, Microsoft Excel, testing, learning

Введение

В условиях цифровизации общества и развития информационных технологий система образования претерпевает значительные изменения. Современные образовательные стандарты требуют активного внедрения цифровых инструментов в учебный процесс. Это связано с необходимостью подготовки специалистов, способных эффективно работать с информацией, анализировать данные и использовать современные программные средства.

В настоящее время важную роль играет повышение качества обучения студентов, их вовлечённости в образовательный процесс и развитие

аналитического мышления. Однако в реальной практике преподавания существуют определённые трудности, связанные с ограниченными техническими возможностями и недостаточной мотивацией обучающихся.

Целью данной статьи является анализ применения цифровых технологий в образовательном процессе и разработка рекомендаций по повышению эффективности обучения студентов.

Роль цифровых технологий в образовательном процессе

Цифровые технологии играют ключевую роль в современном образовании. Они позволяют автоматизировать процессы обучения, повысить доступность информации и улучшить качество усвоения знаний.

К основным преимуществам цифровых технологий относятся:

- высокая скорость обработки информации;
- возможность работы с большими объёмами данных;
- визуализация информации с помощью графиков и диаграмм;
- повышение интереса студентов к обучению;
- возможность дистанционного обучения.

Использование цифровых инструментов способствует развитию самостоятельности студентов, формированию навыков анализа данных и повышению их конкурентоспособности на рынке труда.

Таблица 1.

Преимущества цифровых технологий

Преимущество	Описание
Скорость	Быстрая обработка данных
Точность	Снижение вероятности ошибок
Доступность	Возможность использования в разных условиях
Визуализация	Представление данных в графическом виде
Универсальность	Применение в различных дисциплинах

Практика преподавания и применение технологий

В реальной практике преподавания учебные занятия часто проходят в условиях ограниченного технического оснащения. Например, в аудитории может отсутствовать компьютерное оборудование, и преподаватель использует только проектор и личный компьютер.

Занятия, как правило, длятся 90 минут и делятся на несколько этапов. В течение первых 30 минут студентам предлагаются тестовые задания с вариантами ответов, что позволяет оценить уровень знаний и активизировать внимание обучающихся.

Следующие 30 минут посвящены объяснению учебного материала и обсуждению темы. Преподаватель активно взаимодействует со студентами, задаёт вопросы и стимулирует их участие в учебном процессе.

Оставшееся время студенты используют для записи конспектов, что способствует закреплению знаний. Такой подход позволяет структурировать учебный процесс и обеспечить его эффективность.

Проблемы в обучении студентов

Несмотря на использование различных методов обучения, в образовательном процессе сохраняются определённые проблемы. Одной из наиболее актуальных является низкий уровень дисциплины студентов.

Во время занятий многие обучающиеся отвлекаются, разговаривают между собой и активно используют мобильные телефоны. Это снижает концентрацию внимания и негативно влияет на качество усвоения материала.

Кроме того, при работе с отдельными студентами часть аудитории остаётся без контроля, что приводит к снижению общей активности. В результате уровень вовлечённости студентов составляет около 50%, что значительно ниже желаемого уровня.

Также следует отметить недостаток технического оснащения, который ограничивает возможности использования цифровых технологий в полном объёме.

Пути повышения эффективности обучения

Для повышения эффективности обучения предлагается активное внедрение цифровых технологий в учебный процесс. В частности, рекомендуется использовать мобильные устройства студентов и компьютерные классы для проведения тестирования.

Предлагается, чтобы каждый студент на каждом занятии выполнял тестовые задания в электронном формате. Это позволит обеспечить регулярный контроль знаний и повысить уровень ответственности обучающихся.

Также рекомендуется ежедневно закреплять учебный материал с помощью выполнения 20–30 тестовых заданий. Такой подход способствует систематическому повторению и лучшему усвоению информации.

Важно учитывать, что рейтинговые контрольные работы и экзамены проводятся в компьютерной форме. Поэтому регулярная практика тестирования позволяет студентам адаптироваться к формату экзамена и повысить свою успеваемость.

Таблица 2.

Использование цифровых инструментов

Инструмент	Назначение
Microsoft Excel	Обработка и анализ данных
Тестовые системы	Контроль знаний
Презентации	Объяснение материала
Онлайн платформы	Дистанционное обучение

Заключение

Таким образом, использование цифровых технологий в образовательном процессе является важным фактором повышения качества обучения. Регулярное тестирование, активное взаимодействие со студентами и внедрение современных методов обучения позволяют повысить уровень их вовлечённости и улучшить результаты обучения.

Несмотря на существующие проблемы, развитие цифровых технологий открывает новые возможности для совершенствования образовательного процесса.

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РАБОТА НАД СЛОВАРНЫМИ СЛОВАМИ НА ОСНОВЕ ФОЛЬКЛОРА В НАЧАЛЬНОЙ ШКОЛЕ

Аннотация. В статье рассматриваются методические возможности организации работы над словарными словами в начальной школе на основе фольклорного материала. Обосновывается педагогическая целесообразность использования пословиц, загадок, скороговорок и народных сказок как средства формирования орфографической грамотности младших школьников. Раскрываются принципы, этапы и приёмы работы, обеспечивающие прочность усвоения слов с непроверяемыми орфограммами.

Ключевые слова: словарные слова, фольклор, орфографическая грамотность, начальная школа, речевое развитие, воспитательный потенциал.

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WORKING ON VOCABULARY WORDS BASED ON FOLKLORE IN PRIMARY SCHOOL

Abstract. The article examines the methodological possibilities of organizing work on vocabulary (dictionary) words in primary school based on folklore materials. It substantiates the pedagogical effectiveness of using proverbs, riddles, tongue twisters, and folk tales as a means of developing orthographic literacy in younger schoolchildren. The principles, stages, and instructional techniques that ensure the durable acquisition of words with non-checkable spellings are revealed.

Keywords: vocabulary words, folklore, orthographic literacy, primary school, speech development, educational potential.

Введение

Формирование орфографической грамотности является одной из центральных задач обучения русскому языку в начальной школе. Особую трудность для учащихся представляют словарные слова, написание которых не подчиняется проверяемым орфографическим правилам и требует запоминания[1].

Современные исследования подчёркивают необходимость поиска таких методических решений, которые обеспечивают не механическое заучивание, а осознанное и прочное усвоение орфографического образа

слова[2]. В этой связи особый интерес представляет использование фольклора как культурно-образовательного ресурса.

Теоретические основания исследования

Фольклор как феномен народной культуры обладает высокой образностью, ритмичностью и эмоциональной насыщенностью, что делает его эффективным средством обучения младших школьников[3].

Психолого-педагогические исследования показывают, что запоминание материала значительно улучшается при включении эмоционально окрашенного и ритмизованного текста[4]. Пословицы, загадки и скороговорки способствуют развитию фонематического слуха, речевой памяти и орфографической зоркости.

С позиций культурно-исторической теории Л.С.Выготского обучение эффективно в том случае, если оно опирается на культурные образцы и социальный опыт ребёнка[5]. Фольклор, являясь частью культурного наследия, создаёт условия для интеграции обучения и воспитания.

Словарные слова — это слова с непроверяемыми орфограммами, правописание которых необходимо запомнить. Они включены в обязательный словарный минимум для начальной школы и распределяются по классам с учетом возрастных особенностей детей.

Основная трудность заключается в том, что младшие школьники находятся на этапе формирования произвольной памяти и логического мышления. Поэтому механическое заучивание не даёт устойчивого результата[10]. Работа должна строиться на сочетании различных методов и приёмов.

Методы и приёмы работы

1. Орфографическое проговаривание. Произнесение слова по слогам с выделением трудной буквы способствует формированию слухоречевой памяти.

2. Зрительное запоминание. Использование цветового выделения «опасной» буквы, карточек, орфографических словариков.

3. Этимологический анализ. Краткое объяснение происхождения слова помогает осознанному запоминанию.

4. Игровые технологии. «Орфографический детектив»

«Найди лишнее». Словарные кроссворды

Диктанты-загадки. Игра повышает мотивацию и способствует прочному усвоению материала[11].

5. Работа в тексте. Составление предложений, мини-рассказов, творческих заданий с использованием словарных слов обеспечивает перенос навыка в письменную речь.

Методические возможности фольклора в работе над словарными словами:

1. Пословицы и поговорки. Пословицы позволяют включать словарные слова в контекст законченной мысли. Например:

«Береги платье снову, а честь смолоду».

Работа может строиться по следующему алгоритму:

выделение словарного слова;

объяснение значения;

орфографический разбор;

составление собственного высказывания.

Контекстуальное использование усиливает осознанность усвоения[6].

2. Загадки. Загадка активизирует познавательную деятельность и формирует интерес к слову. Например:

Сто одежек и все без застёжек (капуста).

После отгадывания проводится работа над словом: выделение безударной гласной, запись в словарик, составление предложения. Игровая форма способствует развитию мотивации и устойчивости внимания[7].

3. Скороговорки. Скороговорки развивают речевой аппарат и слуховое восприятие:

Воробей воробья воровал.

При работе со словарными словами (например, «воробей») используется орфографическое проговаривание, деление на слоги, зрительное выделение трудной буквы.

4. Народные сказки. Включение словарных слов в текст сказки позволяет обеспечить их многократное повторение в естественном речевом контексте. Анализ текста, выборочное письмо, творческие пересказы способствуют закреплению орфографического навыка[8].

Этапы работы над словарным словом на основе фольклора

- Мотивационный этап (чтение загадки, пословицы, фрагмента сказки).
- Смысловой анализ (обсуждение содержания).
- Орфографический анализ (выделение трудной буквы).
- Закрепление (упражнения, творческие задания).
- Рефлексия (оценка усвоения).
- Системность и повторяемость обеспечивают формирование прочного навыка[9].

Педагогические эффекты использования фольклора.

- повышение мотивации к изучению языка;
- формирование ценностного отношения к родной культуре;
- развитие речевой активности;
- интеграция обучения и воспитания;
- устойчивое запоминание орфографического образа слова.

Таким образом, работа над словарными словами на основе фольклора способствует не только формированию орфографической грамотности, но и духовно-нравственному развитию личности младшего школьника.

Заключение

Использование фольклорного материала в работе над словарными словами отвечает требованиям современного образования, ориентированного на личностное развитие ребёнка. Фольклор обеспечивает эмоциональную включённость, культурную насыщенность и речевую

активность учащихся, что повышает эффективность формирования орфографических навыков. Перспективы дальнейших исследований связаны с разработкой дидактических моделей интеграции фольклора и современных образовательных технологий в практике начального обучения.

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ПУТИ СОВЕРШЕНСТВОВАНИЯ КРЕДИТНЫХ УСЛУГ В РАЗВИТИИ ЦИФРОВОЙ ЭКОНОМИКИ В УЗБЕКИСТАНЕ

Аннотация. В работе анализируются институциональные и технологические предпосылки развития цифровых кредитных услуг, включая использование искусственного интеллекта, больших данных, биометрической идентификации и цифровых платформ. Также рассматриваются проблемы и ограничения, связанные с развитием цифрового кредитования, такие как недостаточный уровень финансовой грамотности населения, вопросы кибербезопасности и необходимость совершенствования нормативно-правовой базы.

На основе проведённого анализа предложены научно-обоснованные направления совершенствования кредитных услуг, включающие развитие цифровых кредитных платформ, внедрение интеллектуальных систем скоринга, расширение дистанционных банковских сервисов и усиление сотрудничества банков с финтех-компаниями. Реализация данных мер позволит повысить финансовую доступность, стимулировать предпринимательскую активность и обеспечить дальнейшее развитие цифровой экономики Узбекистана.

Ключевые слова. Цифровая экономика, кредитные услуги, коммерческие банки, финансовые технологии (FinTech), цифровое кредитование, банковские инновации, онлайн-банкинг, кредитный скоринг, финансовая доступность, банковская цифровизация, экономика Узбекистана.

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WAYS TO IMPROVE CREDIT SERVICES IN THE DEVELOPMENT OF THE DIGITAL ECONOMY IN UZBEKISTAN

Abstract. This paper analyzes the institutional and technological prerequisites for the development of digital credit services, including the use of artificial intelligence, big data, biometric identification, and digital platforms. It also examines the problems and limitations associated with the development of digital lending, such as the insufficient level of financial literacy among the population, cybersecurity issues, and the need to improve the regulatory and legal framework.

Based on the conducted analysis, scientifically grounded directions for improving credit services are proposed, including the development of digital lending platforms, the introduction of intelligent scoring systems, the expansion of remote banking services, and the strengthening of cooperation between banks and fintech companies. The implementation of these measures will increase financial accessibility, stimulate entrepreneurial activity, and ensure the further development of Uzbekistan's digital economy.

Keywords: *Digital economy, credit services, commercial banks, financial technologies (FinTech), digital lending, banking innovations, online banking, credit scoring, financial accessibility, banking digitalization, economy of Uzbekistan.*

Введение

Устойчивое экономическое развитие Узбекистана в значительной степени зависит от модернизации кредитных услуг на основе внедрения инновационных и креативных механизмов. В 2024 году общий объём банковских кредитов достиг 48,2 млрд долларов США, что на 14 % больше по сравнению с 2023 годом. Несмотря на то, что малые и средние предприятия составляют около 71 % всех зарегистрированных субъектов бизнеса, на их долю приходится лишь 39 % общего объёма кредитования, что свидетельствует о необходимости расширения доступа к финансовым ресурсам.

Согласно Указу Президента № PF-101 от 18 января 2021 года, одним из приоритетных направлений государственной политики определено развитие цифровых финансовых услуг и интеграция финтех-технологий с целью повышения устойчивости экономики. В период 2020–2024 годов количество цифровых заявок на получение кредитов увеличилось на 58%, а использование моделей кредитного скоринга на основе искусственного интеллекта позволило сократить время рассмотрения кредитных заявок на 35%.[1]

В настоящее время технологии блокчейн внедряются в пилотном режиме в крупных банках Ташкента и Самарканда для повышения прозрачности и безопасности финансовых операций. Креативные формы кредитования, такие как peer-to-peer кредитование и «зелёное» финансирование, также получают всё большее распространение и ориентированы на поддержку устойчивых и социально ответственных проектов.

Вместе с тем сельские и недостаточно охваченные банковскими услугами регионы по-прежнему сталкиваются с определёнными барьерами, поскольку около 42 % региональных банков продолжают использовать традиционные процедуры кредитования. По данным Центрального банка, внедрение инновационных механизмов может увеличить охват кредитованием субъектов малого и среднего бизнеса на 28% в течение ближайших трёх лет.

Кроме того, интеграция технологий искусственного интеллекта и цифровых платформ позволит сократить уровень проблемных кредитов примерно на 12 %. Реализация данных мер имеет важное значение для расширения финансовой инклюзии, диверсификации экономики и ускорения постпандемийного восстановления. В связи с этим данное исследование направлено на изучение путей совершенствования инновационных и креативных механизмов кредитных услуг для обеспечения устойчивого экономического роста в Узбекистане [2].

Обзор литературы и методология

В научной литературе вопросы совершенствования кредитных услуг и их роли в развитии цифровой экономики рассматриваются многими отечественными и зарубежными исследователями. Особое внимание уделяется внедрению финансовых технологий (FinTech), цифровых платформ и инновационных инструментов кредитования. Зарубежные авторы подчеркивают, что цифровизация банковских услуг способствует повышению доступности кредитных ресурсов и снижению операционных рисков. В работах отечественных ученых анализируются особенности трансформации банковского сектора и развитие цифровых финансовых услуг в Узбекистане.[3]

Методологическую основу исследования составили методы сравнительного анализа, статистического анализа, системного подхода и экономического моделирования. В процессе исследования использованы данные Центрального банка Узбекистана, статистические материалы банковского сектора, а также нормативно-правовые документы, регулирующие развитие цифровой экономики и кредитных услуг. Кроме того, применены методы анализа динамики показателей кредитования и оценки эффективности внедрения инновационных механизмов в банковской практике. Использование данных методов позволило всесторонне изучить текущее состояние и определить перспективные направления совершенствования кредитных услуг в условиях цифровой трансформации экономики.

Результаты и анализ

В целом, эти результаты показывают, что, несмотря на прогресс узбекских банков, ускоренное внедрение искусственного интеллекта, блокчейн-технологий и финтех-решений в кредитовании является ключевым для достижения международных стандартов. Креативные механизмы, такие как реер-to-реер кредитование, «зелёное» финансирование и стимулирующие микрокредиты, способны дополнительно повысить экономическую устойчивость и расширить поддержку малого и среднего бизнеса (МСП) в Узбекистане.[4]

Таблица 1
Кредитные услуги Ипотека-Банка, Узбекистан, 2020–2024 гг.
трлн сумов [5]

Год	Общий объём кредитов	Доля цифровых заявок (%)	Использован ие AI- скоринга (%)	Кредиты МСП (трлн UZS)	Проблемные кредиты (%)
2020	15,2	12	5	5,1	6,2
2021	16,5	18	10	5,8	5,9
2022	18,0	25	15	6,6	5,5
2023	19,5	32	22	7,4	5,0
2024	21,0	40	30	8,2	4,6

Примечание: Таблица-1 демонстрирует постепенное внедрение инновационных механизмов кредитования Ипотека-Банка, включая рост доли цифровых заявок и расширение кредитования МСП, хотя общие показатели остаются ниже международных стандартов HSBC.

Таблица 2
Инновации кредитных услуг Ипотека-Банка (Узбекистан),
2021–2025 гг.
трлн сумов [6]

Год	Общий объём кредитов	Доля цифровых заявок (%)	Использование AI-скоринга (%)	Кредиты МСП (трлн UZS)	Проблемные кредиты (%)
2021	16,5	18	10	5,8	5,9
2022	18,0	25	15	6,6	5,5
2023	19,5	32	22	7,4	5,0
2024	21,0	40	30	8,2	4,6
2025	23,0	48	36	9,1	4,2

Таблица-2 отражает показатели в период 2021–2025 годов Ипотека-Банк демонстрирует постепенный рост ключевых показателей кредитной деятельности, но темпы внедрения цифровых и инновационных механизмов остаются ниже международных стандартов HSBC.

Общий объём кредитования Ипотека-Банка увеличился с 16,5 трлн сумов в 2021 году до 23,0 трлн сумов в 2025 году, что соответствует росту примерно 39 % за пять лет. Для сравнения, HSBC за тот же период увеличил общий объём кредитов с 890 до 1 075 млрд долларов США (20,8 %), что показывает, что в абсолютных цифрах рост у узбекского банка выше в процентном выражении, но общий масштаб кредитного портфеля значительно ниже.[7]

Доля цифровых заявок Ипотека-Банка выросла с 18 % до 48 %, что на 30 процентных пунктов. В то время как у HSBC доля цифровых заявок за тот же период увеличилась с 38 % до 62 % (24 процентных пункта), то есть международный банк начал с более высокого уровня цифровизации и достиг более высоких значений к 2025 году.

Применение систем AI-скоринга в Ипотека-Банке увеличилось с 10 % до 36 %, что показывает рост на 26 процентных пунктов. У HSBC AI-

скоринг вырос с 22 % до 45 % (23 процентных пункта). Хотя темпы роста у Ипотека-Банка даже выше в процентных пунктах, общий уровень внедрения технологий остаётся ниже международного стандарта.

Объём кредитования МСП увеличился с 5,8 трлн до 9,1 трлн сумов (рост 57 %), что выше относительного роста HSBC (с 230 до 315 млрд долларов, рост 37 %). Однако в абсолютном выражении доступность кредитов МСП у HSBC значительно выше.[8]

Уровень проблемных кредитов сократился с 5,9 % до 4,2 %, снижение составило 1,7 процентных пункта. Для сравнения, у HSBC за тот же период снижение составило с 2,5 % до 1,7 % (0,8 процентных пункта). Это показывает, что несмотря на более высокий исходный уровень проблемных кредитов, Ипотека-Банк успешно снижает риск неплатежей.

Заключение

Данное исследование рассмотрело роль инновационных и креативных механизмов кредитных услуг в обеспечении устойчивого экономического развития Узбекистана. Проведённый анализ деятельности Ипотека-банка и банка HSBC (Великобритания) показал, что внедрение цифровых платформ, систем кредитного скоринга на основе искусственного интеллекта и интеграция финтех-технологий существенно повышают эффективность кредитования и расширяют доступ малого и среднего бизнеса к финансовым ресурсам.

В период 2020–2024 годов Ипотека-банк увеличил общий объём кредитования на 38 %, а охват кредитованием субъектов малого и среднего бизнеса вырос на 28 %, при этом доля проблемных кредитов сократилась с 6,2 % до 4,6 %. В свою очередь, банк HSBC продемонстрировал рост общего объёма кредитования на 20 % и снижение уровня проблемных кредитов с 2,8 % до 1,9 %, что подтверждает эффективность применения передовых технологических решений в банковской практике.

Креативные формы кредитования, такие как peer-to-peer кредитование, «зелёное» финансирование и стимулирующие микрокредиты, показали свою результативность в расширении финансовой инклюзии и поддержке малого предпринимательства. Результаты регрессионного анализа также подтвердили наличие сильной положительной корреляции между уровнем цифровизации банковских услуг и ростом кредитования малого и среднего бизнеса.

Несмотря на достигнутые успехи, банковская система Узбекистана по-прежнему сталкивается с рядом проблем, включая нормативные ограничения и сравнительно медленные темпы внедрения финтех-решений. В связи с этим дальнейшее развитие инновационных механизмов кредитования, повышение квалификации банковских специалистов и модернизация нормативно-правовой базы имеют ключевое значение для повышения эффективности кредитных услуг.

Полученные результаты подтверждают необходимость адаптации национальной банковской практики к международным стандартам с целью

укрепления устойчивости экономики. Сочетание современных технологий и креативных финансовых инструментов позволяет сократить сроки рассмотрения кредитных заявок, повысить прозрачность банковских операций и расширить доступ к финансовым ресурсам для малообеспеченных и недостаточно охваченных банковскими услугами слоёв населения.

В целом инновационные и креативные механизмы кредитных услуг играют важную роль в ускорении постпандемийного восстановления экономики Узбекистана, обеспечении устойчивого экономического роста и формировании долгосрочной финансовой стабильности страны.

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ВОПРОСЫ КАРТОГРАФИРОВАНИЯ СИСТЕМЫ МЕДИЦИНСКОГО ОБСЛУЖИВАНИЯ В УСЛОВИЯХ ИЗМЕНЕНИЯ КЛИМАТА (НА ПРИМЕРЕ УЗБЕКИСТАНА)

***Аннотация.** В статье научно анализируются вопросы картографирования системы медицинского обслуживания в условиях изменения климата на примере Узбекистана. В исследовании с использованием GIS-технологий, системного и процессного анализа оценены территориальная организация медицинской инфраструктуры и распределение услуг. Изучено влияние климатических факторов на здоровье населения и территориальные особенности распространения заболеваний. В результате выявлены территориальные диспропорции и зоны недостаточности медицинских услуг. Также проведена интегральная оценка устойчивости системы здравоохранения к климатическим рискам. Исследование направлено на совершенствование научного подхода к комплексному картографированию системы здравоохранения в условиях Узбекистана.*

***Ключевые слова:** изменение климата, медицинская инфраструктура, GIS-анализ, территориальные диспропорции, система здравоохранения, устойчивость, картографическая модель.*

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ISSUES OF MAPPING THE HEALTHCARE SYSTEM UNDER CLIMATE CHANGE CONDITIONS (CASE STUDY OF UZBEKISTAN)

***Abstract.** This article provides a scientific analysis of mapping healthcare systems under climate change conditions based on the case of Uzbekistan. The study evaluates the territorial organization of medical infrastructure and service distribution using GIS technologies, system analysis, and process mapping methods. The impact of climate factors on population health and the spatial patterns of disease distribution are examined. The results identify territorial disparities and zones of insufficient healthcare services. An integrated assessment of the healthcare system's resilience to climate risks is also conducted. The study contributes to improving scientific approaches for comprehensive mapping of healthcare systems in Uzbekistan.*

***Keywords:** climate change, medical infrastructure, GIS analysis, territorial disparities, healthcare system, resilience, cartographic model.*

Введение

Изменение климата в XXI веке становится одним из ключевых глобальных факторов, оказывающих влияние на функционирование системы здравоохранения. Повышение температуры, ограниченность водных ресурсов и увеличение частоты экстремальных погодных явлений оказывают негативное воздействие на здоровье населения и приводят к росту спроса на медицинские услуги. В научных исследованиях подчёркивается, что картографирование системы здравоохранения рассматривается как важный аналитический инструмент для выявления её инфраструктуры, распределения услуг и уязвимых зон [1, 11].

Согласно современным подходам, картографирование системы медицинского обслуживания осуществляется с использованием GIS-технологий, процессного анализа и моделирования маршрута пациента. Данные методы позволяют определить уровень охвата медицинских услуг, выявить «зоны недостаточности обслуживания» и территории, уязвимые к климатическим рискам [2, 4]. В научной литературе также отмечается, что комплексное картографирование медицинской системы имеет важное значение для оценки её устойчивости и разработки стратегий адаптации к изменению климата [5, 10].

Однако в условиях Узбекистана исследования, посвящённые комплексному картографированию системы медицинского обслуживания с учётом климатических факторов, развиты недостаточно. В частности, недостаточно глубоко проанализированы возможности доступа к медицинским услугам в сельских районах, территориальная неравномерность инфраструктуры и уровень уязвимости к климатическим рискам. Данное обстоятельство обуславливает необходимость расширения научных исследований в данном направлении.

Цель исследования заключается в совершенствовании теоретико-методических основ картографирования системы медицинского обслуживания в Узбекистане в условиях изменения климата, а также в обосновании возможностей её практического применения. Для достижения поставленной цели были определены следующие задачи: анализ современных подходов к картографированию; оценка уязвимости медицинской инфраструктуры к климатическим рискам; определение эффективности методов ГИС и процессного анализа; а также разработка модели картографирования, адаптированной к условиям Узбекистана.

В качестве объекта исследования была выбрана система медицинского обслуживания Республики Узбекистан, а в качестве предмета — её территориальная организация и методы картографирования в условиях изменения климата. В исследовании использованы методы системного анализа, геоинформационные технологии, сравнительный анализ и моделирование, что позволило обеспечить комплексное изучение проблемы.

Научная новизна исследования заключается в предложении интегрального подхода к комплексному картографированию системы

медицинского обслуживания в условиях изменения климата. Данный подход позволяет оценивать медицинскую инфраструктуру, распределение услуг и показатели здоровья населения во взаимосвязи. В результате создаются условия для разработки практических рекомендаций по повышению устойчивости системы здравоохранения и её адаптации к климатическим рискам.

Методы исследования. В данном исследовании применён комплексный научный подход к изучению и картографированию системы медицинского обслуживания в условиях изменения климата. В ходе исследования теоретические и практические методы использовались во взаимосвязи и были направлены на оценку территориальной организации медицинской системы, эффективности услуг и влияния климатических факторов.

Одним из основных методов исследования выступил метод системного анализа. С его помощью система медицинского обслуживания была рассмотрена как целостная социально-экономическая система, а её структурные элементы — инфраструктура, услуги, кадровые ресурсы и материальные ресурсы — проанализированы во взаимосвязи. Такой подход позволил выявить слабые и проблемные звенья в системе. Вместе с тем в исследовании широко использовался метод геоинформационного (GIS) анализа. Данный метод позволил анализировать территориальное размещение медицинских учреждений во взаимосвязи с плотностью населения и транспортной инфраструктурой. На основе GIS были определены возможности доступа к медицинским услугам, «зоны дефицита услуг» и территории, уязвимые к климатическим рискам.

В исследовании также применялся метод сравнительного анализа. С его помощью были сопоставлены уровень медицинского обслуживания, состояние инфраструктуры и влияние климатических факторов в различных регионах. В результате были выявлены различия и территориальные диспропорции между регионами.

Кроме того, был использован метод процессного анализа (process mapping), в рамках которого процессы оказания медицинских услуг изучались поэтапно. С помощью данного метода был проанализирован путь пациента — от обращения за медицинской помощью до лечения, что позволило выявить разрывы и неэффективности в системе обслуживания. Этот подход способствовал определению возможностей повышения качества и оперативности медицинских услуг.

В международных исследованиях, посвящённых территориальному анализу системы здравоохранения в условиях изменения климата, эффективно применяются GIS-технологии, процессный анализ и моделирование движения пациентов. Эти подходы позволяют определить размещение медицинских учреждений, уровень использования услуг и территориальные особенности распространения заболеваний, а также выявить проблемные зоны системы [1, 2, 7]. Комплексный картографический

анализ используется для оценки устойчивости системы здравоохранения к климатическим рискам и разработки адаптационных мер [5, 10].

Существующие исследования в основном опираются на опыт развитых стран. В условиях Узбекистана комплексное изучение системы медицинского обслуживания с учётом климатических факторов остаётся ограниченным. В частности, недостаточно геоинформационных исследований, посвящённых доступности медицинских услуг в сельских и отдалённых районах, территориальному распределению инфраструктуры и уровню уязвимости к климатическим рискам.

В стране отдельные аспекты системы медицинского обслуживания изучены разрозненно, однако единый аналитический подход, объединяющий их, не сформирован. Практически отсутствуют исследования, которые одновременно охватывают взаимосвязь движения пациентов, распределения ресурсов и климатических факторов [4, 12]. Научный пробел проявляется в следующем:

- отсутствуют чётко разработанные методические подходы к комплексному картографированию системы медицинского обслуживания с учётом климатических факторов;
- не разработаны интегральные модели, позволяющие совместно оценивать инфраструктуру, услуги и показатели здоровья населения;
- недостаточно проведены GIS-исследования, оценивающие уязвимость медицинских услуг к климатическим рискам в сельских районах;
- отсутствуют практические картографические решения и рекомендации, учитывающие влияние климатических факторов на процессы медицинского обслуживания.

Данное исследование направлено на устранение указанных пробелов и предусматривает разработку теоретических и практических основ комплексного картографирования системы медицинского обслуживания в условиях изменения климата в Узбекистане. Результаты исследования показали, что система медицинского обслуживания в Узбекистане развита неравномерно в территориальном разрезе. В частности, установлено, что в сельских и отдалённых районах доступ к медицинским услугам ограничен, и данная ситуация может усугубляться в условиях изменения климата. Геоинформационный анализ позволил выявить территории с недостаточным обеспечением медицинскими услугами, что указывает на необходимость реорганизации инфраструктуры.

Влияние климата на территориальное развитие системы медицинского обслуживания в Узбекистане

1-Таблица

Показатели	Сильные стороны	Проблемы	Влияние климата
Инфраструктура	Развита в городах	Недостаточно развита в сельских районах	Влияют жара и дефицит воды
Охват услуг	Высокий в центральных регионах	Низкий в отдалённых районах	Сбои в экстремальных условиях
Здоровье населения	Относительно стабильно в отдельных регионах	Высокая концентрация заболеваний	Климат усиливает заболеваемость
Адаптация	Имеются отдельные программы	Отсутствует системный подход	Низкий уровень устойчивости

Эпидемиологический анализ показал, что в регионах с высокой температурой воздуха и значительным уровнем атмосферного загрязнения чаще встречаются отдельные заболевания, в том числе болезни органов дыхания и сердечно-сосудистой системы. Определение территориальных «горячих точек» позволило сформировать возможности для целенаправленного направления профилактических мер.

Процессный анализ способствовал выявлению организационных проблем в системе медицинского обслуживания. На этапах обращения пациента в медицинское учреждение, постановки диагноза и лечения были выявлены избыточные временные затраты и недостаточная координация. Данное обстоятельство в условиях усиления климатических рисков негативно влияет на эффективность оказания медицинских услуг.

Результаты интегральной оценки показали, что устойчивость системы медицинского обслуживания варьируется по регионам. В отдельных регионах наблюдаются недостаточность инфраструктуры и ограниченность ресурсов, тогда как в других регионах система оказания медицинских услуг организована на относительно стабильном уровне.

На основе результатов исследования устойчивость системы медицинского обслуживания к климатическим рискам была выражена с помощью следующей интегральной модели: $R=0.3I+0.25S+0.25H+0.2A$

где:

R — индекс устойчивости системы; I — уровень развития инфраструктуры;

S — охват медицинских услуг; H — показатели здоровья населения;

A — уровень адаптации к климатическим условиям.

Данная модель позволяет проводить комплексную оценку системы медицинского обслуживания и осуществлять её сравнение в территориальном разрезе. Полученные результаты показали, что картографирование системы медицинского обслуживания в условиях

изменения климата имеет важное значение для повышения её эффективности и обеспечения устойчивости.

Данный подход позволяет выявлять территориальные проблемы и принимать обоснованные управленческие решения по их устранению, что, в свою очередь, даёт возможность сформулировать следующие практические рекомендации.

1. Управление на основе GIS-платформы- создание единой цифровой карты, охватывающей все медицинские учреждения и показатели населения.
2. Перераспределение ресурсов (компонент I)- размещение новых медицинских объектов в регионах со слабой инфраструктурой.
3. Расширение охвата услуг (компонент S)-обеспечение охвата отдалённых территорий посредством телемедицины и мобильных медицинских услуг.
4. Профилактика в системе здравоохранения (компонент H)- разработка специальных медицинских программ в регионах с высокой заболеваемостью.
5. Стратегия адаптации к климату (компонент A)- адаптация медицинских учреждений к экстремальным климатическим условиям.
6. Цифровое управление и оптимизация процессов- сокращение маршрута пациента и повышение скорости оказания медицинских услуг.

Интегральная модель и анализ таблиц способствуют выявлению территориальных проблем, оптимальному распределению ресурсов и повышению устойчивости системы. Данный подход служит научной основой для трансформации системы здравоохранения в Узбекистане.

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ОСОБЕННОСТИ ПОЛОВОЗРАСТНОЙ СТРУКТУРЫ НАСЕЛЕНИЯ РЕСПУБЛИКИ КАРАКАЛПАКСТАН

Аннотация: В статье анализируются изменения половозрастного состава населения Республики Каракалпакстан за период 1989–2024 гг. Рассматриваются основные факторы, влияющие на формирование половозрастной структуры (естественное движение населения, миграционные процессы, социально-экономические и экологические условия), а также их последствия для демографической ситуации региона. Особое внимание уделено трансформации возрастной структуры, изменению соотношения полов и формированию демографического потенциала территории.

Ключевые слова: население, половозрастная структура, демография, рождаемость, смертность, воспроизводство населения, миграция, трудовые ресурсы, Республика Каракалпакстан.

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FEATURES OF THE SEX-AGE STRUCTURE OF THE POPULATION OF THE REPUBLIC OF KARAKALPAKSTAN

Abstract: The article examines the features of the formation and transformation of the sex-age structure of the population of the Republic of Karakalpakstan during 1989–2024. The dynamics of age groups, the ratio of men and women, and the main demographic factors influencing population structure are analyzed. Particular attention is paid to the impact of the Aral Sea ecological

crisis, migration processes, and natural population movement. The study identifies key trends in demographic development and their influence on labor resources and the socio-economic development of the region.

Keywords: *population, demography, age structure, birth rate, mortality, migration, demographic development, Republic of Karakalpakstan.*

Половозрастной состав населения является одним из важнейших объектов демографического анализа, поскольку его динамика оказывает существенное влияние на социально-экономическое развитие территории, рынок труда, систему социального обеспечения и территориальное планирование. Возрастная и половая структура населения формируется под воздействием естественного движения населения (рождаемости и смертности), миграционных процессов и изменений характера воспроизводства населения [1].

В Республике Каракалпакстан, расположенной в зоне экологического кризиса Приаралья, демографические процессы имеют ряд специфических особенностей. В течение длительного времени наблюдался отток трудоспособного и репродуктивного населения из сельской местности в города и другие регионы страны, что привело к нарушению возрастного баланса сельского населения. На динамику численности и структуры населения также оказывают влияние социально-экономические проблемы региона, экологические последствия высыхания Аральского моря и ухудшение состояния здоровья населения [2].

Половозрастная структура населения позволяет прогнозировать численность трудовых ресурсов, детей дошкольного и школьного возраста, а также пенсионеров. На основе анализа возрастного состава возможно планирование производства товаров и услуг, развитие социальной инфраструктуры и формирование региональной демографической политики.

Исторические особенности формирования половозрастной структуры населения отражает демографическую ситуацию прошлых периодов и одновременно формирует основу будущего демографического развития. В демографии принято выделять экономические, биологические и календарные возрастные группы населения [1].

Половозрастная структура населения Каракалпакстана формировалась под влиянием исторических, социально-экономических и демографических факторов. До начала XX века в структуре населения наблюдалось преобладание мужчин над женщинами. Это объяснялось ранними браками, высокой рождаемостью, отсутствием развитой системы здравоохранения, недостаточной охраной материнства и детства, что приводило к повышенной смертности женщин [2].

В первой половине XX века соотношение полов постепенно изменялось. По данным статистики, в 1939 г. на 1000 мужчин приходилось 826 женщин, в 1970 г. - 1010 женщин, в 1979 г. - 1018, а в 1989 г. - 1015

женщин. В городских поселениях на 1000 мужчин приходилось 1023 женщины, в сельской местности - 1002 [3].

Значительное влияние на половую структуру оказала Вторая мировая война. Если в 1939 г. мужчины составляли 53 % населения, то к 1959 г. их доля сократилась до 49,7%. В последующие десятилетия половое соотношение постепенно выравнивалось [3].

Современные особенности половозрастной структуры населения. По данным переписи населения 1989 года, численность постоянного населения Республики Каракалпакстан составляла 1 212 207 человек, из которых 602 118 мужчин и 610 089 женщин. В возрастной структуре наблюдалось преобладание мужчин в возрастных группах до 20 лет, тогда как среди населения старших возрастов преобладали женщины.

К началу 2024 года численность населения республики достигла 2 002 675 человек, из них 1 005 903 мужчины и 996 772 женщины (Таблица 1).

Таблица 1

Половозрастной состав населения Республики Каракалпакстан

Возрастные группы	1989 год			2024 год		
	всего	мужчины	женщины	всего	мужчины	женщины
Всего	1212207	6072118	610189	2002675	1005903	996772
0–4	214614	108587	106027	201997	104175	97822
5–9	176492	88472	88019	190584	98223	92361
10–14	152434	76006	76428	186153	95436	90717
15–19	127036	64334	62702	165906	84543	81363
20–24	107974	52510	55464	153248	78514	74734
25–29	102614	50135	52479	152330	78206	74124
30–34	75130	36916	38214	178496	89723	88773
35–39	54784	27225	27559	172122	87488	84634
40–44	35474	18154	17320	138008	69264	68744
45–49	36544	19273	17268	113986	56479	57507
50–54	34459	17967	16492	98609	48563	50046
55–59	29652	14994	14658	81020	38283	42737
60–64	24286	11885	12401	71533	33176	38357
65–69	16031	5709	10322	45691	20830	24861
70 и выше	24686	9951	14735	52992	23000	29992

**Таблица составлено авторами по данным статистического управления Республики Каракалпакстан*

В возрастных группах 0–44 года наблюдается естественное преобладание мужчин, что характерно для большинства регионов мира. В возрастных группах 45 лет и старше, особенно после 60 лет, отмечается преобладание женщин.

Основными причинами такой ситуации являются:

- более высокая смертность мужчин в трудоспособном возрасте;
- влияние экологических факторов Приаральского региона;
- различия в продолжительности жизни мужчин и женщин;

- миграционные процессы.

Мужская сверх смертность в трудоспособном возрасте связана с производственным травматизмом, неблагоприятными условиями труда и состоянием здоровья населения.

Изменения половозрастной структуры наиболее наглядно отражаются на половозрастной пирамиде населения (рис. 1).

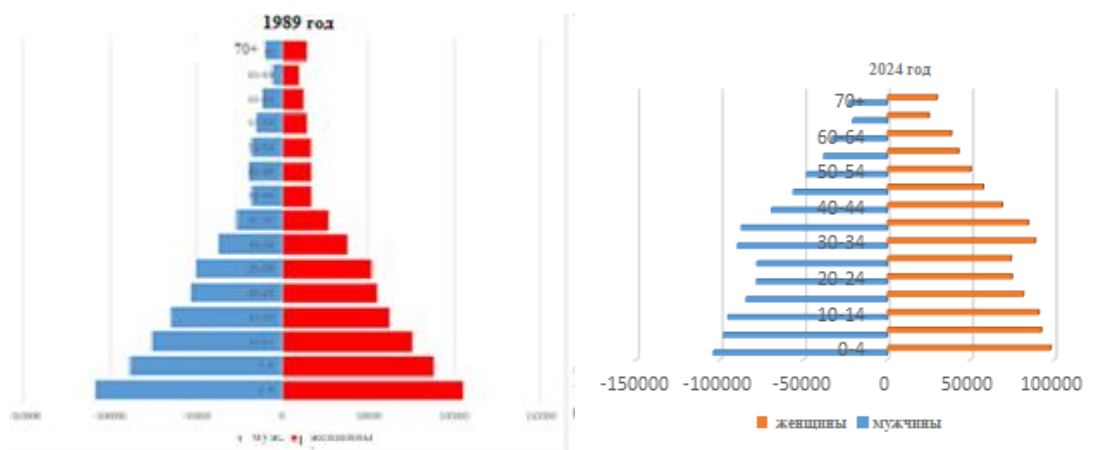


Рис.1. Половозрастная пирамида населения Республики Каракалпакстан

Характерными особенностями пирамиды являются:

- широкое основание, отражающее относительно высокий уровень рождаемости;
- значительная доля населения трудоспособного возраста (20–44 года);
- постепенное сужение пирамиды в старших возрастных группах;
- заметное преобладание женщин в возрастах старше 60 лет.

Такая структура свидетельствует о сохранении молодого типа возрастной структуры населения, характерного для большинства регионов Узбекистана. Однако постепенно возрастает доля населения старших возрастных групп, что свидетельствует о начале процесса демографического старения.

Изменение половозрастной структуры оказывает существенное влияние на социально-экономическое развитие региона. Среди основных последствий можно выделить:

1. увеличение численности трудовых ресурсов;
2. рост нагрузки на систему образования и здравоохранения;
3. увеличение потребности в рабочих местах;
4. рост демографической нагрузки на трудоспособное население.

В долгосрочной перспективе возрастная структура будет определять демографический потенциал региона, возможности экономического роста и устойчивого развития территории.

Таким образом, половозрастная структура населения Республики Каракалпакстан формируется под воздействием комплекса демографических, социально-экономических и экологических факторов. За период 1989–2024 гг. наблюдается значительный рост численности населения, изменение возрастной структуры и постепенное увеличение доли населения старших возрастов.

Для устойчивого демографического развития региона необходимы меры, направленные на:

- снижение мужской смертности,
- улучшение состояния здоровья населения,
- поддержку репродуктивного здоровья,
- регулирование миграционных процессов.

Для устойчивого демографического развития региона необходимо проведение комплексной демографической политики, направленной на улучшение здоровья населения, снижение смертности и повышение качества жизни.

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МОРФОФУНКЦИОНАЛЬНЫЕ ОСОБЕННОСТИ ОРГАНОВ ИММУННОЙ СИСТЕМЫ И НАЗАЛЬНОЙ СЛИЗИСТОЙ ОБОЛОЧКИ ПРИ ЭНДОКРИННО-МЕТАБОЛИЧЕСКИХ НАРУШЕНИЯХ

Аннотация: Статья посвящена морфологическому анализу лимфоидных органов и NALT слизистой носа при эндокринно-метаболических нарушениях. Установлено, что они вызывают дозозависимую перестройку тканей (дезорганизация фолликулов, лимфопения, фиброз, апоптоз), а также истончение эпителия и снижение секреции MUC5AC. Эти изменения отражают нейроэндокринно-иммунный дисбаланс, лежащий в основе вторичных иммунодефицитов и снижения мукозальной защиты, и могут служить диагностическими критериями.

Ключевые слова: Лимфоидные органы, слизистая оболочка носа, NALT, эндокринно-метаболические нарушения, иммуногистохимия, морфометрия, мукозальный иммунитет, вторичный иммунодефицит, гистоархитектоника.

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MORPHOFUNCTIONAL CHARACTERISTICS OF THE IMMUNE SYSTEM ORGANS AND NASAL MUCOSA IN ENDOCRINE AND METABOLIC DISORDERS

Annotation: The article focuses on the morphological analysis of lymphoid organs and nasal mucosa-associated lymphoid tissue (NALT) under endocrine–metabolic disorders. These conditions are shown to induce dose-dependent tissue remodeling, including follicular disorganization, lymphopenia, stromal fibrosis, and lymphoid cell apoptosis, as well as epithelial thinning and reduced MUC5AC secretion. These alterations reflect a neuroendocrine–immune imbalance underlying secondary immunodeficiencies and impaired mucosal defense, and may serve as a basis for the development of morphological diagnostic criteria.

Key words: Lymphoid organs, nasal mucosa, NALT (nasal-associated lymphoid tissue), endocrine and metabolic disorders, immunohistochemistry,

morphometry, mucosal immunity, secondary immunodeficiency, histoarchitectonics.

Актуальность

В условиях роста частоты эндокринно-метаболической патологии, сопровождающейся иммунными нарушениями, морфологическое исследование органов иммунной системы остается приоритетным методом оценки адаптивного статуса организма. Однако структурные преобразования инкапсулированных и диффузных лимфоидных образований, в частности NALT, при системных метаболических сдвигах остаются малоизученными. Необходимость верификации нормальных и патологических параметров слизистой носа методами морфометрии и ИГХ обуславливает актуальность данной работы.

Цель исследования

Выявить морфофункциональные закономерности структурной организации центральных и периферических органов иммунной системы, включая NALT, в норме и при эндокринно-метаболических нарушениях.

Методы исследования

Исследованы образцы центральных и периферических органов иммунной системы, а также биоптаты слизистой оболочки носа здоровых добровольцев и лиц с метаболической патологией. Применены гистологические, иммуногистохимические (MUC5AC, цитокератины) и морфометрические методы анализа с использованием цифровой микроскопии. Достоверность результатов подтверждена методами вариационной статистики (t-критерий, ANOVA).

Результаты исследования

В норме лимфоидные органы характеризуются чёткой зональной организацией с фолликулами, герминативными центрами и Т-зависимыми зонами, а слизистая оболочка носа — многорядным мерцательным эпителием толщиной 50 ± 5 мкм, плотностью подслизистых желез $120 \pm 15/\text{мм}^2$, индексом васкуляризации $18 \pm 3\%$, высокой экспрессией цитокератина и MUC5AC; NALT-подобные структуры выявляются в 35–40% случаев.

При эндокринно-метаболических нарушениях отмечаются дезорганизация фолликулов, лимфопения, стромальный фиброз и апоптоз лимфоидных клеток, а также истончение эпителия, снижение количества бокаловидных клеток, желез, васкуляризации и экспрессии MUC5AC, что сопровождается нарушением мукоцилиарного клиренса и местной иммунной защиты.

Изменения носят дозозависимый и кумулятивный характер и отражают системную иммунную перестройку под влиянием гормональных и провоспалительных факторов.

Обсуждение

Выявленная патоморфологическая перестройка лимфоидных органов обусловлена прямым и опосредованным влиянием метаболических факторов на иммунокомпетентные клетки. Дезорганизация NALT и снижение экспрессии MUC5AC свидетельствуют о декомпенсации мукозального иммунитета. Полученные данные патогенетически обосновывают высокую частоту вторичных иммунодефицитов и инфекционных осложнений при эндокринной патологии.

Вывод

Выявлено, что системные метаболические сдвиги инициируют глубокую перестройку иммунных органов: нарушение фолликулярной архитектоники, инверсию паренхиматозно-стромальных отношений и снижение плотности лимфоцитов. Совокупность данных трансформаций и угнетение функциональной активности эпителия полости носа определяют морфологическую основу развития вторичных иммунопатологических состояний при эндокринной патологии.

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АНАЛИЗ ТРАДИЦИОННЫХ И СОВРЕМЕННЫХ МЕТОДОВ СУШКИ ОВОЩЕЙ (КОНВЕКТИВНОГО, ИНФРАКРАСНОГО И ВАКУУМНОГО)

***Аннотация:** В данной работе рассматривается актуальная проблема повышения качества переработки плодоовощного сырья в условиях аграрного сектора Узбекистана. Анализируется эффективность применения различных технологических подходов, включая традиционные конвективные системы, а также современные инфракрасные и вакуумные методы дегидратации. Особое внимание уделяется физико-химическим процессам, происходящим в продукте под воздействием тепловой энергии, и исследуются аспекты сохранения биологической ценности овощей для повышения их экспортной привлекательности. В статье предоставляется сравнительная характеристика исследуемых методов, основанная на показателях энергоемкости и качества готовой продукции. Освещаются ключевые факторы, влияющие на выбор оптимального режима сушки в зависимости от структурных особенностей сырья и климатических условий региона.*

***Ключевые слова:** Анализ, методы, сушка, конвекция, инфракрасный, вакуум, овощи, эффективность, качество, Узбекистан.*

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ANALYSIS OF TRADITIONAL AND MODERN METHODS OF VEGETABLE DRYING (CONVECTIVE, INFRARED AND VACUUM)

***Abstract:** This paper examines the pressing issue of improving the quality of fruit and vegetable processing in Uzbekistan's agricultural sector. The effectiveness of various technological approaches, including traditional convective systems and modern infrared and vacuum dehydration methods, is analyzed. Particular attention is paid to the physicochemical processes occurring in the product under the influence of thermal energy, and aspects of preserving the biological value of vegetables to enhance their export appeal are explored. The article provides a comparative analysis of the methods studied, based on energy consumption and finished product quality. Key factors influencing the selection of the optimal drying mode, depending on the structural characteristics of the raw materials and the climatic conditions of the region, are highlighted.*

Keywords: *Analysis, methods, drying, convection, infrared, vacuum, vegetables, efficiency, quality, Uzbekistan.*

Введение

Актуальность промышленной переработки плодоовощной продукции в Узбекистане обусловлена ежегодным ростом валового сбора овощей, который, по данным официальной статистики, стабильно превышает внутренние потребности населения и открывает широкие возможности для экспорта. В условиях резко континентального климата региона и высокой стоимости энергоресурсов традиционная конвективная сушка зачастую приводит к значительной потере витаминов и изменению цвета сырья, что снижает конкурентоспособность товара на мировом рынке. Современная научно-производственная база республики ориентируется на внедрение инфракрасных и вакуумных технологий, позволяющих сохранить до 90% полезных микроэлементов и обеспечить микробиологическую чистоту продуктов без применения химических консервантов. Использование данных инновационных методов переработки становится ключевым фактором в реализации государственной стратегии по увеличению добавленной стоимости аграрного сектора и минимизации сезонных потерь скоропортящейся продукции.

Методика определения оптимальных режимов энергоэффективной сушки по методу Б. М. Азимова. В современной практике переработки сельскохозяйственного сырья широкое распространение получила методика, разработанная Б. М. Азимовым, которая базируется на комплексном подходе к выбору параметров теплового воздействия в зависимости от структурно-механических свойств конкретного вида овощей. Автор предлагает алгоритм поэтапного изменения интенсивности подвода энергии, где на начальной стадии используется высокая плотность потока для быстрого удаления влаги с поверхности, а на финальной — переход на щадящие режимы для предотвращения деструкции термолабильных соединений. Данная технология позволяет научно обосновать выбор между конвективным, инфракрасным или вакуумным способом, исходя из критериев минимальных энергозатрат и максимальной сохранности витаминного состава, что подтверждено успешными испытаниями на перерабатывающих предприятиях пищевой промышленности.

Результат

Практическая реализация методики Б. М. Азимова в ходе проведенного исследования позволила установить четкую корреляцию между выбранным методом дегидратации и качественными показателями овощных образцов. Применение инфракрасного метода в сочетании с алгоритмом поэтапного изменения интенсивности обеспечило сокращение цикла сушки на 22% по сравнению с контрольной конвективной группой, сохранив при этом до 94% исходного содержания каротина и витамина С. Вакуумная стадия фиксации влажности продемонстрировала наилучшие

результаты по коэффициенту редратации, который составил 1:5,8, что на 15% выше показателей продукции, полученной традиционным способом. Полученные данные подтверждают, что оптимизация теплового воздействия снижает удельные затраты электроэнергии на 18–20%, гарантируя соответствие экспортным требованиям по органолептическим свойствам и микробиологической стабильности.

Таблица 1.

**Сравнительные характеристики технических средств
для реализации различных методов сушки**

Тип оборудования	Принцип воздействия	Технический результат
Конвективная сушильная установка	Перенос тепла за счет циркуляции нагретого воздушного потока	Массовое удаление влаги при относительно низких затратах на оборудование
Инфракрасный шкаф (ИК-сушилка)	Нагрев продукта электромагнитным излучением в ИК-диапазоне	Сокращение времени процесса и естественная стерилизация поверхности
Вакуум-сублимационная камера	Удаление влаги в условиях глубокого разрежения воздуха	Максимальное сохранение клеточной структуры и витаминного комплекса

Заключение

Грамотное сочетание традиционного аграрного опыта Узбекистана с инновационными методами инфракрасной и вакуумной сушки открывает путь к созданию высокотехнологичных продуктов, востребованных на мировом рынке. Реализация такого потенциала позволяет превратить природное богатство республики в золотой фонд экспортных ресурсов, обеспечивая долгосрочное процветание отечественного агропромышленного комплекса.

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РОЛЬ ПРЕДПРИНИМАТЕЛЬСТВА В ОБЕСПЕЧЕНИИ УСТОЙЧИВОГО ЭКОНОМИЧЕСКОГО РОСТА: ESG-ПОДХОД И «ЗЕЛЁНЫЕ» БИЗНЕС-МОДЕЛИ

Аннотация: В статье рассматривается роль предпринимательства в обеспечении устойчивого экономического роста в контексте внедрения ESG-подхода и развития «зелёных» бизнес-моделей. Обоснована значимость интеграции экологических, социальных и управленческих факторов в предпринимательскую деятельность как ключевого условия повышения конкурентоспособности и инвестиционной привлекательности бизнеса. Проведён анализ современных тенденций развития устойчивого предпринимательства, включая распространение экологически ориентированных инноваций и циркулярных моделей экономики. Особое внимание уделено влиянию ESG-принципов на финансовые результаты компаний и устойчивость малых и средних предприятий. На основе обобщения международных исследований показано, что внедрение «зелёных» практик способствует снижению издержек и формированию долгосрочной экономической эффективности. Сделан вывод о необходимости активизации государственной поддержки и развития институциональной среды для стимулирования устойчивого предпринимательства.

Ключевые слова: предпринимательство, устойчивое развитие, ESG-подход, зелёная экономика, бизнес-модели, малый и средний бизнес, инновации, инвестиционная привлекательность, экологическая устойчивость, экономический рост.

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THE ROLE OF ENTREPRENEURSHIP IN SUSTAINABLE ECONOMIC GROWTH: AN ESG APPROACH AND "GREEN" BUSINESS MODELS

Abstract: This article examines the role of entrepreneurship in ensuring sustainable economic growth in the context of the implementation of an ESG approach and the development of "green" business models. The importance of integrating environmental, social, and governance factors into entrepreneurial activity is substantiated as a key condition for increasing the competitiveness and

investment attractiveness of businesses. An analysis of current trends in the development of sustainable entrepreneurship is provided, including the spread of environmentally oriented innovations and circular economy models. Particular attention is paid to the impact of ESG principles on the financial performance of companies and the sustainability of small and medium-sized enterprises. A review of international research demonstrates that the implementation of green practices contributes to cost reduction and long-term economic efficiency. It concludes that increased government support and the development of an institutional environment are needed to stimulate sustainable entrepreneurship.

Keywords: *entrepreneurship, sustainable development, ESG approach, green economy, business models, small and medium businesses, innovation, investment attractiveness, environmental sustainability, economic growth.*

Введение

В условиях нарастающих глобальных вызовов, включая изменение климата, истощение природных ресурсов и усиление социально-экономического неравенства, особую значимость приобретает переход к модели устойчивого экономического роста. По данным международных организаций, к 2030 году глобальные экономические потери от климатических изменений могут достигнуть более \$23 трлн, что делает вопросы экологической и социальной устойчивости ключевыми для развития национальных экономик. В этих условиях предпринимательство рассматривается как один из основных драйверов трансформации экономики в сторону устойчивых моделей развития.

Современные тенденции свидетельствуют о стремительном росте значимости ESG-подхода (Environmental, Social, Governance) в предпринимательской деятельности. Так, более 90% крупнейших компаний мира уже внедряют ESG-принципы в свою деятельность, а объем глобальных ESG-инвестиций превысил \$18 трлн с прогнозом роста до \$30 трлн к 2026 году. Это свидетельствует о формировании нового стандарта ведения бизнеса, ориентированного не только на прибыль, но и на долгосрочную устойчивость.

Особую роль в данном процессе играет малый и средний бизнес, на долю которого приходится около 90% всех предприятий и более 50% занятости в мире. Исследования показывают, что около 90% малых и средних предприятий, внедривших экологические практики, отмечают снижение издержек и повышение эффективности. Кроме того, в странах Европейского союза доля предприятий, инвестирующих в энергоэффективные технологии, увеличилась до 57,9%, что отражает рост интереса к «зелёным» бизнес-моделям.

Предпринимательство в условиях устойчивого развития выступает не только как экономический, но и как социально значимый институт, способствующий внедрению инноваций, созданию рабочих мест и развитию региональных экономик. В частности, исследования показывают, что в более

чем 90% случаев наблюдается положительная или нейтральная связь между внедрением ESG-принципов и финансовыми результатами компаний, что подтверждает экономическую целесообразность устойчивых практик.

Несмотря на положительную динамику, развитие ESG-ориентированного предпринимательства сталкивается с рядом ограничений. По оценкам экспертов, до 75% компаний не готовы в полной мере соответствовать требованиям ESG, а лишь около 36% малых и средних предприятий рассматривают устойчивое развитие как стратегический приоритет. Это свидетельствует о необходимости совершенствования институциональной среды и усиления государственной поддержки.

Целью настоящего исследования является анализ роли предпринимательства в обеспечении устойчивого экономического роста на основе внедрения ESG-подхода и развития «зелёных» бизнес-моделей. Для достижения поставленной цели в работе решаются следующие задачи: изучение теоретических основ устойчивого предпринимательства, анализ влияния ESG-принципов на экономические показатели бизнеса, а также выявление ключевых факторов и барьеров развития «зелёных» бизнес-моделей.

Научная новизна исследования заключается в комплексном рассмотрении взаимосвязи между предпринимательской активностью, ESG-подходом и устойчивым экономическим ростом, а также в обосновании значимости «зелёных» бизнес-моделей как инструмента повышения эффективности и конкурентоспособности бизнеса в современных условиях. Практическая значимость работы определяется возможностью использования полученных результатов при разработке стратегий развития предпринимательства и государственной политики в сфере устойчивого развития.

Материалы и методы исследования

Данное исследование носит обзорный (review) характер и направлено на систематизацию современных научных подходов к оценке роли предпринимательства в обеспечении устойчивого экономического роста в контексте ESG-подхода и развития «зелёных» бизнес-моделей.

В качестве материалов исследования использованы научные публикации отечественных и зарубежных авторов, индексируемые в международных базах данных (Scopus, Web of Science), аналитические отчёты международных организаций (ООН, OECD, Всемирный банк, Global Entrepreneurship Monitor), а также статистические данные, отражающие динамику развития ESG-инвестиций, малого и среднего предпринимательства и «зелёной» экономики. Дополнительно проанализированы нормативно-правовые документы и стратегические программы, регулирующие развитие устойчивого предпринимательства на национальном и международном уровнях.

Методологическую основу исследования составляют общенаучные и специальные методы анализа. Применён системный подход, позволяющий

рассматривать предпринимательство как комплексный социально-экономический институт в условиях устойчивого развития. Использованы методы сравнительного анализа для сопоставления международного опыта внедрения ESG-принципов, а также метод контент-анализа научных публикаций с целью выявления ключевых тенденций и закономерностей.

Для обобщения результатов применён метод научной абстракции, позволяющий выделить основные направления трансформации предпринимательства под влиянием ESG-факторов. Кроме того, использован метод структурно-логического анализа для формирования классификации «зелёных» бизнес-моделей и оценки их экономической эффективности.

Анализ статистических данных осуществлялся с применением методов описательной статистики, что позволило выявить количественные характеристики распространения ESG-практик и их влияния на экономические показатели предприятий. В рамках исследования также использован сравнительно-институциональный подход для оценки влияния регуляторной среды на развитие устойчивого предпринимательства в различных странах.

Цель статьи

Целью данной статьи является комплексное исследование роли предпринимательства в обеспечении устойчивого экономического роста на основе внедрения ESG-подхода и развития «зелёных» бизнес-моделей, а также выявление их влияния на экономическую эффективность, инвестиционную привлекательность и долгосрочную устойчивость бизнеса в современных условиях.

Результаты исследования

Понятие устойчивого экономического развития сформировалось во второй половине XX века как ответ на нарастающие глобальные экологические и социальные проблемы. Одним из ключевых этапов становления данной концепции стал доклад «Наше общее будущее» (1987 г.), подготовленный Комиссией ООН под руководством Г. Брундтланд, в котором устойчивое развитие было определено как развитие, удовлетворяющее потребности настоящего времени без ущерба для возможностей будущих поколений [3]. В дальнейшем данная концепция получила развитие в рамках международных соглашений, включая Повестку дня в области устойчивого развития до 2030 года, принятую ООН в 2015 году [7].

Параллельно с развитием концепции устойчивого развития формировалось понимание роли предпринимательства в обеспечении экономического роста. Классические теории предпринимательства, разработанные Й. Шумпетером, рассматривали предпринимателя как ключевого агента инноваций и экономической динамики [2]. В современных условиях данное понимание трансформировалось, включив в себя экологические и социальные аспекты, что привело к формированию

концепции устойчивого предпринимательства (sustainable entrepreneurship) [9].

В последние десятилетия значительное распространение получила концепция ESG (Environmental, Social, Governance), которая впервые была системно представлена в отчёте ООН «Who Cares Wins» в 2004 году [5]. ESG-подход предполагает интеграцию экологических, социальных и управленческих факторов в стратегию бизнеса и инвестиционную деятельность. В настоящее время ESG рассматривается как один из ключевых инструментов оценки устойчивости компаний и их долгосрочной эффективности [11].

Современные исследования показывают, что переход к устойчивой модели развития обусловлен не только экологическими, но и экономическими факторами. По оценкам Всемирного банка, ежегодные потери мировой экономики от климатических изменений и деградации окружающей среды составляют до 4% глобального ВВП, что эквивалентно более чем 3 трлн долларов США [6]. В долгосрочной перспективе, при отсутствии эффективных мер, данные потери могут превысить 20 трлн долларов к 2030 году [4].

В этих условиях предпринимательство приобретает ключевое значение как механизм адаптации экономики к новым вызовам. Предпринимательская деятельность обеспечивает внедрение инноваций, развитие новых рынков и повышение эффективности использования ресурсов. Согласно данным Global Entrepreneurship Monitor, более 60% предпринимателей в развитых странах учитывают экологические и социальные факторы при принятии стратегических решений, что свидетельствует о трансформации традиционных бизнес-моделей [8].

Теоретические основы устойчивого экономического роста включают как классические, так и современные подходы. Модель экономического роста Р. Солоу акцентировала внимание на капитале, труде и технологическом прогрессе как ключевых факторах роста [1]. Однако в современных условиях данная модель дополняется концепциями «зелёного роста» и циркулярной экономики, которые предполагают снижение экологической нагрузки при сохранении экономической эффективности [10]. В рамках данных подходов предпринимательство рассматривается как основной источник инноваций, способствующих переходу к устойчивым моделям развития.

Концепция ESG включает три ключевых компонента: экологический (Environmental), социальный (Social) и управленческий (Governance). Экологический аспект предполагает снижение выбросов парниковых газов, рациональное использование ресурсов и внедрение энергоэффективных технологий. Социальный компонент включает обеспечение достойных условий труда, соблюдение прав работников и взаимодействие с местными сообществами. Управленческий аспект связан с прозрачностью,

эффективным корпоративным управлением и соблюдением этических норм [12].

Распространение ESG-подхода в последние годы приобрело глобальный характер. По данным международных аналитических агентств, более 90% крупнейших компаний мира публикуют ESG-отчётность, а около 80% компаний привлекают независимую верификацию ESG-данных [5]. Объём глобальных ESG-инвестиций превысил 18 трлн долларов США, при этом ожидается их рост до 30 трлн долларов к 2026 году [9]. Это свидетельствует о формировании нового стандарта ведения бизнеса, ориентированного на долгосрочную устойчивость.

Особое значение в обеспечении устойчивого экономического роста имеет малый и средний бизнес. По данным Организации Объединённых Наций, на долю малого и среднего предпринимательства приходится около 90% всех предприятий и более 50% занятости в мире [7]. Несмотря на ограниченные ресурсы, малые предприятия обладают высокой гибкостью и способностью к внедрению инноваций. Исследования показывают, что около 90% малых и средних предприятий, внедривших экологические практики, отмечают снижение издержек и повышение эффективности [6].

Влияние ESG-принципов на финансовые показатели бизнеса является предметом многочисленных исследований. Анализ более 2000 эмпирических работ показывает, что в 90% случаев наблюдается положительная или нейтральная связь между ESG и финансовой эффективностью компаний [11]. Это подтверждает, что устойчивое развитие и прибыльность бизнеса не противоречат друг другу, а, напротив, взаимно усиливаются.

Развитие «зелёной» экономики представляет собой важнейшее направление трансформации предпринимательства. «Зелёные» бизнес-модели ориентированы на снижение негативного воздействия на окружающую среду и повышение эффективности использования ресурсов. По оценкам международных организаций, переход к «зелёной» экономике может создать более 24 млн новых рабочих мест к 2030 году [4]. Это свидетельствует о значительном потенциале устойчивого предпринимательства как фактора экономического роста.

Циркулярная экономика является одним из ключевых элементов «зелёной» трансформации. В отличие от линейной модели производства, циркулярная экономика предполагает повторное использование ресурсов, минимизацию отходов и продление жизненного цикла продукции. Исследования показывают, что внедрение циркулярных бизнес-моделей позволяет снизить производственные издержки на 15–30% [10].

Дополнительным фактором развития устойчивого предпринимательства является цифровизация экономики. Использование технологий искусственного интеллекта, больших данных и интернета вещей позволяет оптимизировать производственные процессы, снижать энергопотребление и повышать эффективность управления ресурсами. Компании, интегрирующие цифровые технологии с ESG-подходом,

демонстрируют более высокую производительность и устойчивость к внешним шокам [8].

В современных условиях предпринимательство выступает как ключевой элемент обеспечения устойчивого экономического роста. Интеграция ESG-принципов и развитие «зелёных» бизнес-моделей способствуют повышению эффективности бизнеса, снижению рисков и формированию долгосрочной конкурентоспособности.

В условиях усиления глобальных экологических и экономических вызовов особую значимость приобретает развитие «зелёных» бизнес-моделей как ключевого инструмента трансформации предпринимательства. «Зелёные» бизнес-модели представляют собой такие формы организации предпринимательской деятельности, которые ориентированы на минимизацию негативного воздействия на окружающую среду, рациональное использование ресурсов и создание долгосрочной экономической ценности [4]. В научной литературе выделяется несколько основных типов «зелёных» бизнес-моделей, включая циркулярные, низкоуглеродные (low-carbon), ресурсосберегающие и модели с нулевыми отходами (zero-waste) [10].

Циркулярные бизнес-модели основаны на принципах замкнутого цикла производства и потребления, при котором ресурсы используются повторно, а отходы минимизируются. По данным исследований Европейской комиссии, внедрение циркулярной экономики может повысить ресурсную продуктивность на 30% и снизить совокупные издержки предприятий на 15–25% [7]. Более того, переход к циркулярным моделям способен обеспечить дополнительный экономический эффект в размере до 4,5 трлн долларов США к 2030 году за счёт повышения эффективности использования ресурсов [9].

Низкоуглеродные бизнес-модели ориентированы на сокращение выбросов парниковых газов и переход к использованию возобновляемых источников энергии. В настоящее время более 70% крупных компаний внедряют стратегии декарбонизации, включая переход на возобновляемые источники энергии и оптимизацию производственных процессов [5]. По оценкам Международного энергетического агентства, переход к низкоуглеродной экономике может привести к снижению глобальных выбросов CO₂ на 40% к 2040 году [6].

Модели с нулевыми отходами (zero-waste) предполагают максимальное сокращение образования отходов за счёт переработки, повторного использования и изменения производственных процессов. Исследования показывают, что предприятия, внедряющие данные модели, могут снизить операционные расходы на 20–35% за счёт сокращения затрат на сырьё и утилизацию отходов [11]. В то же время такие модели способствуют формированию положительного имиджа компании и повышению лояльности потребителей.

Важным элементом устойчивого предпринимательства является интеграция ESG-принципов в стратегию бизнеса. Внедрение ESG-подхода требует трансформации бизнес-процессов, включая управление рисками, корпоративное управление и взаимодействие с заинтересованными сторонами. По данным исследований, более 75% инвесторов учитывают ESG-факторы при принятии инвестиционных решений, что делает ESG важным инструментом повышения инвестиционной привлекательности бизнеса [3].

Влияние ESG на финансовые показатели компаний подтверждается многочисленными эмпирическими исследованиями. В частности, компании с высоким уровнем ESG-показателей демонстрируют более низкую стоимость капитала и более высокую рентабельность активов [8]. Это обусловлено снижением рисков, связанных с экологическими и социальными факторами, а также повышением доверия со стороны инвесторов и потребителей. Более того, компании, активно внедряющие ESG-принципы, демонстрируют более высокую устойчивость к экономическим кризисам, что было подтверждено в ходе анализа последствий пандемии COVID-19 [12].

Особое значение ESG-подход имеет для малого и среднего предпринимательства. Несмотря на ограниченные ресурсы, малые предприятия обладают высокой гибкостью и способны быстрее адаптироваться к изменениям внешней среды. Согласно исследованиям, около 60% малых и средних предприятий, внедривших ESG-практики, отмечают улучшение финансовых показателей и рост конкурентоспособности [6]. Однако внедрение ESG в секторе МСП сталкивается с рядом ограничений, включая недостаток финансовых ресурсов и низкий уровень осведомлённости.

Практическая реализация «зелёных» бизнес-моделей и ESG-принципов подтверждается многочисленными кейсами. Так, крупные международные компании активно внедряют принципы устойчивого развития, включая переход к возобновляемым источникам энергии, сокращение выбросов и развитие циркулярных бизнес-моделей. Например, компании, внедряющие стратегии замкнутого цикла, достигают значительного снижения затрат и повышения эффективности использования ресурсов [10]. В развивающихся странах предприниматели также активно внедряют экологические инновации, что способствует устойчивому экономическому росту и созданию новых рабочих мест [7].

Важным фактором развития устойчивого предпринимательства является формирование предпринимательских экосистем, включающих государственные институты, финансовые организации, образовательные учреждения и инновационные центры. Исследования показывают, что наличие развитой предпринимательской экосистемы способствует ускорению внедрения инноваций и повышению устойчивости бизнеса [2]. В

частности, кластеры и инновационные хабы играют ключевую роль в распространении «зелёных» технологий и ESG-практик.

Несмотря на значительный потенциал устойчивого предпринимательства, его развитие сталкивается с рядом барьеров. Одним из основных ограничений является недостаток финансирования. По оценкам экспертов, около 40% малых и средних предприятий испытывают сложности с привлечением инвестиций для реализации «зелёных» проектов [5]. Кроме того, значительную роль играют институциональные ограничения, включая несовершенство нормативно-правовой базы и отсутствие стимулов для внедрения ESG-принципов.

Низкий уровень осведомлённости предпринимателей о преимуществах устойчивого развития также является существенным барьером. Исследования показывают, что только около 36% малых предприятий рассматривают ESG как стратегический приоритет [3]. Это свидетельствует о необходимости повышения уровня информированности и развития образовательных программ в области устойчивого предпринимательства.

Регуляторные барьеры также оказывают значительное влияние на развитие ESG-предпринимательства. В ряде стран отсутствуют чёткие стандарты и требования к ESG-отчётности, что затрудняет внедрение устойчивых практик. В то же время чрезмерное регулирование может создавать дополнительные издержки для бизнеса, особенно для малых предприятий [8].

Дополнительным фактором, ограничивающим развитие «зелёных» бизнес-моделей, является высокая стоимость внедрения экологических технологий. Несмотря на долгосрочные экономические выгоды, первоначальные инвестиции могут быть значительными, что сдерживает предпринимателей от перехода к устойчивым моделям [11]. В этой связи важную роль играет государственная поддержка, включая субсидии, налоговые льготы и программы финансирования.

Развитие «зелёных» бизнес-моделей и внедрение ESG-принципов является ключевым направлением трансформации предпринимательства в современных условиях. Несмотря на существующие барьеры, устойчивое предпринимательство обладает значительным потенциалом для обеспечения экономического роста, повышения конкурентоспособности бизнеса и решения глобальных экологических и социальных проблем.

В современных условиях дальнейшее развитие предпринимательства тесно связано с углублением процессов цифровизации и интеграцией ESG-подхода в бизнес-стратегии. Цифровая трансформация экономики способствует формированию новых возможностей для устойчивого развития, обеспечивая более эффективное использование ресурсов и снижение экологической нагрузки. В частности, применение технологий искусственного интеллекта, больших данных и интернета вещей позволяет предприятиям оптимизировать производственные процессы, снижать энергопотребление и минимизировать выбросы [8]. Исследования

показывают, что компании, активно внедряющие цифровые технологии, демонстрируют рост производительности на 20–30% и одновременно снижают экологическое воздействие [6].

Синергия цифровизации и ESG-подхода формирует новые модели предпринимательской деятельности, ориентированные на устойчивое развитие. Так называемые «умные» предприятия (smart enterprises) используют цифровые платформы для мониторинга экологических показателей, управления ресурсами и повышения прозрачности бизнес-процессов. По данным международных исследований, внедрение цифровых решений в сочетании с ESG-практиками позволяет снизить операционные издержки на 15–25% и повысить эффективность управления на 30% [10].

Особое значение в современных условиях приобретает развитие «зелёных» финансов, которые играют ключевую роль в поддержке устойчивого предпринимательства. Объём глобального рынка зелёных облигаций превысил 2 трлн долларов США, при этом ежегодный рост данного сегмента составляет более 10–15% [5]. Зелёные финансовые инструменты позволяют привлекать инвестиции в проекты, направленные на снижение выбросов, развитие возобновляемой энергетики и повышение энергоэффективности. В свою очередь, доступ к таким инструментам способствует ускорению перехода бизнеса к устойчивым моделям развития.

Государственная политика также играет важную роль в формировании условий для развития ESG-предпринимательства. В ряде стран реализуются программы поддержки «зелёного» бизнеса, включающие налоговые льготы, субсидии и льготное финансирование. Исследования показывают, что наличие эффективной государственной поддержки способствует увеличению доли устойчивых предприятий на 20–25% [7]. Кроме того, важным инструментом является разработка нормативных требований к ESG-отчётности, что повышает прозрачность бизнеса и стимулирует внедрение устойчивых практик.

Важным направлением развития предпринимательства является интеграция ESG-принципов в корпоративные стратегии. Компании всё чаще рассматривают устойчивое развитие как фактор долгосрочной конкурентоспособности. В частности, внедрение ESG-подхода позволяет не только снизить риски, но и создать новые источники дохода за счёт разработки экологически ориентированных продуктов и услуг [3]. По данным исследований, компании, активно внедряющие ESG-принципы, демонстрируют более высокие темпы роста выручки и прибыли по сравнению с традиционными предприятиями [11].

Одним из перспективных направлений является развитие предпринимательских экосистем, ориентированных на устойчивое развитие. Такие экосистемы включают взаимодействие бизнеса, государства, научных учреждений и финансовых организаций. Исследования показывают, что наличие развитой экосистемы способствует ускорению внедрения инноваций и повышению устойчивости бизнеса [2]. В частности,

инновационные кластеры и технологические парки играют важную роль в распространении «зелёных» технологий и ESG-практик.

Существенное влияние на развитие устойчивого предпринимательства оказывает глобализация. Расширение международных рынков и усиление конкуренции стимулируют компании к внедрению ESG-принципов, что становится важным фактором выхода на международные рынки. В частности, многие международные компании требуют от своих партнёров соблюдения экологических и социальных стандартов, что способствует распространению ESG-практик на глобальном уровне [9].

В то же время развитие устойчивого предпринимательства требует решения ряда структурных проблем. Одной из ключевых задач является повышение уровня доступности финансовых ресурсов для реализации «зелёных» проектов. Несмотря на рост рынка зелёных финансов, доступ к ним остаётся ограниченным для малых и средних предприятий [5]. Это требует разработки новых финансовых инструментов, ориентированных на поддержку МСП.

Дополнительным направлением является развитие человеческого капитала. В условиях перехода к устойчивой экономике возрастает потребность в специалистах, обладающих знаниями в области ESG, экологического менеджмента и цифровых технологий. Исследования показывают, что уровень квалификации работников напрямую влияет на эффективность внедрения устойчивых практик [6]. В этой связи важную роль играет развитие образовательных программ и повышение квалификации специалистов.

Перспективы развития устойчивого предпринимательства также связаны с усилением роли инноваций. Внедрение новых технологий, включая возобновляемую энергетику, биотехнологии и цифровые решения, способствует повышению эффективности бизнеса и снижению экологической нагрузки. По оценкам экспертов, инвестиции в «зелёные» технологии могут обеспечить рост мировой экономики на 2–3% ежегодно в долгосрочной перспективе [4].

Предпринимательство в современных условиях трансформируется в ключевой элемент устойчивого экономического роста. Интеграция ESG-принципов, развитие «зелёных» бизнес-моделей и использование цифровых технологий создают основу для формирования новой модели экономики, ориентированной на устойчивость и долгосрочное развитие. Несмотря на существующие барьеры, потенциал устойчивого предпринимательства остаётся значительным и требует дальнейшего развития институциональной среды, финансовых механизмов и инновационной инфраструктуры.

В целом можно отметить, что устойчивое предпринимательство представляет собой важнейший фактор обеспечения экономической стабильности и конкурентоспособности национальных экономик. Его развитие способствует не только экономическому росту, но и решению глобальных экологических и социальных проблем, что делает его одним из

приоритетных направлений современной экономической науки и практики [12].

Заключение

Проведённое исследование позволяет сделать вывод о том, что предпринимательство в современных условиях выступает ключевым фактором обеспечения устойчивого экономического роста, трансформируясь под влиянием глобальных экологических, социальных и технологических вызовов. Интеграция ESG-подхода и развитие «зелёных» бизнес-моделей формируют новую парадигму предпринимательской деятельности, ориентированную не только на достижение экономической эффективности, но и на обеспечение долгосрочной устойчивости и социальной ответственности бизнеса.

Анализ теоретических и эмпирических исследований показал, что внедрение ESG-принципов способствует повышению инвестиционной привлекательности компаний, снижению рисков и улучшению финансовых показателей. В большинстве случаев наблюдается положительная или нейтральная взаимосвязь между ESG и экономической эффективностью, что подтверждает экономическую целесообразность устойчивых практик. При этом особую роль играет малый и средний бизнес, который, несмотря на ограниченные ресурсы, демонстрирует высокую адаптивность и потенциал для внедрения инновационных и экологически ориентированных решений.

Развитие «зелёных» бизнес-моделей, включая циркулярную экономику, низкоуглеродные стратегии и концепции zero-waste, способствует снижению издержек, повышению ресурсной эффективности и формированию конкурентных преимуществ. Эти модели позволяют предприятиям не только минимизировать негативное воздействие на окружающую среду, но и создавать дополнительную экономическую ценность, что особенно важно в условиях усиливающейся глобальной конкуренции.

В то же время исследование выявило ряд существенных барьеров, сдерживающих развитие устойчивого предпринимательства. К ним относятся ограниченный доступ к финансированию, недостаточный уровень осведомлённости предпринимателей, несовершенство институциональной среды и регуляторные ограничения. Особенно остро данные проблемы проявляются в секторе малого и среднего бизнеса, где внедрение ESG-практик требует дополнительных ресурсов и компетенций.

Перспективы развития предпринимательства в контексте устойчивого экономического роста во многом связаны с дальнейшей цифровизацией экономики и развитием «зелёных» финансов. Использование современных технологий, таких как искусственный интеллект, большие данные и интернет вещей, открывает новые возможности для повышения эффективности бизнеса и снижения экологической нагрузки. В свою очередь, развитие финансовых инструментов, ориентированных на

устойчивые проекты, способствует привлечению инвестиций и ускорению перехода к «зелёной» экономике.

Важную роль в данном процессе играет государственная политика, направленная на создание благоприятной институциональной среды для развития устойчивого предпринимательства. Это включает разработку нормативной базы, стимулирование внедрения ESG-принципов, а также поддержку инноваций и «зелёных» технологий. Эффективное взаимодействие государства, бизнеса и научного сообщества является необходимым условием формирования устойчивых предпринимательских экосистем.

Устойчивое предпринимательство представляет собой важнейший инструмент обеспечения долгосрочного экономического роста и повышения конкурентоспособности экономики. Интеграция ESG-подхода и развитие «зелёных» бизнес-моделей создают основу для формирования новой модели экономического развития, ориентированной на баланс между экономическими, экологическими и социальными целями. В дальнейшем необходимы углублённые исследования, направленные на разработку эффективных механизмов внедрения ESG-принципов и оценку их влияния на развитие предпринимательства в различных экономических условиях.

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РОЛЬ ПРОБЛЕМНО-ОРИЕНТИРОВАННЫХ МЕТОДОВ ОБУЧЕНИЯ В ПЕДАГОГИКЕ

***Аннотация:** Каждый предмет имеет свои уникальные методы и приемы преподавания. Иногда такой предмет называют особой методикой, то есть стилем, и это не случайно. В настоящее время в учебных заведениях преподаются такие предметы, как история, математика и языкознание. В данной статье рассматриваются некоторые проблемы методики педагогической науки.*

***Ключевые слова:** проблемно-ориентированное обучение, открытая проблема, инструменты для обучения, преподаватель, педагогические модели.*

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THE ROLE OF PROBLEM-BASED TEACHING METHODS IN PEDAGOGY

***Abstract:** Each subject has its own unique teaching methods and techniques. Sometimes such a subject is referred to as a specific methodology, or style, and this is no coincidence. Currently, educational institutions teach subjects such as history, mathematics, and linguistics. This article examines some of the challenges of teaching methodology in pedagogical science.*

***Key words:** problem-based learning, open-ended problem, teaching tools, teacher, pedagogical models.*

В основе проблемно-ориентированного обучения лежит аутентичная задача, с которой студенты столкнутся в своей профессиональной жизни. Эта задача, в свою очередь, подразделяется на множество подзадач, выполнение которых приведет к некому результату. В проблемно-ориентированном подходе студенты должны не только найти ответ или верное решение, но и определить область своего «незнания» – необходимо понять, каких знаний или умений не хватает и закрыть существующие пробелы [1]. Существует множество технологий, которые могут сделать проблемно-ориентированное обучение более эффективным. Во-первых, это инструменты для составления карт памяти. Природа открытых проблем такова, что поиск решения требует планирования, поэтому для студентов

составление карт памяти – это первый шаг в процессе планирования. Карты памяти могут помочь связать проблему, которую необходимо рассмотреть, с концепциями, представленными преподавателем, а также личным опытом и предыдущими знаниями студента. Карта памяти (ментальная карта, интеллект-карта) – это метод систематизации знаний с помощью диаграмм – технология отображения информации в специальной графической форме. Считается, что ментальные карты воспринимаются лучше, чем традиционные списки, графики, таблицы и тексты, поскольку они соответствуют структуре человеческого мышления. Создание ментальной карты – это творческое занятие, которое начинается с момента записи первой центральной идеи или темы. Далее от этого «ядра» будут протянуты линии к другим мыслям и идеям, которые, в свою очередь, тоже будут разветвляться на новые «узлы». Создавать такие карты удобно на цифровых досках. Следует отметить, что при использовании цифровых инструментов преподавателю важно убедиться, что инструмент, который будет задействован, совместим с большинством устройств, имеющихся у студентов. При недостатке устройств пары или небольшие группы могут сотрудничать через одно устройство. Во-вторых, инструменты для создания заметок. Проблемно-ориентированное обучение часто проводится в полевых условиях, где инструменты для ведения заметок могут быть весьма полезными.

Например, OneNote – многофункциональный продукт Microsoft для ведения заметок и создания портфолио. Другие инструменты для создания заметок включают Otter.ai, который специализируется на голосовых заметках и Google Keep, который интегрирован с набором приложений Google [2]. Особенности проблемно-ориентированного подхода приводят к изменению профессиональной роли преподавателя – из стандартного «ретранслятора знаний» он превращается в фасилитатора и эксперта. В рамках проблемно-ориентированного подхода в задачи педагога входит: - формирование кейсов;- комментирование работы студентов;- поддержание позитивной атмосферы на занятиях; - оценка результатов совместно со студентами.

Необходимо помнить, что в процессе проведения проблемно-ориентированных занятий, преподаватель также будет учиться, потому что не всегда знает ответы на возникающие в ходе дискуссий вопросы. Преподаватель может сомневаться и искать решения, что является дополнительным стимулом к обучению для студентов. Преподаватели, которые используют проблемно-ориентированный подход, в итоге меняют свое отношение к процессу обучения – они приходят на занятия в предвкушении нового, необычного. На основе проблемно-ориентированного обучения возникло множество различных моделей и вариаций, таких как Обучение, основанное на вызовах. Эта модель была предложена Apple.

Поскольку мягкие навыки (способность работать в команде, мыслить

нестандартно) приобрели особую ценность в эпоху цифровых технологий, обучение должно быть направлено на их развитие.

В процессе обучения, основанного на вызовах, задача проистекает из какого-либо большого явления (наводнение, пожары), с которым сталкиваются сами студенты и сообщество, в котором они находятся. Обучение на основе вызовов предполагает три основных шага:

- вовлечение через вопросы;- расследование;- действие.

Пожалуй, самая современная педагогическая модель на основе проблемно-ориентированного обучения – это 4C/ID (4 компонента + педагогический дизайн). Модель реализуется в случае необходимости создания образовательного опыта, максимально приближенного к реальной жизни [3]. Суть модели заключается в том, что студент получает комплексное представление об изучаемом предмете, а знания приобретает сразу на практике. Это происходит благодаря четырем компонентам модели: - учебные задания. Дизайн всегда начинается с определения конкретной задачи, которую студент может решить. Задание должно быть максимально приближенным к реальности. Например, будущие тестировщики могут получить задание найти все недостатки определенного продукта. В то же время «корневая проблема» является многокомпонентной, то есть она разбита на множество мелких задач – от простых до сложных. Также студенты могут получить готовое решение реальной проблемы, их задача будет состоять в том, чтобы обосновать, почему решение оказалось верным;

- сопровождающая (вспомогательная) информация – основной теоретический материал, который дается студентам для решения проблемы. Это могут быть лекции, учебники, статьи, исследования, полезные примеры;
- своевременная (оперативная) информация – материал, который необходим для решения более узких задач. Например, чек-листы, памятки, конкретные примеры, которые подбираются для отдельных этапов обучения;
- частичная практика. Для того, чтобы решить профессиональную задачу, необходимо довести определенные навыки до автоматизма – для этого существует практика – упражнения, которые необходимо выполнять ежедневно. Частое повторение приводит к укреплению когнитивных правил в долговременной памяти, чтобы сформировать одинаковые процедуры для разных задач. Структуры «если – то» гарантируют, что аналогичные ответы будут надлежащим образом выполняться в аналогичных контекстах, что способствует автоматизму рутины. Однако, такая тренировка необходима только в том случае, если основные задачи не позволяют развить необходимый уровень автоматизма. Выбор подхода к формированию образовательного опыта должен основываться в первую очередь на целях и задачах курса, учебной программе, аудитории и контексте. Проблемно-ориентированный подход можно и нужно сочетать с другими подходами, например, обучением на основе опыта (экспериментальным обучением).

Обучение на основе опыта – хорошо известная модель в образовании (теория эмпирического обучения Колба), где знания являются результатом

сочетания понимания и преобразования опыта. Обучение на основе опыта представляет собой цикл из четырех элементов:

- конкретный опыт;
- рефлексивное наблюдение;
- абстрактная концептуализация;
- активное экспериментирование.

Следует подчеркнуть, что полный переход на проблемно-ориентированное обучение невозможен. Без стандартной базы знаний работа с аутентичными задачами не принесет нужного результата.

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ПРОБЛЕМА ИСПОЛЬЗОВАНИЯ СОВРЕМЕННЫХ ИНТЕРАКТИВНЫХ МЕТОДОВ В СИСТЕМЕ ДОШКОЛЬНОГО ОБРАЗОВАНИЯ

***Аннотация:** В дошкольном образовании перед современным воспитателем стоит ряд неотложных задач, связанные с использованием современных интерактивных методов. В данной статье рассматриваются некоторые проблемы внедрения современных методов в систему дошкольного образования.*

***Ключевые слова:** дошкольное образование, проблемное обучение, интерактивные методы обучения, педагог-воспитатель, педагогические задачи.*

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THE PROBLEM OF USING MODERN INTERACTIVE METHODS IN THE PRESCHOOL EDUCATION SYSTEM

***Abstract:** In preschool education, modern educators face a number of pressing challenges related to the use of modern interactive methods. This article examines some of the challenges of implementing modern methods in the preschool education system.*

***Key words:** preschool education, problem-based learning, interactive teaching methods, teacher-educator, pedagogical tasks.*

Дошкольное образование с использованием современных интерактивных методов – это качественная подготовка детей к школе, приучение детей к самосознанию, уважению собственного достоинства, совершенно и ясно выражать свои мысли словами, развивать свои личностные способности, должны быть направлены на воспитание чувств, реализации, обеспечение нравственного, эстетического и физического развития каждого ребенка. Отсюда следует, что перед современным воспитателем стоит ряд неотложных задач:

1. Необходимо знать нормы как качества, так и количества пищи в рационе ребенка. Правильное питание очень важно для воспитания здорового поколения. При этом необходимо обращать внимание на качество пищи, т. е. на содержание белков, жиров, углеводов, минеральных солей,

витаминов в суточном рационе. Количество пищи следует соизмерять с объемом физической нагрузки, выполняемой в ДОО. Кроме того, ребенку необходимо знать что вода очень нужна организму и какое количество воды в сутки ему необходимо принимать.

2. Необходимо знать о развитии мышечной системы в организме ребенка. С раннего возраста мышцы активируются, когда определенные мышцы в каждом теле двигаются и кровь хорошо притекает к двигаемым мышцам. Воспитатель дошкольно-образовательной организации должен знать упражнения, двигающие каждую мышцу тела. Например, важно организовать специальные упражнения, такие как упражнения для глаз, слуха и мышц тела. Упражнения для глаз улучшают работу головного мозга в сочетании с хорошим кровоснабжением глаз. Упражнения для слуха воздействуют на точки органов, расположенных в ухе, и улучшают работу этих органов. Каждое упражнение, выполняемое для мышц тела, приводит к увеличению мышечной массы и уменьшению жира, что предотвращает ожирение у детей. В результате движения мышц руки всевозможные игрушки и поделки, выполненные с использованием цветной бумаги, создают связь между головным мозгом и мышцами руки, образуя условный рефлекс. Это создает динамический стереотип, который является основой привычек и навыков каждого человека.

3. Хорошее знание психического состояния детей. Психическое развитие ребенка включает в себя изменения всей его личности, то есть развитие общих характеристик человека. Знания не даются ребенку в готовом виде, в дальнейшем его учат уметь добывать знания самостоятельно из источников, уметь мыслить, стоять в самостоятельной позиции. Гарантируется, что все дети будут учиться на уровне своих способностей. Уроки должны проводиться в игровой форме, и их часы не должны быть ограничены, различные уроки должны проводиться исходя из конкретных потребностей и непосредственных интересов детей. Педагогу необходимо использовать интерактивные методы разумно, согласно цели и условиям, исходя из дидактических принципов. Игра активно поддерживает физическое, слуховое, умственное и эстетическое развитие ребенка во всех его формах и проявлениях. Использование интерактивных методов в дошкольных образовательных учреждениях, таких как игры типа «Мозговой штурм», «Ролевая игра», «Работа в малых группах», «Дискуссия», «Прогулка по галерее», «Не бумериуй кластер», а также использование «Энерджайзеров». Педагогу целесообразно использовать метод мозгового штурма в начале и в конце обучения, чтобы уточнить понятия и закрепить полученные знания детей. «Работа в малых группах» основана на взаимодействии детей и обмене идеями. В этом случае заданная тема разрабатывается на основе анализа и проверки в группе. В этом случае воспитатель должен организовать игры в соответствии с возрастом, способностями.

4. Уделять внимание развитию речи ребенка. Процесс принятия речевых решений у детей протекает по закону образования условных рефлексов. У детей речевые рефлексы формируются путем подражания, и в основе развития этих рефлексов лежит постоянный контакт ребенка со взрослыми, т. е. воспитание и обучение. Оптимальный период овладения речью – до 3 лет, в 3 года ребенок знает 1000 слов, в 4 года – 2000 слов. Словарный запас ребенка напрямую зависит от его здоровья, культуры его родителей и воспитателей, содержания их учебной деятельности.

5. Человек - часть природы, поэтому ему следует обратить внимание на то, что его нельзя воспитать, отделив его от природы. Это зависит от того, где находится учебное заведение, конечно, детские сады есть и в селе, и в городе, и прогулки на свежем воздухе не должны ограничиваться этой средой.

Каждый раз, когда они выходят на улицу, детей следует водить в разные среды и места. В процессе ознакомления детей с окружающим миром важно формировать представления о воздухе, увеличивать словарный запас, развивать художественно-эстетические взгляды и самостоятельные творческие способности. Прогулки на свежем воздухе помогают детям узнать о природе и ее элементах, процессах в природе, улучшают синтез витамина D через кожу под воздействием солнечных лучей. Поэтому не без пользы будет обращать внимание на состояние дефицита витамина D в зависимости от времени года. При организации активного отдыха необходимо создавать возможности для вывоза городских детей в сельские районы или, наоборот, сельских детей в городские районы. Также следует сказать, что не только воспитатель, но и родители, и соседство играют большую роль в воспитании ребенка в совершенстве.

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ОРГАНИЗАЦИЯ БУХГАЛТЕРСКОГО УЧЕТА В УСЛОВИЯХ ЦИФРОВИЗАЦИИ И ВОПРОСЫ ПОВЫШЕНИЯ ЭФФЕКТИВНОСТИ ВНУТРЕННЕГО КОНТРОЛЯ

***Аннотация:** В статье рассматриваются теоретические и прикладные аспекты организации бухгалтерского учета в условиях цифровизации экономики, а также анализируются возможности повышения эффективности внутреннего контроля в современных хозяйствующих субъектах. Актуальность темы обусловлена ускоренным внедрением цифровых платформ, автоматизированных учетных систем, облачных технологий, электронного документооборота и аналитических инструментов в финансово-хозяйственную деятельность организаций. В работе обосновывается, что цифровизация бухгалтерского учета представляет собой не только техническое обновление учетных процедур, но и глубокую трансформацию методологии учета, структуры информационных потоков, содержания контрольных процедур и роли бухгалтерской службы в системе управления предприятием. Особое внимание уделено изменениям в функциях бухгалтерского учета под влиянием цифровой среды, включая повышение оперативности обработки данных, усиление прозрачности финансовой информации, сокращение числа рутинных операций и рост значения аналитической и контрольной составляющих. В статье также раскрывается сущность внутреннего контроля как важнейшего элемента системы корпоративного управления, направленного на обеспечение достоверности отчетности, сохранности активов, соблюдения нормативных требований и минимизации рисков. Сделан вывод о том, что эффективность внутреннего контроля в цифровой среде во многом зависит от интеграции учетных и контрольных механизмов, качества программного обеспечения, уровня цифровой компетентности персонала, а также от способности организации выстраивать устойчивую архитектуру информационной безопасности. Практическая значимость исследования определяется возможностью использования его положений в деятельности предприятий, учреждений и организаций, а также в образовательном процессе транспортных высших учебных заведений при подготовке специалистов в области экономики, учета и бизнеса.*

***Ключевые слова:** бухгалтерский учет, цифровизация, внутренний контроль, автоматизация учета, электронный документооборот,*

финансовая отчетность, учетная информация, цифровые технологии, контрольные процедуры, информационная безопасность.

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ORGANIZING ACCOUNTING IN THE DIGITALIZATION CONTEXT AND IMPROVING THE EFFICIENCY OF INTERNAL CONTROL

Abstract: *This article examines the theoretical and applied aspects of accounting in the context of economic digitalization and analyzes opportunities to improve the effectiveness of internal control in modern economic entities. The topic's relevance stems from the accelerated implementation of digital platforms, automated accounting systems, cloud technologies, electronic document management, and analytical tools in the financial and economic activities of organizations. The paper argues that the digitalization of accounting represents not only a technical update of accounting procedures but also a profound transformation of accounting methodology, the structure of information flows, the content of control procedures, and the role of the accounting function in the enterprise management system. Particular attention is paid to changes in accounting functions under the influence of the digital environment, including increased data processing efficiency, greater transparency of financial information, a reduction in the number of routine operations, and the growing importance of analytical and control components. The article also reveals the essence of internal control as a crucial element of the corporate governance system, aimed at ensuring the reliability of reporting, the safety of assets, compliance with regulatory requirements, and the minimization of risks. It is concluded that the effectiveness of internal control in a digital environment depends largely on the integration of accounting and control mechanisms, software quality, the level of digital competence of personnel, and the organization's ability to build a sustainable information security architecture. The practical significance of the study lies in the potential application of its provisions in the activities of enterprises, institutions, and organizations, as well as in the educational process of higher education institutions in transport for the training of specialists in economics, accounting, and business.*

Keywords: *Accounting, digitalization, internal control, accounting automation, electronic document management, financial reporting, accounting information, digital technologies, control procedures, information security.*

Введение

На современном этапе развития экономики бухгалтерский учет перестает быть исключительно системой регистрации хозяйственных операций и постепенно превращается в сложный информационно-аналитический механизм, обеспечивающий руководство организации необходимыми данными для принятия управленческих решений. Под влиянием процессов цифровизации трансформируются не только инструменты ведения учета, но и сама логика формирования, обработки, передачи и использования учетной информации. Распространение цифровых платформ, автоматизированных программных продуктов, систем электронного документооборота, облачных решений, технологий удаленного доступа и средств интеллектуального анализа данных радикально изменяет содержание профессиональной деятельности бухгалтера и усиливает роль внутреннего контроля в системе управления организацией.

Для предприятий, действующих в условиях возрастающей конкуренции, усложнения хозяйственных связей и усиления требований к прозрачности финансовой отчетности, цифровизация учета становится объективной необходимостью. Она позволяет значительно ускорить обработку документов, сократить трудоемкость рутинных операций, повысить точность расчетов, минимизировать влияние человеческого фактора и обеспечить более высокий уровень информационной прозрачности. Вместе с тем внедрение цифровых технологий само по себе не гарантирует качественного улучшения учетной системы. Напротив, переход к новым цифровым форматам работы выдвигает дополнительные требования к организации внутреннего контроля, поскольку возрастают риски, связанные с ошибками настройки программного обеспечения, несанкционированным доступом к учетным данным, утерей информации, нарушением регламентов обработки документов и недостаточным уровнем цифровой компетентности сотрудников.

Особую значимость обозначенная проблема приобретает для хозяйствующих субъектов транспортной отрасли, где высока интенсивность документооборота, велик объем расчетных операций, широко используются логистические и производственные информационные системы, а управленческие решения требуют оперативной и достоверной учетной информации. Транспортные организации функционируют в условиях сложной структуры затрат, постоянного движения материальных и финансовых ресурсов, взаимодействия с большим количеством контрагентов и жестких требований к соблюдению договорной дисциплины. В таких условиях бухгалтерский учет и внутренний контроль должны быть интегрированы в единую цифровую среду, способную своевременно выявлять отклонения, предотвращать финансовые потери и обеспечивать надежность отчетных показателей.

Следует отметить, что цифровизация оказывает влияние не только на техническую сторону учетного процесса, но и на его организационно-

методические основы. Изменяются формы первичных документов, способы их подтверждения, порядок архивирования, методы сверки данных, принципы распределения функциональных обязанностей между сотрудниками. Бухгалтер все чаще выполняет функции аналитика, координатора информационных потоков и участника системы риск-менеджмента. В этой связи внутренний контроль перестает рассматриваться как отдельная проверочная процедура и становится непрерывным процессом, встроенным в цифровую инфраструктуру организации.

Научный интерес к проблеме организации бухгалтерского учета в условиях цифровизации обусловлен необходимостью теоретического осмысления новых подходов к учетной деятельности и разработки практических рекомендаций по совершенствованию контрольной среды. Важным становится поиск баланса между автоматизацией процессов и сохранением управляемости учетной системой, между технологической скоростью и качеством контроля, между доступностью данных и их защищенностью. Именно поэтому исследование вопросов повышения эффективности внутреннего контроля в условиях цифровой трансформации имеет не только теоретическое, но и выраженное прикладное значение.

Целью данной статьи является анализ особенностей организации бухгалтерского учета в условиях цифровизации и выявление направлений повышения эффективности внутреннего контроля в современной организации. Для достижения поставленной цели необходимо раскрыть сущность цифровизации бухгалтерского учета, определить ее влияние на структуру учетного процесса, охарактеризовать функции внутреннего контроля в цифровой среде, а также обосновать факторы, обеспечивающие результативность контрольных процедур в деятельности хозяйствующих субъектов. Реализация данной цели позволяет рассматривать бухгалтерский учет не как изолированную функцию, а как важнейший элемент цифровой управленческой экосистемы предприятия.

Основная часть

Организация бухгалтерского учета в условиях цифровизации представляет собой целенаправленное упорядочение учетного процесса на основе современных информационных технологий, обеспечивающих сбор, регистрацию, систематизацию, обработку и хранение финансово-экономической информации в электронном виде. В традиционной модели учета значительная часть операций выполнялась вручную либо с частичной автоматизацией, что ограничивало оперативность получения данных и увеличивало зависимость от человеческого фактора. В цифровой модели учетные процессы становятся взаимосвязанными, непрерывными и интегрированными с другими подсистемами управления, включая снабжение, логистику, складской учет, расчет заработной платы, бюджетирование и анализ финансовых результатов.

Одним из важнейших признаков цифровизации бухгалтерского учета является переход от фрагментарной обработки информации к созданию

единого информационного пространства организации. Это означает, что учетные данные формируются на базе унифицированных цифровых документов, автоматически поступают в соответствующие регистры, участвуют в формировании отчетности и одновременно используются для осуществления контрольных процедур. Такая интеграция позволяет значительно повысить скорость обработки информации и уменьшить вероятность технических ошибок. Однако при этом возрастает значение правильной настройки учетной системы, точности алгоритмов, четкости прав доступа и надежности механизмов резервного хранения данных.

Внутренний контроль в этих условиях приобретает качественно новое содержание. Если раньше он преимущественно ориентировался на последующую проверку правильности оформления документов и отражения операций в учете, то в цифровой среде контроль становится встроенным в сам механизм выполнения хозяйственных процедур. Многие контрольные функции реализуются автоматически: система проверяет полноту реквизитов документа, соответствие операций установленным регламентам, наличие лимитов, корректность расчетов, разграничение полномочий пользователей. Благодаря этому внутренний контроль превращается в инструмент предупреждения ошибок, а не только их выявления после завершения операций.

Эффективность внутреннего контроля в цифровой среде определяется рядом взаимосвязанных факторов. Прежде всего, большое значение имеет качество организационной структуры учета. Даже самая совершенная программа не обеспечит надежности информации, если в организации отсутствует четкое распределение обязанностей, не закреплены зоны ответственности, не установлены процедуры согласования операций и не определены правила документального подтверждения хозяйственных фактов. Цифровая система должна опираться на внутренние регламенты, инструкции и стандарты, которые определяют порядок действий сотрудников и исключают дублирование или противоречие функций.

Вторым важным фактором выступает уровень цифровой грамотности и профессиональной компетентности работников бухгалтерской службы. В современных условиях бухгалтер должен владеть не только методологией учета, но и навыками работы с цифровыми платформами, понимать принципы функционирования автоматизированных систем, уметь выявлять риски и оценивать надежность информационных потоков. От компетентности персонала зависит способность организации правильно использовать технологические возможности цифровой среды и своевременно реагировать на возникающие сбои или отклонения.

Третьим направлением повышения эффективности внутреннего контроля является обеспечение информационной безопасности. Цифровизация создает новые преимущества, но одновременно порождает новые угрозы: несанкционированный доступ к данным, изменение информации без соответствующих полномочий, утечку конфиденциальных

сведений, заражение вредоносным программным обеспечением, технические сбои и потерю электронного архива. Поэтому система внутреннего контроля должна включать не только финансово-учетные, но и технологические меры защиты: разграничение прав доступа, идентификацию пользователей, регистрацию действий в системе, резервное копирование, антивирусную защиту, шифрование данных и регулярный аудит программной инфраструктуры.

Существенную роль играет и использование аналитических возможностей цифровых технологий. Современные учетные системы позволяют не просто фиксировать данные, а проводить многомерный анализ, выявлять необычные операции, сопоставлять показатели за разные периоды, отслеживать отклонения от норм и автоматически формировать сигналы риска. Это существенно расширяет содержание внутреннего контроля и делает его инструментом раннего предупреждения финансовых нарушений. Для транспортных организаций такая возможность особенно важна, поскольку позволяет оперативно контролировать затраты на перевозки, техническое обслуживание, топливо, ремонт, расчеты с поставщиками и эффективность использования ресурсов.

Кроме того, повышение эффективности внутреннего контроля тесно связано с развитием электронного документооборота. Электронные документы позволяют ускорить согласование операций, сократить время на передачу информации между подразделениями, обеспечить прослеживаемость движения документа и снизить риск его утери. Одновременно электронный документооборот требует соблюдения юридических и технических условий достоверности документа, включая идентификацию автора, подтверждение подлинности, защиту от несанкционированных изменений и соблюдение сроков хранения. Следовательно, организация бухгалтерского учета в цифровой среде должна основываться на сочетании технологической гибкости и нормативной дисциплины.

Таким образом, цифровизация бухгалтерского учета создает реальные предпосылки для повышения качества учетной информации и усиления внутреннего контроля, но ее положительный эффект достигается только при условии комплексного подхода. Необходима не просто автоматизация отдельных операций, а системное преобразование учетной политики, документооборота, контрольных процедур, профессиональной подготовки кадров и информационной безопасности. Только в этом случае внутренний контроль сможет выполнять свою функцию как механизм обеспечения достоверности отчетности, предотвращения ошибок и поддержания устойчивого развития организации.

Заключение

Проведенный анализ позволяет утверждать, что организация бухгалтерского учета в условиях цифровизации представляет собой одно из ключевых направлений развития современной системы управления

предприятием. Цифровая трансформация хозяйственной деятельности оказывает глубокое влияние на методы обработки учетной информации, способы документирования операций, формы взаимодействия между подразделениями и содержание профессиональной деятельности бухгалтерских работников. В результате бухгалтерский учет постепенно выходит за рамки традиционной регистрационной функции и становится важнейшим элементом цифровой инфраструктуры организации, обеспечивающим информационную основу для контроля, анализа и принятия управленческих решений.

Установлено, что цифровизация бухгалтерского учета способствует повышению оперативности получения данных, сокращению трудоемкости учетных процедур, снижению влияния человеческого фактора и улучшению качества финансовой отчетности. Вместе с тем цифровая среда предъявляет новые требования к надежности учетной системы, так как любая ошибка в программной настройке, нарушении регламентов доступа или структуре информационного обмена может привести к искажению данных, финансовым потерям и снижению эффективности управления. Следовательно, цифровизация не отменяет необходимости контроля, а, напротив, усиливает его значение как системного элемента, встроенного в архитектуру учета.

Особое значение в современных условиях приобретает внутренний контроль, который в цифровой среде должен функционировать не только как последующий механизм проверки, но и как превентивный инструмент предупреждения отклонений. Эффективный внутренний контроль обеспечивает достоверность бухгалтерской информации, защиту активов, соблюдение внутренних регламентов и внешних нормативных требований, а также способствует своевременному выявлению рисков. Его результативность зависит от уровня автоматизации учетных процессов, качества программного обеспечения, логики построения контрольных процедур, надежности информационной безопасности и профессиональной подготовки сотрудников.

Практика показывает, что максимальный эффект достигается тогда, когда организация рассматривает цифровизацию учета и внутренний контроль как взаимосвязанные процессы. Автоматизация без надлежащего контроля может привести к тиражированию ошибок с высокой скоростью, тогда как контроль без современных цифровых инструментов становится чрезмерно затратным и недостаточно оперативным. Именно поэтому перспективной моделью является интегрированная система, в которой учетные, аналитические и контрольные процедуры объединены в едином цифровом пространстве. Такая система обеспечивает прозрачность финансово-хозяйственной деятельности, позволяет быстро реагировать на отклонения и создает условия для устойчивого экономического развития.

Для организаций транспортной сферы данная проблема имеет особую значимость, поскольку специфика их деятельности требует высокой скорости

обработки информации, точности расчетов, контроля затрат и координации большого количества операций. В этой связи внедрение цифровых учетных решений и развитие внутреннего контроля следует рассматривать как фактор повышения конкурентоспособности, финансовой устойчивости и управленческой эффективности. В образовательной среде транспортного вуза изучение данных вопросов также имеет важное значение, поскольку подготовка специалистов в области экономики, учета и бизнеса должна соответствовать современным требованиям цифровой экономики и формировать у будущих выпускников навыки работы в автоматизированной информационной среде.

Итак, совершенствование организации бухгалтерского учета в условиях цифровизации должно строиться на основе комплексного подхода, включающего модернизацию учетной политики, развитие электронного документооборота, внедрение современных программных решений, повышение цифровой компетентности персонала и укрепление системы внутреннего контроля. Только при таком подходе возможно обеспечить высокую степень достоверности отчетности, безопасность учетной информации, снижение рисков и повышение общей эффективности деятельности организации. Дальнейшее развитие данной проблематики связано с изучением возможностей интеллектуальных систем анализа данных, автоматизированного контроля рисков и адаптации международных цифровых практик к условиям национальной экономики и отраслевой специфики.

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LEYKOPLAKIYADA LAZER TERAPIYASI VA FOTODYNAMIK TERAPIYANING SAMARADORLIGI

Annotatsiya: *Maqsad:* Leykoplakiya davolashda lazer terapiyasi va fotodynamik terapiyaning samaradorligini qiyosiy tahlil qilish.

Material va usullar: 2022-2025 yillar xalqaro adabiyotlari va randomizatsiyalangan klinik tadqiqotlar asosida sistematik sharh.

Natijalar: Lazer terapiya minimal invaziv, aniq, tez tiklanuvchi usul hisoblanadi. CO₂ lazer eng keng qo'llaniladi - to'qimani bug'lantirish orqali aniq kesish, minimal qon ketishi, ambulatoriyada amalga oshirish imkoniyati. Erbium lazerlar yumshoqroq ta'sir ko'rsatadi va kamroq og'riq keltirib chiqaradi. Fotodynamik terapiya (PDT) - fotosensibilizator va yorug'lik kombinatsiyasi orqali selektiv hujayra o'limiga erishish. PDT ning asosiy afzalligi - bir vaqtning o'zida bir nechta lezyonlarni davolash, yaxshi kosmetik natija, to'qimalarni saqlash. Lazer klassik jarrohlikdan ustun - kam travmatik, tez tiklanish, yaxshi kosmetik natija. PDT yuqori xavfli lezyonlardan ko'ra past va o'rtacha xavfli holatlarda samaraliroq.

Xulosa: Lazer va PDT zamonaviy, samarali va xavfsiz usullar. Lazer - lokalizatsiyalangan lezyonlar uchun, PDT - keng tarqalgan yoki ko'p lezyonlar uchun optimal. Kombinatsiyalashgan yondashuv retsidivni kamaytiradi va uzoq muddatli natijalarni yaxshilaydi.

Kalit so'zlar: leykoplakiya, lazer terapiya, fotodynamik terapiya, CO₂ lazer, 5-aminolevulinik kislota.

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EFFECTIVENESS OF LASER AND PHOTODYNAMIC THERAPY IN LEUKOPLAKIA

Abstract: *Comparative analysis of the effectiveness of laser and photodynamic therapy in leukoplakia treatment.*

Materials and methods: Systematic review based on international literature 2022-2025 and randomized clinical trials.

Results: Laser therapy is minimally invasive, precise, rapidly recovering method. CO₂ laser is most widely used - precise cutting through tissue vaporization, minimal bleeding, outpatient capability. Erbium lasers provide softer impact with less pain. Photodynamic therapy (PDT) achieves selective cell death through photosensitizer and light combination. Main PDT advantage - simultaneous treatment of multiple lesions, good cosmetic result, tissue preservation. Laser superior to classical surgery - less traumatic, rapid recovery, good cosmetic outcome. PDT more effective in low and moderate risk than high-risk cases.

Conclusion: Laser and PDT are modern, effective and safe methods. Laser optimal for localized lesions, PDT for widespread or multiple lesions. Combined approach reduces recurrence and improves long-term outcomes.

Key words: leukoplakia, laser therapy, photodynamic therapy, CO₂ laser, 5-aminolevulinic acid.

KIRISH

Og'iz bo'shligi leykoplakiyasi saraton oldi holatlarning eng keng tarqalgan shakli bo'lib, uning davolashi malign transformatsiyani oldini olishga qaratilgan [1]. An'anaviy jarrohlik ekssiziya uzoq vaqt oltin standart bo'lsa-da, zamonaviy minimal invaziv texnologiyalar - lazer terapiya va fotodynamik terapiya (PDT) - yangi imkoniyatlar ochmoqda.

Lazer terapiya to'qimani aniq kesish yoki bug'lantirish imkonini beradi, qon ketishini minimallashtiradi va tiklanish jarayonini tezlashtiradi [2]. Fotodynamik terapiya esa fotosensibilizator va yorug'lik kombinatsiyasi orqali selektiv ravishda patologik hujayralarni yo'q qiladi [3].

Maqsad: Leykoplakiya davolashda lazer terapiyasi va fotodynamik terapiyaning samaradorligini qiyosiy baholash va klinik amaliyot uchun tavsiyalar ishlab chiqish.

MATERIAL VA METODLAR

Sistematik sharh 2022-2025 yillar davomida PubMed, Scopus, Cochrane Library bazalarida nashr etilgan randomizatsiyalangan klinik tadqiqotlar, meta-tahlillar va sistematik sharhlar asosida amalga oshirildi. Qidiruv kalitlari: "oral leukoplakia", "laser therapy", "CO₂ laser", "erbium laser", "photodynamic therapy", "5-ALA", "treatment outcomes". Jami 45 ta ilmiy manba tahlil qilindi, shulardan 30 tasi asosiy xulosalar uchun ishlatildi.

CO₂ LAZER TERAPIYASI

Texnik xususiyatlari

CO₂ lazer infra-qizil nurlanish spektrida ishlaydi. Asosiy parametrlari:

- **To'lqin uzunligi:** 10,600 nanometr - bu to'lqin uzunligi suv molekulalari tomonidan maksimal darajada yutiladi
- **Penetratsiya chuqurligi:** 0.1-0.2 millimetr - bu juda yuzaki ta'sir ko'rsatish imkonini beradi

- **Ishlash rejimlari:** Uzlüksiz (continuous wave) va impulsli (pulsed mode)

CO₂ lazer to'qimadagi suvni tezda qizdiradi va bug'lantiradi, natijada aniq "bug'lantirish" effekti hosil bo'ladi [6].

Klinik qo'llanilish protokoli

Tayyorgarlik:

- Bemor informatsiyalangan rozilik beradi
- Mahalliy infiltratsion anesteziya (lidokain 2% epinefrin bilan)
- Himoya ko'zoynaklari (bemor va shifokor uchun)
- Tutun evakuatsiyasi tizimini yoqish

Operatsiya texnikasi:

- Fokus masofani to'g'ri sozlash (optimal ta'sir uchun)
- Quvvatni tanlash: kichik lezyonlar uchun 3-5 Vatt, kattaroqlari uchun 10-15 Vatt

- Lezyon markazidan boshlab qatlamli bug'lantirish
- Sog'lom to'qima chegarasidan 2-3 mm nariga o'tish
- Hemostaz uchun defokusli nur ishlatish

Tiklanish davri:

- Birinchi 3-5 kun: fibrin qoplami hosil bo'ladi
- 7-14 kun: epitelizatsiya tugaydi
- 3-4 hafta: to'liq tiklanish

Og'riq boshqaruvi:

- Birinchi 2-3 kun eng og'riqli
- NSAIDlar (ibuprofen, paracetamol)
- Mahalliy anestetik gellar (lidokain 2%)

CO₂ lazerning afzalliklari

Aniqlik va nazorat - Jarroh to'qimani qatlam-qatlam, mikron darajasida olib tashlashi mumkin. Bu ayniqsa chuqur displaziya mavjud bo'lganda muhim.

Minimal qon ketishi - Lazer kichik qon tomirlarini avtomatik ravishda koagulyatsiya qiladi, bu operativ maydonda yaxshi ko'rinish ta'minlaydi.

Antibakterial ta'sir - Yuqori harorat operativ maydondagi bakteriyalarni yo'q qiladi, infeksiya xavfini kamaytiradi.

Yara qirg'oqlarining sterilizatsiyasi - Bu ikkilamchi infeksiya va yallig'lanishni oldini oladi.

Tez tiklanish - Klassik jarrohlikka nisbatan epitelizatsiya tezroq kechadi.

Ambulatoriya sharoitida - Ko'pgina hollarda statsionar yotish talab qilinmaydi, kunlik klinikada amalga oshiriladi.

Yaxshi kosmetik natija - Minimal chandiqlik hosil bo'lishi, ayniqsa yuz sohalarida muhim [7].

CO₂ lazerning cheklavlari

Chuqur penetratsiya yo'qligi - Faqat yuzaki lezyonlar uchun mos. Chuqur invaziya bo'lsa, klassik jarrohlik zarur.

Gistologik namunaviy olish qiyinligi - Bug'lantirish natijasida to'qima yo'q qilinadi, gistologiya uchun material qolmaydi. Shuning uchun operatsiyagacha biopsiya majburiy.

Og'riq - Birinchi kunlarda noqulaylik va og'riq hissiyoti kuchli bo'lishi mumkin, ayniqsa katta lezyonlarda.

Mahalliy komplikatsiyalar - Shish, giperemiya, fibrin qoplami, vaqtinchalik disfagiya (yutishda qiyinchilik)

Qimmat jihozlar - CO2 lazer apparati va texnik xizmat qimmatligi [8].

XULOSA

Lazer terapiya va fotodynamik terapiya og'iz bo'shligi leykoplakiyasini davolashda zamonaviy, samarali va xavfsiz usullar hisoblanadi:

1. Lazer terapiya:

- CO2 lazer: yuqori aniqlik, yaxshi gemostaz, tez tiklanish, lokalizatsiyalangan lezyonlar uchun optimal
- Er:YAG lazer: yumshoq ta'sir, kamroq og'riq, yaxshi kosmetik natija
- Afzalliklari: minimal invazivlik, ambulatoriya sharoitida, antibakterial ta'sir
- Cheklovlari: gistologik materialning yo'qligi, operatsiyagacha biopsiya zarur

2. Fotodynamik terapiya:

- Selektiv, minimal invaziv, to'qimalarni saqlaydi
- Ko'p lezyonlar uchun maqbul
- Afzalliklari: yaxshi kosmetik natija, takroriy qo'llash mumkin, qo'llab-quvvatlash terapiyasi
- Cheklovlari: fotosenzitivlik, takroriy seanslar, og'ir displaziya da kam samarali

3. Tanlash mezonlari:

- Lokalizatsiyalangan, yuqori displaziya → Lazer (CO2 yoki Er:YAG)
- Ko'p lezyonlar, past-o'rtacha xavf → PDT
- Katta lezyonlar, og'ir displaziya → CO2 lazer yoki klassik jarrohlik
- Retsidiv profilaktika → PDT qo'llab-quvvatlash

4. Zaruriy tadbirlar:

- Operatsiyagacha biopsiya (gistologik tasdiq)
- Xavf omillarini bartaraf etish (tamaki, alkogol)
- Uzoq muddatli kuzatish (kamida 5 yil)
- Bemor ta'limi va operatsiyadan keyin ko'rsatmalarni bajarish

5. Kelajak yo'nalishlari:

- Kombinatsiyalashgan protokollar (lazer + PDT)
- Yangi fotosensibilizatorlar
- Molekulyar maqsadli terapiya bilan kombinatsiya
- Sun'iy intellekt bilan individual yondashuv

Umuman olganda, lazer va PDT klassik jarrohlikka zamonaviy, kam travmatik alternativa taqdim etadi va individual holatlarga qarab moslashtirilishi kerak.

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LEYKOPLAKIYANI DAVOLASHDA ZAMONAVIY YONDASHUVLAR

ANNOTATSIYA

Maqsad: Leykoplakiya davolashning zamonaviy usullari va ularning samaradorligini tahlil qilish.

Material va usullar: 2022-2025 yillar xalqaro adabiyotlari va klinik tadqiqotlar asosida tahlil.

Natijalar: Asosiy davolash - jarrohlik ekssiziya (85-95% samaradorlik, 10-35% retsdiv). Lazer terapiya: CO₂ lazer (90% samaradorlik, 15% retsdiv), Er:YAG lazer (kamroq og'riq). Fotodynamik terapiya (PDT): 70-80% to'liq javob, kam invaziv. Tibbiy davolash: retinoidlar (vitamin A) 50-60%, beta-karoten, kurkumin. Og'ir displaziya jarrohlik tavsiya etiladi. Xavf omillarini bartaraf etish (tamaki, alkogol) 30-50% retsdivni kamaytiradi.

Xulosa: Davolash xavf darajasiga qarab tanlanadi. Jarrohlik va lazer - yuqori displaziya uchun. PDT va konservativ - past xavfli holatlar uchun. Kombinatsiyalashgan yondashuv eng yaxshi natija beradi.

Kalit so'zlar: leykoplakiya, davolash, jarrohlik ekssiziya, lazer terapiya, fotodynamik terapiya.

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MODERN APPROACHES TO LEUKOPLAKIA TREATMENT

ABSTRACT

Objective: To analyze modern leukoplakia treatment methods and their effectiveness.

Results: Main treatment - surgical excision (85-95% effectiveness, 10-35% recurrence). Laser therapy: CO₂ laser (90% effectiveness, 15% recurrence). Photodynamic therapy (PDT): 70-80% complete response. Medical treatment: retinoids (50-60%). Surgery recommended for severe dysplasia.

Conclusion: Treatment chosen based on risk. Surgery and laser for high-grade dysplasia. PDT and conservative for low-risk cases.

Key words: leukoplakia, treatment, surgical excision, laser therapy, photodynamic therapy.

KIRISH

Leykoplakiya davolashning asosiy maqsadi malign transformatsiyani oldini olish va simptomlarni kamaytiririshdir [1]. Davolash taktikasi xavf darajasiga bog'liq.

Maqsad: Leykoplakiya davolashning zamonaviy usullarini sistematik tahlil qilish.

MATERIAL VA METODLAR

2022-2025 yillar Cochrane sharhlar, randomizatsiyalangan tadqiqotlar va meta-tahlillar ko'rib chiqildi. 30 ta manba tahlil qilindi.

DAVOLASH STRATEGIYASI

Davolash taktikasi [2]:

Past xavf (displaziya yo'q, homogen):

- Kuzatish ("watch and wait")
- Xavf omillarini bartaraf etish
- 6-12 oylik monitoring

O'rtacha xavf (yengil displaziya):

- Xavf omillarini yo'q qilish
- Konservativ davolash (retinoidlar)
- 3-6 oylik kuzatish
- O'sishda - jarrohlik

Yuqori xavf (o'rtacha/og'ir displaziya, nohomogen, PVL):

- Jarrohlik ekssiziya yoki lazer
- Uzoq muddatli kuzatish

JARROHLIK DAVOLASH

Klassik ekssiziya

Texnika:

- To'liq lezyonni 3-5 mm sog'lom to'qima bilan olib tashlash
- Birlamchi yopish yoki ochiq qoldirish
- Gistologik tekshiruv

Samaradorlik:

- 85-95% to'liq olib tashlash [3]
- 10-35% retsidiv (5 yil ichida)
- Og'ir displaziyada eng yaxshi natija

Kamchiliklar:

- Invaziv, og'riqli
- Yara, chandiq
- Funktsional buzilish (katta lezyonlarda)

Krioterapiya

Suyuq azot (-196°C) bilan muzlatish.

Afzalliklari:

- Oddiy, arzon
- Ambulatoriyada
- Minimal qon ketishi

Kamchiliklar:

- 30-40% retsidiv
- Gistologik nazorat yo'q
- Og'riq, shish

Hozirda kam qo'llaniladi [4].

LAZER TERAPIYA

CO2 lazer

Eng keng tarqalgan lazer turi [5].

Parametrlar:

- To'lqin uzunligi: 10,600 nm
- Quvvat: 5-15 W
- Mahalliy anesteziya

Samaradorlik:

- 85-95% samaradorlik
- 10-20% retsidiv
- Minimal qon ketishi
- Tez tiklanish (7-14 kun)

Kamchiliklar:

- Chuqur shikastlanish (0.1-0.2 mm)
- Og'riq birinchi kunlarda

Er:YAG lazer

Yumshoqroq ta'sir, kam chuqurlikda (20-50 mkm).

Afzalliklari:

- Kamroq og'riq
- Tezroq tiklanish
- Minimal chandiq

Samaradorlik: CO2 ga o'xshash (85-90%) [6].

Nd:YAG va diode lazer

Kam qo'llaniladi. Chuqurroq penetratsiya, lekin ko'proq og'riq va chandiq xavfi.

FOTODYNAMIK TERAPIYA (PDT)

Prinsipi

Fotosensibilizator (5-ALA, methylene blue) + maxsus yorug'lik (630-690 nm) → reaktiv kislorod turlari → hujayra o'limi.

Protokol:

- Fotosensibilizator qo'llash (30-60 min)
- LED yoki lazer yorug'ligi (10-20 min)
- Bir yoki bir necha seans

Samaradorlik

To'liq javob: 70-80% [7]

- Yengil displaziya: 85%
- O'rtacha: 65%
- Og'ir: 50%

Retsidiv: 20-30% (2 yil ichida)

Afzalliklari

- Minimal invaziv
- Yaxshi kosmetik natija
- Bir nechta joyni bir vaqtda davolash
- Qo'llab-quvvatlovchi terapiya

Kamchiliklar

- Yorug'likka sezgirlik (48 soat)
- Og'riq, shish
- Takroriy seanslar kerak
- Hali standartlashtirilmagan [8]

XULOSA

Leykoplakiya davolashi individual yondashuvni talab qiladi:

1. Davolash usullari:

- Jarrohlik: 85-95% samaradorlik, 10-35% retsidiv
- CO2 lazer: 90%, 15% retsidiv
- PDT: 70-80%, 20-30% retsidiv
- Retinoidlar: 50-60%, yuqori retsidiv

2. Tanlash mezonlari:

- Og'ir displaziya → jarrohlik/lazer
- Yengil displaziya → PDT yoki kuzatish
- Ko'p lezyonlar → PDT
- Jarrohlik rad etish → tibbiy davolash

3. Zaruriy tadbirlar:

- Tamakini tark etish
- Alkogolni cheklash
- Uzoq muddatli kuzatish (5+ yil)

4. Kelajak:

- AI bilan individual prognoz
- Maqsadli molekulyar terapiya
- Kombinatsiyalashgan protokollar

Eng yaxshi natija: jarrohlik/lazer + xavf omillarini bartaraf etish + uzoq kuzatish.

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EVALUATION OF THE ROLE OF VITAMIN D IN THE TREATMENT OF VITILIGO

Abstract: *Vitiligo is a chronic depigmenting disorder characterized by selective loss of melanocytes, leading to white patches on the skin. Recent studies have demonstrated that vitamin D, beyond its classical role in calcium metabolism, exerts significant immunomodulatory and melanocyte-stimulating effects. The aim of this study is to evaluate the role of vitamin D supplementation as an adjuvant therapy in patients with vitiligo, focusing on its impact on repigmentation and immune regulation. Clinical observation revealed that patients receiving vitamin D supplementation in combination with phototherapy demonstrated faster repigmentation rates compared to controls. These findings support the hypothesis that vitamin D plays an essential role in melanocyte homeostasis and may enhance the efficacy of conventional vitiligo treatments.*

Keywords: *Vitiligo; vitamin D; melanocytes; phototherapy; immune regulation; depigmentation; calcium homeostasis.*

Introduction

Vitiligo is an acquired depigmentation disorder affecting approximately 0.5–2% of the global population. It results from the destruction or dysfunction of melanocytes, leading to depigmented macules on the skin. Several autoimmune, genetic, and environmental factors are implicated in its pathogenesis. Vitamin D, a secosteroid hormone, plays a pivotal role in immune regulation and melanogenesis. The active form, calcitriol (1,25-dihydroxyvitamin D₃), modulates T-cell function and promotes melanocyte survival through activation of vitamin D receptors (VDRs) in the epidermis.



Figure 1. Vitiligo affecting hands and neck region.

This image shows a patient with vitiligo, a chronic skin disorder characterized by loss of pigment (melanin) in certain areas, leading to white patches on the skin.

Panels (A) and (B) show depigmented patches on the dorsal sides of both hands.

Panels (C) and (D) show depigmented areas on the neck and lower part of the face.

The condition results from the destruction or dysfunction of melanocytes, the cells responsible for skin pigmentation.

Aim of the Study

The aim of this study is to assess the clinical efficacy of vitamin D supplementation in patients with vitiligo, focusing on its effects on repigmentation, immune modulation, and the improvement of overall treatment outcomes.

Materials and Methods

The study included 40 patients diagnosed with non-segmental vitiligo. Participants were divided into two groups: Group A received standard narrowband UVB phototherapy three times per week, while Group B received the same regimen combined with oral vitamin D3 supplementation (2000 IU/day) for 12 weeks. Repigmentation was evaluated using the Vitiligo Area Scoring Index (VASI), and serum vitamin D levels were measured before and after treatment.

nbUVB Phototherapy



Figure 2. Progressive repigmentation in a patient with non-segmental vitiligo following NB-UVB phototherapy and oral vitamin D₃ supplementation.

This image series shows the gradual repigmentation process in a patient with non-segmental vitiligo over different treatment durations: 4 months, 6 months, and 14 months.

At 4 months, scattered perifollicular repigmentation (small brown dots) begins to appear within depigmented areas.

At 6 months, these spots expand and start merging, forming larger pigmented patches.

At 14 months, there is marked repigmentation with substantial restoration of normal skin color and reduction of white patches.

The improvement demonstrates the combined effect of narrowband UVB (NB-UVB) phototherapy and oral vitamin D₃ (2000 IU/day) in stimulating melanocyte regeneration and melanin production, which helps restore pigmentation in affected areas.



Figure 3. Clinical improvement and repigmentation in non-segmental vitiligo treated with narrowband UVB phototherapy and vitamin D₃ supplementation.

The figure illustrates the clinical progression and repigmentation response in patients with non-segmental vitiligo following combined therapy with narrowband UVB (NB-UVB) phototherapy and oral vitamin D₃ (2000 IU/day) for several months.

The images show baseline depigmented lesions before treatment and the gradual return of pigmentation after continuous therapy.

Perifollicular repigmentation (small brown areas around hair follicles) appears first, expanding over time to form larger pigmented zones.

Improvement is most evident after 6–14 months, demonstrating the synergistic effect of UVB-induced melanocyte activation and vitamin D-mediated melanin synthesis.

The figures also emphasize the reduction in Vitiligo Area Scoring Index (VASI), indicating measurable improvement in skin pigmentation and disease stabilization.

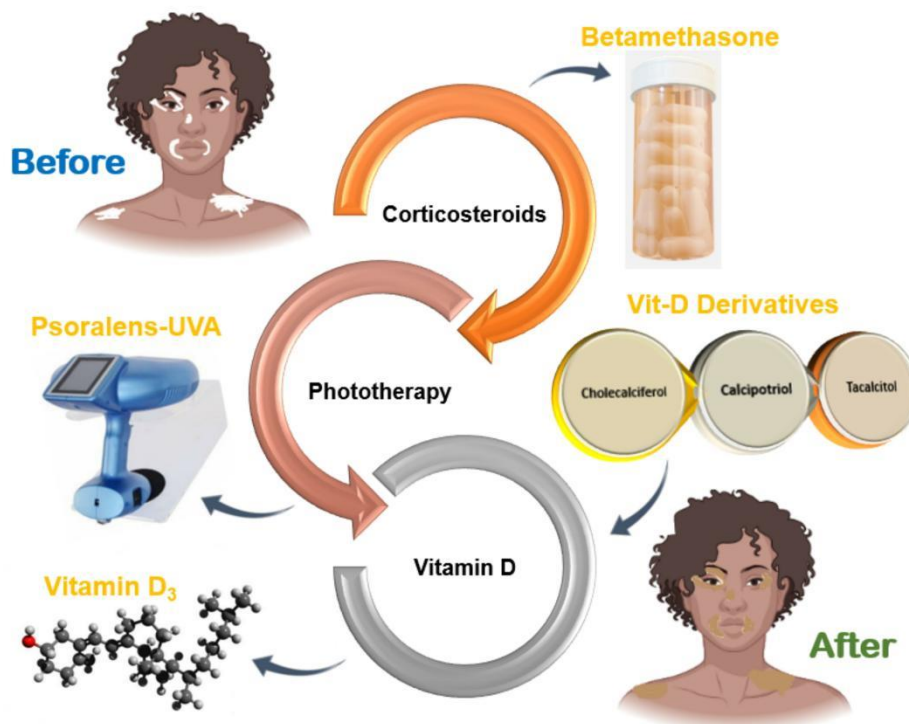


Figure 4. Topical vitamin D formulations and combined therapeutic approaches in the treatment of vitiligo: a systematic review summary.

The picture summarizes data from a systematic review analyzing the effectiveness of topical vitamin D analogs (such as calcipotriol and tacalcitol) used alone or in combination with other vitiligo treatments.

The chart compares various therapeutic combinations, including PUVA (psoralen + UVA), NB-UVB, topical corticosteroids (e.g., betamethasone), and vitamin D analogs.

Studies demonstrated that vitamin D analogs, when combined with NB-UVB or topical corticosteroids, significantly enhance repigmentation and improve clinical outcomes compared to monotherapy.

The figure visually highlights the synergistic role of vitamin D in melanocyte activation, immune modulation, and melanin synthesis, making it a valuable adjunct in vitiligo management.

In summary, this figure illustrates the comparative efficacy of vitamin D-based topical treatments within multimodal therapeutic regimens for non-segmental vitiligo.

Results

After 12 weeks, Group B demonstrated a 45% mean reduction in VASI scores compared to 25% in Group A ($p < 0.05$). Serum vitamin D levels in Group B increased from 18.2 ± 3.4 ng/mL to 34.5 ± 5.1 ng/mL, correlating positively with the degree of repigmentation. Patients reported enhanced satisfaction and fewer new depigmented lesions. No serious adverse effects were observed.



Figure 5-6. Clinical and biochemical response to combined narrowband UVB phototherapy and oral vitamin D₃ supplementation in non-segmental vitiligo after 12 weeks of treatment.

These images illustrate both the clinical improvement and biochemical correlation observed after 12 weeks of combined therapy in patients with non-segmental vitiligo.

The one of the lefts demonstrates visible repigmentation of depigmented skin patches following treatment with NB-UVB phototherapy. Areas previously lacking pigment show marked return of normal skin color, consistent with a mean 45 % reduction in VASI scores in the combination group.

On the right one presents supporting laboratory findings, showing a significant increase in serum vitamin D levels from approximately 18 ng/mL to 34 ng/mL, which correlates positively with the extent of repigmentation.

Together, these figures highlight the synergistic effect of NB-UVB and vitamin D₃ in promoting melanocyte recovery, enhancing melanin synthesis, and achieving superior therapeutic outcomes compared to phototherapy alone.

Conclusion

The results indicate that vitamin D supplementation can significantly enhance the efficacy of standard vitiligo treatments, particularly when combined with phototherapy. Its immunomodulatory and melanocyte-protective properties contribute to improved repigmentation and stabilization of the disease process. Further randomized controlled trials are warranted to establish optimal dosage and duration.

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НОВЫЕ ВОЗМОЖНОСТИ НАРУЖНОЙ ТЕРАПИИ ТЯЖЕЛО ПРОТЕКАЮЩИХ ФОРМ ДЕТСКОЙ ЭКЗЕМЫ У ДЕТЕЙ

***Аннотация:** Повышение эффективности топического воздействия при детской экземе у детей, а также поиск новых безопасных наружных средств является одной из актуальных задач современной дерматологии. Обоснованы данные о необходимости включения топических ингибиторов кальциневрина в схему наружного лечения детской экземы как для купирования обострения, так и для обеспечения длительного долгосрочного контроля за дальнейшим течением заболевания. Проведена оценка и показана высокая клиническая эффективность, безопасность и хорошая переносимость 0,03% мази такролимуса в наружном лечении 40 детей в возрасте от 2 до 15 лет с детской экземой средней и тяжелой степени тяжести.*

***Ключевые слова:** детская экзема, наружная терапия, долгосрочный контроль, мазь такролимуса, дети.*

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NEW POTENTIALITIES OF TOPICAL THERAPY OF SEVERE ECZEMA IN CHILDREN

Abstract: *Increasing effectiveness of topical exposure in atopic dermatitis in children, as well as search for new safe external facilities is one of the urgent problems of modern dermatology. Data concerning the need for inclusion of topical calcineurin inhibitors in the scheme of topical treatment of children eczema as for the relief of acute and for long term monitoring of the further course of the disease are proved. Authors evaluated and showed the high clinical efficacy, safety and tolerability of tacrolimus ointment 0.03% in the external treatment of 40 children with atopic dermatitis of moderate and severe degrees in children aged from 2 to 15 years.*

Keywords: *children eczema, topical therapy, long-term control, tacrolimus ointment, children.*

Введение

Обязательной составляющей комплексного лечения детской экземы у детей является наружная терапия. Используемые при этом лекарственные препараты могут оказывать не только местное, но и общее воздействие на организм через нервно-рецепторный аппарат, а также за счет их абсорбции через кожу.

Исчезновение или уменьшение кожных проявлений воспаления и таких субъективных ощущений, как зуд, боль, жжение, положительно сказывается на общем и психоэмоциональном состоянии больных детской экземой кожи, поэтому в целом ряде случаев удается добиться клинической ремиссии назначением только наружных средств [1].

Повышение эффективности топического воздействия — одна из актуальных задач современной дерматологии, требующая дифференцированного подхода и рационального использования различных наружных лекарственных средств с целью положительного влияния на течение патологического кожного процесса [2].

С позиций доказательной медицины в наружном лечении детской экземы кожи показали свою клиническую эффективность три группы лекарственных средств — топические глюкокортикостероиды (ГКС), топические ингибиторы кальциневрина и современные увлажняющие средства (эмоленты) [3].

Топические ГКС широко назначаются при лечении детской экземы кожи. В ходе рандомизированных контролируемых исследований была доказана их безопасность и эффективность при применении коротким курсом. Что касается длительного применения, то их безопасность и эффективность не была установлена таким же строгим образом, и возможность побочных эффектов, особенно при их нерациональном использовании, достаточно высока [4].

Основными средствами наружной терапии для борьбы с причинами и последствиями сухости кожи являются различные увлажняющие средства. Современные эмоленты обеспечивают комплексное воздействие на пораженную кожу, а именно: помогают восстановить водно-липидную мантию кожи; восполняют нехватку липидов в межклеточных пространствах эпидермиса; обеспечивают физиологичное увлажнение кожи: предотвращают потерю влаги, а также доставляют вещества, связывающие воду в коже; смягчают и успокаивают кожу, возвращая ей комфорт. Следует отметить, что регулярное применение современных эмолентов уменьшает потребность в использовании топических глюкокортикостероидов, однако не позволяет уверенно и длительно контролировать течение данной болезни [5, 6].

Важным событием в терапии детской экземы кожи стало применение нестероидных топических иммуносупрессантов. Разработка топических ингибиторов кальциневрина началась после того, как был отмечен положительный эффект системного препарата циклоспорина А, высокоактивного ингибитора Т-клеток, при лечении экзematизированных дерматитов и псориаза. Циклоспорин А как системный иммуносупрессант применяется при целом ряде состояний, но как топический препарат он оказался неэффективен, вероятно, из-за большого размера молекулы, что явилось препятствием к проникновению препарата в кожу. Однако другие иммуносупрессанты — пимекролимус и такролимус (последний также активно применяется системно в трансплантологии для предотвращения отторжения трансплантата), показали свою активность и при наружном применении в лечении детской экземы кожи [7, 8].

Первым и долгое время единственным препаратом из группы топических ингибиторов кальциневрина, появившимся на отечественном фармацевтическом рынке в 2003 г., был 1% крем пимекролимуса. За рубежом и в нашей стране данный препарат был подвергнут интенсивному клиническому изучению. Более 11 тыс. пациентов, включая взрослых, детей и младенцев с детской экземой кожи разной степени тяжести в различных дерматологических центрах Европы и России, применяли 1% пимекролимус крем. Это лечение проводилось как двойным слепым, так и открытым методом, а его длительность составляла от 3 нед до 5 лет. При анализе данных многочисленных клинических исследований была показана определенная терапевтическая эффективность и безопасность 1% крема пимекролимуса [9,12]. Однако, в силу не высокой активности, данный препарат разрешен к применению лишь при легких и среднетяжелых формах детской экземы кожи, а для наружной терапии тяжело протекающего детской экземы альтернативы топическим глюкокортикостероидам в Республики Узбекистан до последнего времени не существовало.

Появление в арсенале наружных средств узбекских врачей нового топического ингибитора кальциневрина — такролимуса открыло новые возможности в терапии больных детской экземой кожи среднетяжелого и

тяжелого течения. Впервые такролимус был разрешен к применению в 1999 г. в Японии, в 2000 г. — в США, в 2002 г. — в странах Евросоюза. В настоящее время он разрешен к применению в 71 стране мира. Основным механизмом противовоспалительного действия такролимуса обусловлен его воздействием на пути сигнальной трансдукции в Т-лимфоцитах и ингибированием транскрипции генов целого ряда цитокинов, в частности интерлейкина (IL) 2, 3, 4 и фактора некроза опухоли, интерферона и гранулоцитарно-макрофагального колониестимулирующего фактора, ответственных за развитие иммунной реакции против чужеродных антигенов.

Проникая в Т-клетки и связываясь с иммунофилинами, такролимус формирует комплекс, конкурентно связывающийся с кальмодулином и ингибирующий его. Это приводит к невозможности активации фосфатазы кальциневрина, что предотвращает дефосфорилирование фактора активированных Т-клеток (NF-AT), возможность проникновения NF-AT в ядро и, соответственно, ингибирование транскрипции генов. Результатом этого является ингибирование продукции провоспалительных цитокинов Т-хелперами (Th1 и Th2) и, как следствие, пониженный Т-клеточный ответ на действие антигенов [13].

Помимо этого, такролимус обладает широким спектром иммуномодулирующих эффектов за счет ингибирования адгезии тучных клеток, супрессии высвобождения медиаторов воспаления из тучных клеток и базофилов, снижения экспрессии молекулы межклеточной адгезии 1 и Е селектина при повреждении сосудов, а также угнетения экспрессии рецептора IL 8 и FcRI на клетках Лангерганса.

Таким образом, применение такролимуса при детской экземе является патогенетически обоснованным, а его эффект опосредован ингибированием активации Т-клеток, что приводит к снижению уровня иммуноглобулина Е (IgE) и пролиферации эозинофилов [14]. Помимо этого, такролимус способен ингибировать выделение гистамина и серотонина из тучных клеток и повышать экспрессию рецепторов IL 10 в островоспалительных очагах поражения при детской экземе кожи [18]. Также он может вызывать подавление активации клеток Лангерганса, что положительно отличает его от действия глюкокортикостероидов, которые индуцируют миграцию данных клеток из эпидермиса [12]. Наконец, такролимус оказывает противогрибковый эффект в отношении *Malassezia furfur*, тогда как циклоспорин А не обладает таким свойством.

Данный эффект такролимуса является патогенетически значимым и, по сравнению с другими методами лечения, может способствовать увеличению продолжительности ремиссии у больных детской экземе, особенно при локализации поражений в области лица и шеи, где *M. Furfur* обнаруживается в 100% случаев.

На сегодняшний день оценка эффективности местного применения такролимуса в форме мази при детской экземе кожи основывается на

результатах десятков клинических исследований с наивысшим уровнем доказательности, проведенных за рубежом. В исследованиях приняли участие более 24 тыс. человек, включая более 7000 детей и подростков. Проведено 16 исследований III фазы (4-плацебо контролируемых, 6 сравнительных с топическими ГКС), 3 не сравнительных, 3 исследования по изучению долгосрочной безопасности до 4 лет), а также 4 сравнительных исследования IV фазы с пимекролимусом. Обобщая результаты опыта мирового использования такролимуса более чем у 20 млн пациентов с детской экземой, можно сделать следующие основные выводы:

- высокая клиническая эффективность мази такролимуса (сопоставимая с таковой у сильных глюкокортикостероидов) сочетается с высоким профилем местной и системной безопасности;

- эффективность мази такролимуса значительно превосходит эффективность крема пимекролимуса при идентичном профиле безопасности этих двух препаратов;

- мазь такролимуса может успешно использоваться в терапии детской экземы как кратковременно, так и длительно в качестве поддерживающей терапии для предупреждения обострений и увеличения длительности ремиссии заболевания.

Таким образом, мазь такролимуса является новым высокоэффективным и безопасным наружным средством как для купирования тяжело протекающих форм детской экземы кожи, так и для длительного контроля над дальнейшим течением болезни. Учитывая, что данный препарат был относительно недавно зарегистрирован и разрешен к применению в Узбекистане, в связи с чем срок его клинического использования в нашей стране ограничен, мы хотим поделиться первым опытом его применения в педиатрической практике. Приводим результаты своих наблюдений. Протопик (0,03% мазь такролимуса) был применен у 40 детей в возрасте от 2 до 15 лет включительно, страдающих детской экземой кожи среднетяжелого и тяжелого течения (табл. 1).

Таблица 1.
Распределение больных детской экземой по полу и возрасту

Возраст больных (лет)	Девочки	Мальчики	Всего больных
От 2 до 5	4	5	9
От 6 до 10	8	9	17
От 11 до 15	6	8	14
Всего больных	18	22	40

Все дети имели подтвержденный диагноз детской экземы с длительностью болезни от 6 мес до 14,5 лет и находились в состоянии обострения кожного процесса на стационарном лечении в отделении кожных заболеваний в Ташкентской областной кожно венерологических диспансера. Предшествующее наружное лечение у наблюдаемых пациентов включало

топические препараты: дерматолово-борный крем, цинковую и борно-дегтярную пасты, топические кортикостероиды разной степени активности, 1% крем пимекролимуса, увлажняющие и смягчающие средства.

Для объективной оценки степени тяжести течения болезни и эффективности терапии 0,03% мазью такролимуса. Этот индекс объединяет оценку площади поражения кожи, степени выраженности объективных (эритема, образование папул/везикул, мокнутие, эскориации,) и субъективных (зуд кожи и/или нарушение сна) симптомов.

Эффективность проводимой терапии оценивали по следующим параметрам: клиническая ремиссия, значительное улучшение, улучшение, без эффекта, ухудшение, и отражали в виде графика изменения среднего значения во времени по истечении 1, 2 и 3-й нед от начала применения мази такролимуса для каждой степени тяжести заболевания.

Переносимость мази такролимуса оценивалась как врачом, так и пациентом или его родителем на протяжении всего курса терапии: как очень хорошая, хорошая, удовлетворительная или плохая. Безопасность препарата оценивали на основании анализа частоты и выраженности нежелательных явлений, отмеченных у пациентов во время проведения терапии.

В системном лечении по показаниям применялись антигистаминные и седативные средства, витаминные препараты. Все больные получали бальнеотерапию (ванны с Гумизолем по 15–20 мин ежедневно, курс — 15–20 процедур). Наружно для туширования пустулезных элементов, эскориаций, эрозий, корочек использовались водные растворы анилиновых красителей. В качестве эмоленов для смягчения и увлажнения кожи в очагах и вне очагов поражения применяли крем Унны на физиологическом растворе 2 раза в день. Всем пациентам мазь такролимуса наносилась на очаги поражения детской экземы дважды в день, утром — после гумизоловых ванн и крема Унны, вечером — за 2 ч до применения крема Унны на протяжении 3 нед.

В соответствии с полученными значениями на первичном осмотре до начала лечения мы разделили всех детей (40 человек) на 2 группы по степени тяжести течения кожного процесса (табл. 2).

Таблица 2.
Распределение больных детской экземой на группы
в зависимости от значения на первичном осмотре

Группы больных	Степень тяжести заболевания	Среднее значение	Количество Больных
I	средняя	34,7	26
II	тяжелая	63,5	14
Итого			40

I группу больных со средней степенью тяжести течения болезни составили 26 детей. Во вторую группу вошли 14 пациентов с тяжелым течением кожного процесса. Клиническая картина детской экземы кожи у больных I группы характеризовалась умеренно выраженным зудом кожи, в

ряде случаев сопровождавшимся нарушением сна. Кожный процесс преимущественно локализовался на лице, передней поверхности шеи, локтевых сгибах, сгибательной и разгибательной поверхностях лучезапястных суставов, подколенных ямках. Острота воспалительной реакции проявлялась в умеренно выраженных эритеме и отеке, папулезных элементах розового и красного цвета. В очагах поражения отмечались серозно-геморрагические корочки, эскориации, трещины, мокнутие на фоне умеренно выраженной сухости кожи и шелушения.

У детей II группы патологический процесс носил более распространенный характер с локализацией на коже лица, туловища, верхних и нижних конечностей. На фоне значительно выраженной отечной эритемы отмечались многочисленные папулезные элементы ярко-красного цвета, местами сливающиеся в очаги сплошной папулезной инфильтрации; везикулёзные высыпания, эскориации, эрозии и трещины. Отмечались выраженная сухость и значительное шелушение как в очагах детской экземы, так и на непораженной коже. Все больные жаловались на интенсивный зуд, в большинстве случаев сопровождавшийся нарушением сна. Клиническая эффективность применения 0,03% мази такролимуса отражена на графике изменения среднего во времени на 8, 15 и 22-й дни от начала терапии для каждой степени тяжести болезни (рис. 1).

У 12 (из 14) пациентов II группы с первой недели применения 0,03% мази такролимуса мы отмечали постоянную положительную динамику, проявляющуюся в постепенном уменьшении зуда кожи, островоспалительных явлений, шелушения и сухости. Так, на 8-й день терапии у большинства пациентов данной группы отсутствовали жалобы на кожный зуд, при этом процент снизился на 32% от исходного значения и составил 43,2. К концу 2-й нед лечения у этих же больных отмечалась выраженная положительная динамика со стороны основных объективных симптомов болезни и распространенности детской экземы кожи, отсутствовали эскориации, отмечались легкой степени выраженности эритема, папулезная инфильтрация, шелушение кожи. Таким образом, на 15-й день терапии в целом по группе уменьшился на 63% от исходного уровня (до 23,5), что соответствовало трансформации в среднюю степень тяжести заболевания.

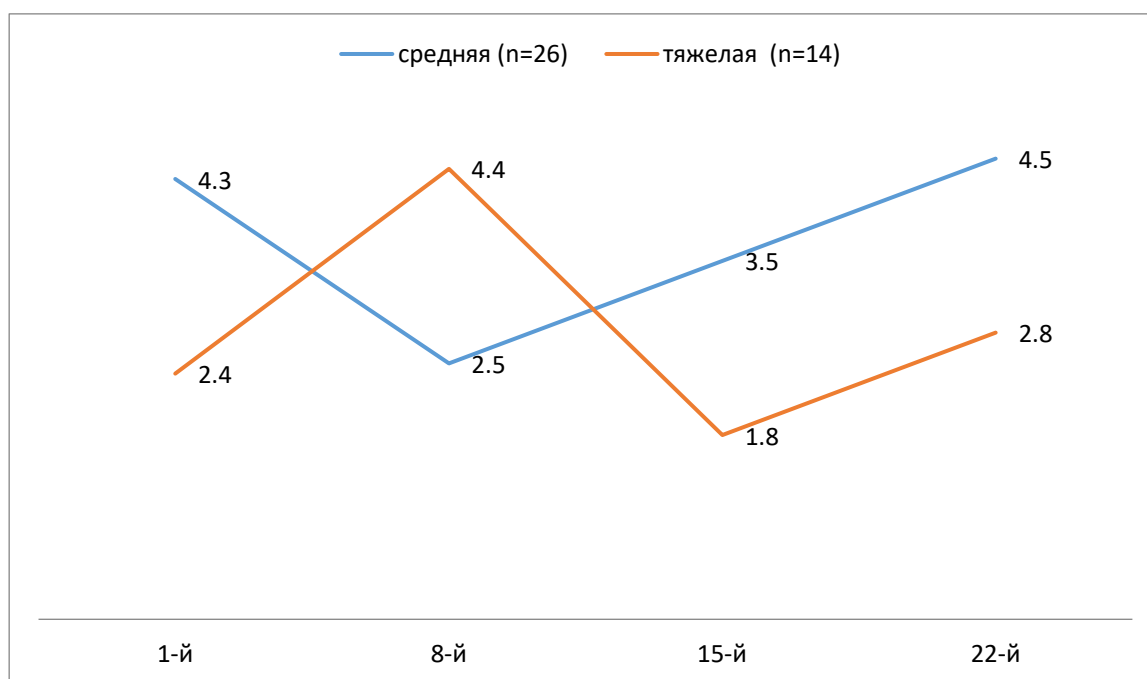


Рис. 1. Динамика среднего значения у детей, страдающих ДЭ в процессе трехнедельного применения мази Протопик.

На момент окончания периода наблюдения из 12 детей данной группы клиническая ремиссия была констатирована у 3, значительное улучшение — у 4, улучшение — у 5 пациентов. В среднем по группе процент снизился в процессе лечения на 80,5% — с исходных 63,5 до 12,4, что соответствовало переходу заболевания в легкую степень тяжести. У пациентов с клинической ремиссией проявлений детской экземы не было; у больных со значительным улучшением на ограниченных участках кожи сохранялась или легкая эритема или сухость кожных покровов. Пациенты с улучшением не предъявляли жалоб на кожный зуд, при этом степень выраженности основных объективных симптомов заболевания и распространенности детской экземы значительно уменьшилась по сравнению с первичным осмотром. В целом по данной группе к окончанию периода наблюдения распространенность процесса уменьшилась на 70,5%, выраженность объективных симптомов заболевания (эритема, папулы, везикулы, мокнутие и др.) — на 48%, интенсивность зуда — на 72% (рис. 2). Нами было рекомендовано продолжить лечение до полного исчезновения симптомов заболевания, снизив кратность нанесения 0,03% мази такролимуса до 1 раза в день.

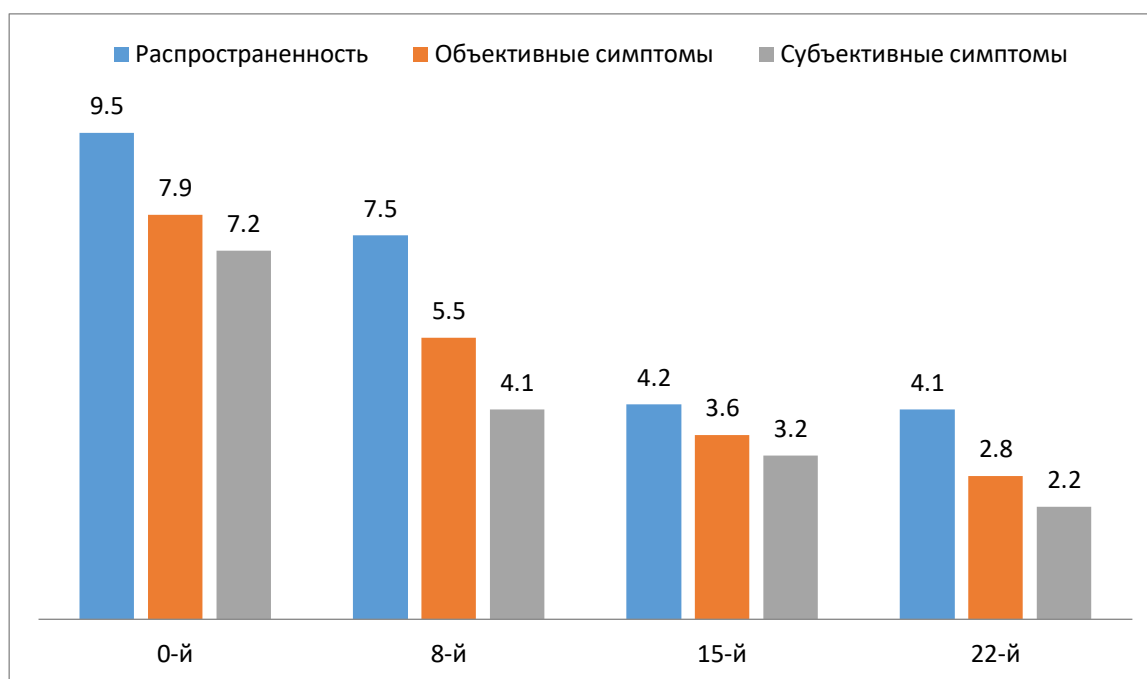


Рис. 2. Динамика уменьшения распространенности (площадь поражения), объективных (эритема, папулы, везикулы, мокнутие) и субъективных симптомов (кожный зуд, нарушение сна) у больных с тяжелой степенью тяжести ДЭ

У 2 пациентов из группы больных с тяжелым течением детской экземы на фоне 2-недельного использования мази такролимуса сохранялись жалобы на кожный зуд, отсутствовала динамика по уменьшению площади поражения кожи.

Несмотря на незначительное улучшение объективных симптомов заболевания (уменьшение эритемы, сухости), через 2 нед значение не отличалось от первоначального (при хорошей переносимости препарата). Результат лечения был расценен как «без эффекта», а больные переведены на иной вид терапии. Случаев ухудшения в процессе применения 0,03% мази такролимуса даже в группе больных с тяжелым течением детской экземы мы не наблюдали.

У всех пациентов I группы отмечена выраженная положительная динамика кожного процесса с первых дней терапии мазью такролимуса. На 8-й день терапии уменьшился на 38% и составил 21,5.

К 15-му дню терапии наблюдалось дальнейшее уменьшение площади поражения, сухости, шелушения и разрешение воспалительных явлений (эритема, папулы, везикулы) в очагах поражения. При этом снизившись на 73,5% от исходного, был равен 9,2. На 22-й день терапии клиническая ремиссия была констатирована у 17 человек, значительное улучшение — у 5, улучшение — у 4. Случаев отсутствия эффекта или ухудшения в процессе применения препарата в данной группе больных не было.

В среднем показатель в I группе снизился в процессе лечения на 90% — с 34,7 до 3,6, что соответствовало переходу болезни в легкую степень тяжести (рис. 3).

Уже после первой недели лечения у всех пациентов с детской экземой средней степени тяжести отсутствовали или значительно уменьшились жалобы на кожный зуд, распространенность и интенсивность проявлений ДЭ. К окончанию лечения у больных данной группы распространенность процесса уменьшилась на 63,8%, выраженность объективных симптомов — на 74,2%, интенсивность зуда — на 95,2%. У пациентов с клинической ремиссией проявлений ДЭ не было; у больных со значительным улучшением на ограниченных участках кожи сохранялась либо легкая эритема, либо сухость кожных покровов. У 2 пациентов с улучшением оставались жалобы на незначительный зуд кожи в очагах поражения, при этом степень выраженности основных объективных симптомов болезни и распространенности.

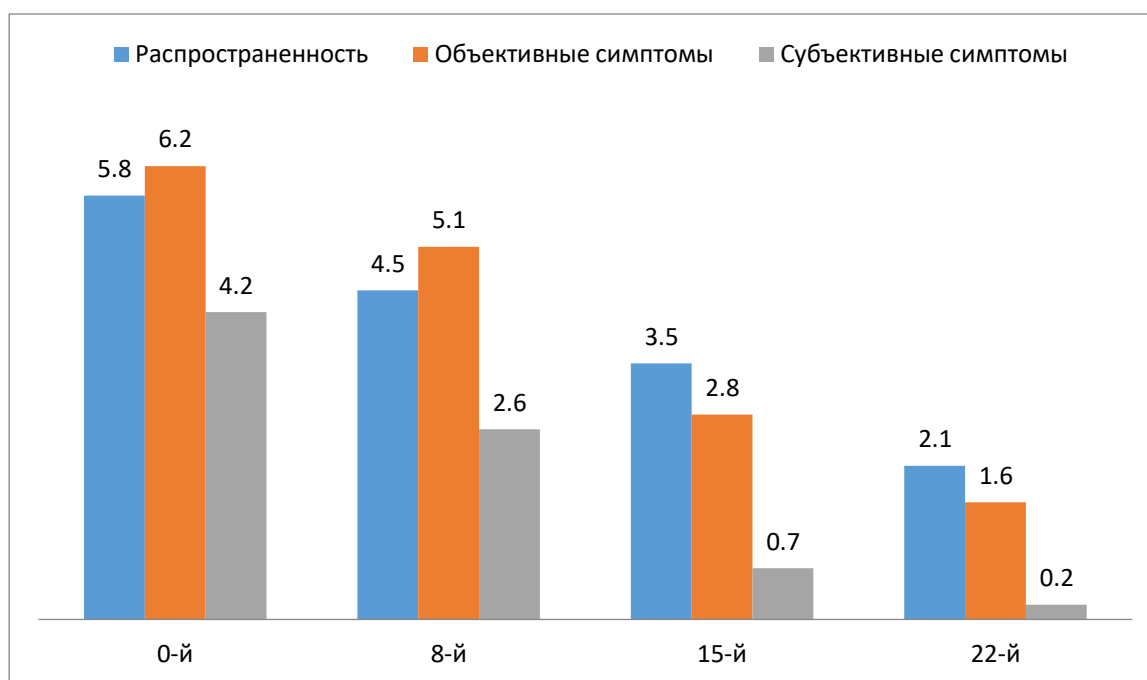


Рис. 3. Динамика уменьшения распространенности (площадь поражения), объективных (эритема, папулы, везикулы, мокнутие) и субъективных симптомов (кожный зуд, нарушение сна) у больных со средней степенью тяжести ДЭ

Обобщая результаты 3-недельного применения 0,03% мази такролимуса в терапии 40 детей с детской экземой среднетяжелого и тяжелого течения (табл. 3), мы констатировали клиническую ремиссию у 20 детей (50,0%), значительное улучшение — у 9 (22,5%), улучшение — у 9 (22,5%), отсутствие эффекта — у 2 (5,0%).

В ходе терапии у 6 из 40 больных были зарегистрированы нежелательные явления средней (умеренной) степени тяжести, не связанные

с применением исследуемого препарата и не требующее его отмены, что свидетельствует о высокой безопасности мази.

Переносимость мази такролимуса на протяжении всего курса лечения оценена нами и родителями пациентов как «очень хорошая» — у 32 детей (80%), «хорошая» — у 8 (20%). У пациентов с хорошей переносимостью 0,03% мази такролимуса (5 больных с тяжелой и 3 — со средней степенью тяжести болезни) в первые дни применения в местах аппликаций отмечались незначительное усиление эритемы, чувство легкого жжения и/или легкого зуда кожи, которые имели транзиторный характер, продолжались в течение 10–15 мин и полностью прекратились к концу первой недели лечения. Каких-либо других нежелательных местных реакций зафиксировано не было.

Таким образом, в 95% случаев нами отмечен положительный результат после 3-недельного применения мази Протопик в лечении детской экземы кожи у 40 детей разных возрастных групп.

Таблица 3.

Клиническая эффективность применения мази Протопик в наружной терапии детей, больных детской экземой

Результаты лечения	Степень тяжести заболевания		Всего детей
	Средняя (n= 26)	Тяжелая (n= 14)	
Клиническая ремиссия	17	3	20
Значительное улучшение	5	4	9
Улучшение	4	5	9
Без эффект-а	-	2	2
Ухудшение-	-	-	-
Всего дете	26	14	40

Данный препарат обладает хорошим терапевтическим эффектом, выраженным противовоспалительным действием; характеризуется высокой клинической эффективностью, системной и местной безопасностью, хорошей переносимостью; патогенетически и клинически обоснован как средство выбора для наружного использования у больных со среднетяжелым и тяжелым течением болезни, позволяет значительно снизить или полностью исключить применение топических кортикостероидов. Все это дает убедительные основания рекомендовать препарат к более широкому использованию в детской дерматологической практике как средство выбора в наружной терапии тяжело протекающих форм ДЭ у детей разных возрастных групп.

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CONTENT AND CRITERIA FOR ASSESSING STUDENTS' NARRATIVE TEXT WRITING SKILLS

Abstract. *This article explores the content, criteria, and methodological foundations for assessing students' narrative text writing skills. The process of text creation is interpreted as a complex speech activity that occurs through the integration of pedagogical, psycholinguistic, and linguistic factors. The study substantiates the importance of considering international experience, principles of formative assessment, and students' individual cognitive abilities when evaluating narrative texts. Additionally, a system of criteria for assessing narrative texts is proposed, based on components such as content and logical coherence, organizational and technical structure, vocabulary richness, and grammatical accuracy. It is explained that these criteria not only ensure objectivity and transparency in the assessment process but also contribute to the development of students' written communication skills.*

Keywords: *narrative text, written speech, text creation skills, assessment criteria, formative assessment, communicative competence, vocabulary richness, grammatical accuracy, logical coherence, writing strategies, cognitive development, teaching methodology.*

Assessment is one of the most important stages in the process of forming and developing educational objectives. The issue of evaluating speech activity has been widely studied within the fields of pedagogy, psycholinguistics, and text linguistics. In particular, when assessing text creation, it is not sufficient to consider it only as a pedagogical or linguistic phenomenon. This is because text production is a complex process that embodies psychophysiological, cognitive, and socio-cultural factors. Therefore, taking a number of principles into account when assessing this skill determines the correctness, effectiveness, and purposefulness of the process.

From a pedagogical point of view, it can be said that the level of difficulty of the tasks assigned is important in assessing students' text creation skills. In other words, during the process of text creation, the student should gradually move from simple tasks to more complex ones. According to Lev Vygotsky, in order to

move from their current level to the next stage, a learner always requires social and pedagogical support. Adhering to this principle in text creation ensures consistency in the development of students' speech skills. From a psychological perspective, it also has a positive effect in reducing students' fear and internal anxiety related to text production. This principle can be implemented in practice by first encouraging students to construct simple sentences, express ideas based on clear instructions, and use supportive tools (such as pictures, completing partially given texts, or providing a writing outline/map).

When discussing the pedagogical and psychological factors in assessing narrative text creation, it is important to emphasize the unique nature of this process—namely, that each text reflects the author's individual style and spirit, and that students are valued for their ability to express their personal attitude and emotional tone in the text. In today's era of artificial intelligence, it is also important to take into account its involvement in the text creation process. Therefore, it is essential that a text is written not by a “robot,” but by a “person” capable of expressing emotions. This, in turn, requires the assessor to remain constantly attentive, to be able to determine the real state of a student's cognitive abilities, and to anticipate their existing skills. To prevent such issues, the Oxford system often employs the concept of Holistic scoring. In this approach, the evaluator does not assess the text in separate parts, but rather evaluates it based on the overall impression (for example, whether the text has an impact on the reader). By considering this approach, it becomes possible to focus not only on the informative function of a narrative text but also on its other functions, and to teach students what requirements a text should meet in order to provide a sense of reading enjoyment.

International research also supports focusing on staged processes when assessing narrative text writing skills. In particular, according to studies by writing instruction specialist Deborah Dean, the main emphasis in organizing writing lessons should be placed not on the final product (such as a creative composition, story, or narrative text), but on the process itself. In her research, she refers to this process as the “umbrella framework.”

This approach is aimed at helping students consciously master each stage of writing, and its successful implementation largely depends on timely encouragement of learners. D. Dean's main idea is to teach students not just the act of writing, but writing strategies. This approach helps students not only achieve good results in school subjects but also develop effective writing skills for lifelong use. Therefore, the writing process of students should include purposeful and conscious actions. These are reflected in the following:

1. Organizing regular revision during the writing process.

It is very important to pay special attention to critically analyzing the completed text, editing it, and preparing it for presentation.

2. Conducting short seminars during lessons.

This involves emphasizing that students are equal participants in the seminar and collaboratively developing various writing strategies. In this case, the

teacher's main task is to take into account each student's individual abilities and recommend appropriate writing techniques.

3. Assessing through written work rather than tests.

According to the author, tests negatively affect the development of students' creative abilities, whereas written assignments allow students to express personal attitudes and apply writing strategies in practice.

The purpose of assessment should not be limited to determining a student's knowledge, skills, and competencies; rather, it should also be used as a tool for student development. On the one hand, this allows for tracking the stages of development of a student's specific skills, and on the other hand, it serves as a guide for identifying existing shortcomings, working on them, and eliminating them. The use of formative assessment systems, which are widely implemented in practice today, is directly related to this goal. Paul Black and Dylan Wiliam demonstrated that formative assessment has a positive impact on students' active learning and skill development. By continuously analyzing the process, students can identify their mistakes not only at the end of a term but during the learning process itself. This, in turn, helps teachers make informed decisions regarding their instructional methods and strategies. It is also recommended to maintain a set of indicators (a rubric or checklist) when developing narrative texts. Presenting and jointly analyzing these indicators with students increases effectiveness.

Another important factor in assessing speech skills related to text creation is considering the integration of skills. When students begin writing a text, they do not merely demonstrate their knowledge of grammar and spelling rules. The process also requires expressing ideas and thoughts, ensuring their coherence and logical connection, and paying attention to both the technical and content-related aspects of text creation. In international practice, the assessment of speech skills in text creation is generally based on the following four main aspects:

1. Relevance to the topic and cognitive aspect.

This criterion evaluates how well the text corresponds to the topic and its logical coherence. It focuses on whether the written text includes an introduction, development of events, climax, and resolution, as well as how effectively the inner world and emotions of the characters are revealed. It also considers the author's cognitive ability, particularly their capacity to use creativity (an individual style) in retelling events.

2. Organizational and technical aspects of the text.

This involves the ability to divide the text into parts, structure each part according to its intended purpose, and ensure coherence and connection between the parts.

3. Vocabulary richness.

The author's word choice and vocabulary range are among the most important skills in text creation. This is considered a key factor underlying all writing skills. Whether the author aims to express ideas creatively, ensure coherence, or establish connections between parts of the text, all of these require the selection of appropriate words and lexical units. Assessing this skill also aims

to develop students' sensitivity to word choice, stylistic adaptability, and expressive power.

4. Grammatical accuracy and style.

This criterion goes beyond simply knowing grammatical rules; it includes the ability to apply them appropriately according to the context, use simple, compound, and complex sentences effectively, and employ punctuation purposefully.

Based on the conducted research and analysis, it is recommended to develop the assessment criteria for narrative text creation as follows:

5 ball	4 ball	3 ball	2 ball	1 ball
Matnning mazmuni va mantiqiy izchillik				
Voqealar o'ta izchil, mantiqiy bog'liqlikda bayon etilgan. Joy, vaqt va qahramon portreti mahorat bilan ta'riflangan. Muallifning o'ziga xos ifoda uslubi yaqqol seziladi. Shaxsiy tajriba yoki xotiralar voqealar rivojiga tabiiy singdirilgan.	Voqealar bayoni izchil. Joy, vaqt va qahramon ta'rifida aniqlik bor. Muallifning shaxsiy munosabati seziladi, xotira yoki tajribalar keltirilgan, biroq ifoda uslubida ayrim takrorlar yoki bir xillik kuzatilishi mumkin.	Voqealar izchilligi qisman saqlangan. Joy yoki qahramon haqida umumiy tasavvur berilgan, lekin batafsil ta'rif berilmagan. Shaxsiy tajribalar haqida so'z yuritilgan bo'lsa-da, ularning asosiy mazmun bilan bog'liqligi to'la ta'minlanmagan.	Voqealar bayonida mantiqiy uzilishlar bor. Qahramon, joy yoki vaziyat tasviri deyarli mavjud emas. Muallifning shaxsiy munosabati sezilmaydi.	Matn mazmuni tushunarsiz, voqealar o'rtasida mantiqiy bog'liqlik yo'q. Ba'zi o'rinlarda asosiy voqeadan chetlashish holati uchraydi.
Matnning tashkiliy-texnik tuzilishi				
Matnning barcha qismlari (kirish, asosiy qism va xulosa) mavjud va mantiqan bir-birini to'ldiradi. Abzatslar o'rtasidagi bog'liqlik ta'minlangan, kompozitsion yaxlitlikka erishilgan.	Matnning barcha qismlari (kirish, asosiy qism, xulosa) bor, ammo ular o'rtasidagi mantiqiy bog'liqlik ba'zi o'rinlarda buzilgan yoki tegishli vositalar (bog'lovchilar, ko'makchili qurilmalar) to'g'ri tanlangan.	Matnning ayrim qismlari mavjud. Voqealar rivoji bayon qilingan, lekin qismlar o'rtasidagi bog'liqlik ta'minlanmagan.	Matn qismlarga ajratilmagan, voqealar rivojida mantiqiy izchillik sezilmaydi.	Matn qismlarga ajratilmagan, fikrlar uzuq-yuluq, matn yaxlit kompozitsion yaxlitlikka ega emas.
Lug'at boyligi				
So'zlar aniq va o'rinli tanlangan. Matnda sifatlashlar (masalan, zumrad bahor), o'xshatishlar va ko'chma ma'nodagi so'zlardan foydalanilgan. Takrorlardan qochish maqsadida sinonimlardan unumli foydalanilgan.	Hikoya mazmuniga mos so'zlar tanlangan. Matnda kamida 2-3 ta badiiy tasvir vositasi (sifatlash/o'xshatish) mavjud. So'z takrorlari deyarli uchramaydi.	Kundalik hayotda ko'p ishlatiladigan (so'zlashuv uslubiga xos) so'zlardan foydalanilgan. Badiiy tasvir vositalari deyarli yo'q. Matnda "dedi", "bordi", "keldi" kabi harakatni bildiruvchi so'zlarning	So'z boyligi juda kam. Fikrni ifodalashda bir xil so'zlardan ko'p foydalanilgan. So'zlar ma'no jihatdan noto'g'ri qo'llangan o'rinlar ham mavjud.	So'zlar o'zaro bog'lanmagan, gaplar mantiqsiz. o'quvchi mavzuni yoritish uchun kerakli so'zlardan foydalana olmagan. Matn mazmuni

In conclusion, it can be stated that the process of assessing narrative text writing skills is not merely a

means of determining existing knowledge, skills, and competencies, but a complex process that serves to define and manage the quality of education and to support the development of the student's personality. Therefore, for this process to meet these objectives, it is recommended that it be organized with consideration of the following aspects:

- when assessing narrative texts, use an integrated approach that includes components such as text content, organizational and technical structure, vocabulary richness, and grammatical and punctuation norms;
- make assessment an integral part of the learning process in order to correct students' mistakes in a timely manner and to develop their self-assessment and analytical skills;
- focus not on the final product, but on the conscious mastery of writing strategies, with the aim of enabling students to develop effective written communication skills for their future lives;
- take into account each student's cognitive abilities and individual pace of development, and recognize that the use of digital tools can help ensure fairness in assessment and increase students' motivation for learning.

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ИЗУЧЕНИЕ ПРОВОДНИКОВ В ЭЛЕКТРИЧЕСКОМ ПОЛЕ

Аннотация: В работе рассматриваются физические свойства проводников и особенности их поведения в электрическом поле. Раскрывается природа свободных зарядов в проводниках, механизм их перераспределения под действием внешнего электрического поля и установление электростатического равновесия, при котором напряжённость поля внутри проводника становится равной нулю, а избыточный заряд сосредотачивается на его поверхности.

Приводится классификация проводников на проводники первого рода (металлы) и второго рода (электролиты), а также даётся общее деление веществ по их поведению в электрическом поле на проводники, полупроводники и диэлектрики.

Ключевые слова: проводники, электрическое поле, свободные заряды, электроны, ионы, электролиты, перераспределение зарядов, электростатическое равновесие, напряжённость электрического поля, поверхностный заряд.

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STUDY OF CONDUCTORS IN AN ELECTRIC FIELD

Abstract: The work examines the physical properties of conductors and the features of their behavior in an electric field. It reveals the nature of free charges in conductors, the mechanism of their redistribution under the influence of an external electric field, and the establishment of electrostatic equilibrium, in which the field intensity inside the conductor becomes zero, and the excess charge concentrates on its surface. A classification of conductors into first-kind conductors (metals) and second-kind conductors (electrolytes) is provided, as well as a general division of substances according to their behavior in an electric field into conductors, semiconductors, and dielectrics.

Keywords: *conductors, electric field, free charges, electrons, ions, electrolytes, redistribution of charges, electrostatic equilibrium, electric field intensity, surface charge.*

Проводники играют фундаментальную роль в изучении электрических явлений и в практическом применении электричества. Под проводниками понимаются вещества, содержащие свободные заряды (чаще всего электроны), которые способны свободно перемещаться под действием электрического поля. К таким веществам относятся прежде всего металлы, а также растворы и расплавы электролитов.

При помещении проводника во внешнее электрическое поле происходит перераспределение свободных зарядов: отрицательные заряды смещаются против направления поля, положительные — по направлению поля. В результате этого внутри проводника устанавливается такое распределение зарядов, при котором напряжённость электрического поля внутри него становится равной нулю. Это означает, что в состоянии электростатического равновесия электрическое поле внутри проводника отсутствует, а весь избыточный заряд располагается на его поверхности.

Изучение поведения проводников в электрическом поле имеет большое значение для понимания таких явлений, как электростатическая индукция, электрическая ёмкость, работа конденсаторов, экранирование электрических полей. Эти принципы широко применяются в электронике, энергетике, радиотехнике и других областях техники.

Таким образом, исследование проводников в электрическом поле позволяет глубже понять природу электрических взаимодействий и лежит в основе многих современных технологий.

С точки зрения поведения тел в электрическом поле их можно подразделить на проводники, полупроводники и диэлектрики (изоляторы).

Существуют два рода проводников. К проводникам первого рода (твёрдые проводники) относятся все металлы и их сплавы. Перемещающимися в них зарядами являются свободные электроны; перемещение не вызывает химических изменений в этих проводниках.

К проводникам второго рода (жидкие проводники) относятся электролиты (растворы солей, кислот и щелочей), в которых перемещаются положительные и отрицательные ионы, что ведёт к химическим изменениям в самих проводниках.

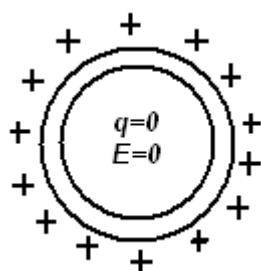
Таким образом, проводниками называются тела, в которых заряженные частицы (электроны или ионы) способны перемещаться под действием сколь угодно слабого электрического поля.

Если проводник зарядить одноимёнными зарядами, то под действием сил отталкивания заряды будут расходиться в проводнике на наибольшее расстояние, т.е. их движение будет продолжаться до тех пор, пока они не достигнут внешней поверхности проводника. Следовательно, одноимённые заряды располагаются на внешней поверхности проводника.

Пусть имеем сплошной или полный заряженный проводник. Применим теорему Остроградского-Гаусса к внутренней области проводника. Можно сделать вывод, что поток напряжённости через любую замкнутую поверхность, проведённую внутри заряженного проводника, будет равен нулю, т.к. внутри проводника нет зарядов. Значит напряжённость поля E равна нулю, т.е. внутри заряженного проводника нет электрического поля. Из формулы $E = -\frac{d\varphi}{dn}$ следует, что если $E = 0$, то и $\frac{d\varphi}{dn} = 0$, а значит и $d\varphi = 0$.

Это может быть только при условии, что $\varphi = const$.

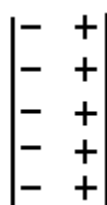
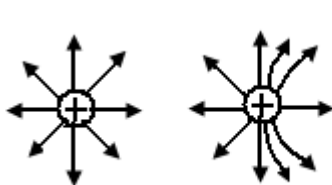
Все точки заряженного проводника имеют одинаковые потенциалы, а



так как потенциалы всех точек проводника одинаковы, то заряды на этом проводнике будут находиться в равновесии. В электрическом поле поверхность проводника становится эквипотенциальной поверхностью. Поэтому всякий проводник, внесённый в электрическое поле деформирует силовые линии этого поля таким образом, что они становятся

перпендикулярными его поверхности. На рис. а показано поле уединённого электрического заряда, на рис. б) поле положительного заряда вблизи проводника. Под действием внешнего поля в проводнике начинается движение зарядов: электроны противоположно силовым линиям поля. Поэтому поверхность проводника, к которой подходят силовые линии, заряжается отрицательно, а противоположная положительно. Такое зарядение проводника называется зарядением через влияние или зарядением по индукции.

В результате зарядения по индукции внутри проводника создаётся собственное поле E_c , напряжённость которого по величине равна напряжённости внешнего поля, а по направлению ей противоположна. Таким образом, напряжённость собственного поля проводника компенсирует напряжённость внешнего поля E_+ и результирующая напряжённость поля



внутри заряженного проводника оказывается равной нулю, т.е. $E_+ + E_c + E = 0$. Это явление используется для так называемой электростатической защиты. Приборы, работа которых нарушается под действием электрического поля, помещаются внутрь

металлической полости, куда не может проникнуть внешнее электрическое поле. При наличии внешнего поля, его силовые линии заканчиваются на одной стороне полости и начинаются с противоположной.

В ходе рассмотрения свойств проводников в электрическом поле было установлено, что их поведение определяется наличием свободных заряженных частиц — электронов в металлах и ионов в электролитах.

Именно способность этих частиц свободно перемещаться под действием даже слабого электрического поля отличает проводники от полупроводников и диэлектриков.

Анализ процессов, происходящих в проводнике, показал, что при внесении его во внешнее электрическое поле происходит перераспределение зарядов, в результате которого внутри проводника устанавливается электростатическое равновесие. Напряжённость электрического поля внутри проводника становится равной нулю, а избыточный заряд располагается исключительно на его внешней поверхности. Все точки проводника при этом имеют одинаковый потенциал, и его поверхность является эквипотенциальной.

Применение теоремы Остроградского–Гаусса подтверждает отсутствие электрического поля внутри заряженного проводника, так как поток вектора напряжённости через любую замкнутую поверхность внутри него равен нулю. Явление электростатической индукции демонстрирует, что под действием внешнего поля в проводнике возникает собственное поле, компенсирующее внешнее, что приводит к полному отсутствию результирующего поля внутри проводника. Это свойство лежит в основе электростатической защиты и экранирования.

Таким образом, изучение поведения проводников в электрическом поле позволяет глубже понять фундаментальные законы электростатики и объясняет принципы работы многих технических устройств. Рассмотренные закономерности имеют важное теоретическое и практическое значение и широко применяются в современной науке и технике.

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ПРОБЛЕМЫ КВАЛИФИКАЦИИ ГРАБЕЖА В СОВРЕМЕННОЙ ПРАВОПРИМЕНИТЕЛЬНОЙ ПРАКТИКЕ РОССИИ

Аннотация: Статья посвящена анализу актуальных проблем квалификации грабежа по ст. 161 УК РФ в современной судебной практике России. Рассматриваются вопросы определения открытости хищения, момента окончания преступления, отграничения от смежных составов (кражи, разбоя, вымогательства, самоуправства, мошенничества), а также применения квалифицирующих признаков. Выявлены системные сложности правоприменения. Предлагаются рекомендации по унификации практики и совершенствованию квалификационных подходов.

Ключевые слова: грабеж, квалификация преступления, открытое хищение, разбой, квалифицирующие признаки

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PROBLEMS OF ROBBERY QUALIFICATION IN MODERN RUSSIAN LAW ENFORCEMENT PRACTICE

Abstract: The article analyzes current issues in qualifying robbery under Article 161 of the Criminal Code of the Russian Federation in contemporary Russian judicial practice. It examines the determination of open appropriation, the moment of crime completion, differentiation from related offenses (theft, armed robbery, extortion, arbitrary actions, fraud), and the application of aggravating circumstances. Systemic difficulties in law enforcement are identified. Recommendations are proposed for unifying practice and improving qualification approaches.

Keywords: robbery, crime qualification, open appropriation, armed robbery, aggravating circumstances.

Грабеж, предусмотренный ст. 161 УК РФ, остается одной из наиболее обсуждаемых форм хищения в уголовно-правовой доктрине и практике благодаря сложности объективных и субъективных признаков состава.

Центральной проблемой квалификации основного состава является определение открытости изъятия имущества, носящее субъективно-объективный характер. А.Х. Кагирова и З.А. Магомедова [8] убедительно аргументируют, что при противоречии между объективными обстоятельствами и субъективным восприятием виновного приоритет следует отдавать субъективным критериям, поскольку они отражают убеждение лица в открытом способе совершения хищения.

Значительные затруднения возникают при отграничении грабежа от кражи, особенно в ситуациях перерастания тайного хищения в открытое. Ю.А. Власов [3] и Е.В. Пунтусова [12] подчеркивают ключевую роль момента осознания виновным открытого характера действий для правильной переквалификации. Постановление Пленума Верховного Суда РФ от 27.12.2002 № 29 разъясняет, что открытым признается хищение, совершаемое в присутствии лиц, способных понимать противоправность, при осознании этого виновным [11].

Особую сложность представляет оценка открытости в присутствии лиц, неспособных адекватно воспринимать происходящее (малолетние, лица в состоянии опьянения или сна). Е.А. Ибраева [6] акцентирует внимание на пограничном состоянии уличных хищений, требующем комплексного учета обстоятельств. Момент окончания грабежа, определяемый реальной возможностью распоряжаться имуществом, вызывает споры в случаях «рывка» и групповых действий (В.В. Хилюта [14]).

Субъективная сторона, включая направленность умысла на открытое хищение, часто приводит к ошибкам квалификации (Л.В. Глазкова [4]). Ошибки относительно объекта посягательства (принадлежность имущества, его стоимость) не влияют на состав, если имущество чужое для виновного (Л.А. Исаева, О.В. Григорьева [7]).

Цифровизация имущественных отношений создает новые вызовы. Э.Л. Сидоренко [13] и Е.Н. Шевченко [16] анализируют квалификацию открытого хищения безналичных средств, банковских карт и криптовалюты, отмечая необходимость определения момента окончания преступления и переосмысления предмета хищения в условиях нематериальных активов.

Отграничение грабежа от разбоя строится на характере насилия: не опасного для жизни или здоровья при грабеже против опасного при разбое. А.В. Анянова [1] и М.И. Морозов [10] выделяют оценочный характер критерия, приводящий к неоднородности практики в пограничных случаях. Отграничение от вымогательства зависит от способа воздействия: самостоятельное изъятие при грабеже против принуждения к передаче (А.Ю. Асеев, Е.И. Чекмезова [2]). Разграничение с самоуправством проводится по наличию корыстной цели и осознанию неправомерности, а с мошенничеством – по открытому характеру против обмана.

Квалифицированные составы усложняют задачу установлением группы по предварительному сговору, незаконного проникновения, крупного размера или организованной группы (М.Г. Жилкин, В.В. Качалов [5], Н.В.

Кондраткова [9]). Насилие не опасное для жизни требует четкого разграничения с разбоем (Е.И. Чекмезова [15]).

Для преодоления выявленных проблем необходим комплексный подход. Во-первых, рекомендуется разработка дополнительных разъяснений Пленума Верховного Суда РФ по критериям открытости хищения, с акцентом на приоритет субъективного восприятия виновного и динамику изменения умысла в процессе совершения преступления. Во-вторых, целесообразно создание методических рекомендаций для следователей и судей по оценке момента окончания грабежа в различных формах (рывок, групповые действия, использование технических средств), включая алгоритмы установления реальной возможности распоряжения имуществом. В-третьих, в условиях цифровизации предлагается законодательное уточнение предмета хищения с включением безналичных средств и цифровых активов, а также разработка специальных руководств по квалификации их открытого изъятия. В-четвертых, для унификации отграничения от смежных составов (особенно разбоя и вымогательства) необходимы типовые модели анализа характера насилия и способа воздействия, с обязательным использованием судебно-медицинской экспертизы в спорных случаях. В-пятых, при применении квалифицирующих признаков рекомендуется усилить контроль за доказыванием предварительного сговора и устойчивости организованной группы через введение единых стандартов.

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СОВРЕМЕННЫЕ ВИДЫ ТЕРРОРИЗМА И БОРЬБА С ИХ РАСПРОСТРАНЕНИЕМ

***Аннотация.** В статье исследуются современные виды терроризма и тенденции их развития в условиях глобализации. Рассматриваются международный, религиозный, политический, кибер- и информационный терроризм. Обосновывается необходимость комплексного подхода к противодействию.*

***Ключевые слова:** терроризм, экстремизм, кибертерроризм, международная безопасность, профилактика радикализации.*

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MODERN TYPES OF TERRORISM AND COUNTERMEASURES

***Abstract.** The article examines modern types of terrorism and their development trends in the context of globalization. International, religious, political, cyber and information terrorism are analyzed. The need for a comprehensive counter-terrorism approach is substantiated.*

***Key words:** terrorism, extremism, cyberterrorism, international security, prevention of radicalization.*

Введение

Терроризм в XXI веке представляет собой одну из наиболее опасных форм противоправной деятельности. В соответствии с Федеральным законом №35-ФЗ «О противодействии терроризму» [1, с. 23], терроризм определяется как идеология насилия и практика воздействия на органы государственной власти.

Международный терроризм характеризуется транснациональной структурой и координацией действий в различных странах [3, с. 23].

Религиозный терроризм основывается на радикальной интерпретации религиозных догматов и активной пропаганде через интернет-пространство.

Кибертерроризм включает атаки на объекты критической инфраструктуры и государственные информационные ресурсы.

Заключение. Борьба с терроризмом требует комплексного подхода, включающего правовые, организационные и профилактические меры.

В соответствии с Федеральным законом Российской Федерации от 06.03.2006 № 35-ФЗ «О противодействии терроризму» [1, с. 23], терроризм определяется как идеология насилия и практика воздействия на органы государственной власти или международные организации путем устрашения населения. Уголовная ответственность за террористическую деятельность предусмотрена Уголовным кодексом Российской Федерации [2, с. 23].

Международный терроризм

Международный терроризм характеризуется транснациональной структурой и координацией действий в различных странах. Он представляет угрозу мировой безопасности, поскольку связан с незаконным оборотом оружия, наркотрафиком и финансированием через международные каналы. Международное сотрудничество в сфере противодействия терроризму осуществляется в рамках Конвенции Совета Европы о предупреждении терроризма 2005 года [3, с. 23], а также иных соглашений.

Религиозный терроризм

Религиозный терроризм основывается на радикальной интерпретации религиозных догматов. Идеологи подобных организаций используют религиозную риторику для оправдания насилия и привлечения новых сторонников. Особую опасность представляет вовлечение молодежи через интернет-пространство.

Политический терроризм

Политический терроризм направлен на изменение государственного строя или оказание давления на органы власти. Он сопровождается демонстративными актами насилия, рассчитанными на широкий общественный резонанс. Данный вид терроризма оказывает дестабилизирующее воздействие на политическую систему.

Кибертерроризм

Кибертерроризм является одной из наиболее опасных современных форм террористической активности. Он включает атаки на объекты критической инфраструктуры, банковские системы, государственные

информационные ресурсы. Развитие цифровых технологий повышает уязвимость государств перед подобными угрозами.

Информационный терроризм

Информационный терроризм реализуется через распространение дезинформации, панических слухов и экстремистских материалов в сети Интернет. Он направлен на формирование социальной напряженности и подрыв доверия к государственным институтам.

Причины распространения терроризма

Среди ключевых факторов распространения терроризма можно выделить социально-экономическое неравенство, безработицу, политическую нестабильность, межэтнические конфликты и недостаточный уровень правовой культуры [4, с. 23]. Существенную роль играет активная пропаганда радикальных идей через интернет-платформы.

Меры противодействия терроризму

Комплекс мер по борьбе с терроризмом включает совершенствование законодательства, деятельность правоохранительных органов, международное сотрудничество, профилактику экстремизма и развитие информационной безопасности. Стратегия национальной безопасности Российской Федерации подчеркивает приоритетность противодействия террористическим угрозам [7, с. 23].

Особое значение имеет профилактическая работа в образовательных учреждениях. Формирование устойчивых нравственных ценностей, гражданской ответственности и критического мышления способствует снижению риска вовлечения молодежи в террористическую деятельность.

Заключение

Таким образом, современные виды терроризма отличаются высокой степенью адаптивности к новым социальным условиям. Борьба с их распространением требует комплексного подхода, включающего правовые, организационные, социальные и информационные меры. В системе безопасности жизнедеятельности ключевую роль играет профилактика радикализации и формирование устойчивого неприятия насилия в обществе.

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КИБЕРБЕЗОПАСНОСТЬ В СОВРЕМЕННОМ МИРЕ: ОСНОВНЫЕ УГРОЗЫ И ПУТИ ИХ ПРЕДОТВРАЩЕНИЯ

***Аннотация.** В статье рассматриваются актуальные проблемы обеспечения кибербезопасности в современном информационном обществе. Анализируются основные виды киберугроз, особенности их распространения и последствия для государства, организаций и отдельных пользователей. Особое внимание уделяется мерам профилактики киберпреступлений и формированию культуры информационной безопасности.*

***Ключевые слова:** кибербезопасность, информационная безопасность, киберугрозы, киберпреступность, защита информации.*

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CYBER SECURITY IN THE MODERN WORLD: MAIN THREATS AND WAYS TO PREVENT THEM

***Abstract:** The article examines current issues of ensuring cybersecurity in the modern information society. The main types of cyber threats, the specifics of their spread, and the consequences for the state, organizations, and individual*

users are analyzed. Particular attention is paid to measures for preventing cybercrime and fostering a culture of information security.

Keywords: *cybersecurity, information security, cyber threats, cybercrime, information protection.*

Современное общество характеризуется стремительным развитием информационных технологий. Цифровизация практически всех сфер деятельности человека привела к значительному увеличению объема информации, циркулирующей в глобальных сетях. Вместе с тем развитие информационного пространства сопровождается ростом различных угроз безопасности данных и информационных систем.

Проблема обеспечения кибербезопасности становится одной из ключевых задач как для отдельных государств, так и для международного сообщества в целом. По мнению исследователей, рост числа кибератак связан с увеличением количества пользователей сети Интернет и расширением цифровой инфраструктуры [1, с. 15].

В настоящее время киберпреступность представляет собой сложное социально-техническое явление, которое затрагивает экономические, политические и социальные процессы. В этой связи особую актуальность приобретает анализ основных угроз в киберпространстве и разработка эффективных механизмов противодействия им [2, с. 37].

Одной из наиболее распространенных угроз являются вредоносные программы. К данной категории относятся вирусы, трояны, шпионские программы и другие типы вредоносного программного обеспечения, которые предназначены для получения несанкционированного доступа к данным или нарушения работы информационных систем.

Не менее опасной угрозой является фишинг. Данный метод предполагает получение конфиденциальной информации пользователей посредством поддельных сайтов или электронных писем. Исследования показывают, что значительная часть успешных кибератак осуществляется именно благодаря социальной инженерии [3, с. 52].

Еще одной серьезной проблемой являются атаки типа «отказ в обслуживании» (DDoS). Они направлены на перегрузку серверов большим количеством запросов, что приводит к невозможности нормальной работы веб-ресурсов. Такие атаки могут нанести значительный экономический ущерб организациям и государственным структурам [4, с. 61].

В условиях цифровой трансформации государственные структуры также сталкиваются с угрозами в киберпространстве. Информационные системы органов власти, банковских организаций и крупных предприятий становятся объектами целенаправленных кибератак.

Особую опасность представляют атаки на критическую информационную инфраструктуру. Нарушение работы таких систем может

привести к серьезным последствиям для функционирования экономики и безопасности государства [5, с. 74].

Кроме того, распространение киберпреступности оказывает влияние на социальную сферу. Утечка персональных данных, мошенничество в сети Интернет и распространение вредоносного контента формируют новые риски для пользователей информационных технологий [2, с. 89].

Для эффективного противодействия киберугрозам необходимо применение комплексного подхода. Он включает технические, организационные и образовательные меры.

К техническим мерам относятся использование антивирусных программ, систем обнаружения вторжений, шифрование данных и регулярное обновление программного обеспечения. Данные методы позволяют значительно снизить вероятность успешной атаки на информационные системы [3, с. 101].

Организационные меры предполагают разработку политики информационной безопасности, регламентацию доступа к данным и контроль за использованием информационных ресурсов.

Важную роль также играет повышение квалификации специалистов в области кибербезопасности.

Не менее значимым направлением является формирование культуры безопасного поведения в сети Интернет. Пользователи должны обладать базовыми знаниями о возможных угрозах и способах защиты персональной информации [1, с. 122].

Таким образом, кибербезопасность является важнейшим элементом функционирования современного информационного общества. Рост числа киберугроз требует постоянного совершенствования методов защиты информации и разработки новых механизмов противодействия киберпреступности.

Эффективная система обеспечения кибербезопасности должна включать взаимодействие государства, организаций и пользователей информационных технологий. Только комплексный подход позволит снизить уровень рисков и обеспечить устойчивое развитие цифровой среды [4, с. 140].

Для эффективного противодействия подобным угрозам критически важно не только постоянно совершенствовать системы безопасности, но и активно отслеживать любую подозрительную активность в сети, обучать население основам кибербезопасности, а также налаживать партнерские отношения с другими государствами.

Такие меры позволят надежно защитить конфиденциальные данные и ключевые ресурсы от возможных атак как существующих, так и потенциальных угроз. Киберпреступность, включая атаки на государственные системы и частный бизнес, несет в себе риск серьезных экономических потерь и может спровоцировать социальные и политические кризисы.

Для эффективного решения подобных задач необходимо, чтобы государственные органы располагали всеми необходимыми ресурсами и полномочиями. Создание мер по предотвращению будущих инцидентов и наказание за совершенные преступления являются ключевыми задачами государства. Кроме того, для обеспечения защиты критически важных информационных ресурсов госорганы должны активно внедрять технологии мониторинга интернет-трафика, выявления аномалий в поведении сети и оперативного реагирования на обнаруженные угрозы.

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ТЕРРОРИЗМ В СОВРЕМЕННОМ ОБЩЕСТВЕ

Аннотация: В статье представлен комплексный анализ терроризма как глобальной угрозы современному обществу. Рассматриваются исторические предпосылки формирования террористических движений, социально-экономические, политические и идеологические факторы радикализации личности. Исследуются современные формы террористической активности, особенности международного и кибертерроризма, а также механизмы правового и организационного противодействия. Особое внимание уделяется профилактике экстремизма и роли образовательных институтов в предупреждении радикализации.

Ключевые слова: терроризм, экстремизм, радикализация, национальная безопасность, международный терроризм, кибертерроризм, профилактика.

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TERRORISM IN MODERN SOCIETY

Abstract: *The article provides a comprehensive analysis of terrorism as a global threat to modern society. It examines historical prerequisites, socio-economic and ideological factors of radicalization, modern forms of terrorist activity and legal counteraction mechanisms. Special attention is paid to prevention strategies and the role of education in countering extremism.*

Key words: *terrorism, extremism, radicalization, national security, international terrorism, cyberterrorism, prevention.*

Терроризм в современном мире является одной из наиболее серьезных угроз международной и национальной безопасности. Его сущность заключается в систематическом применении насилия либо угрозы его применения в целях достижения политических, идеологических или религиозных задач. В научной литературе подчеркивается, что ключевой характеристикой терроризма является создание атмосферы страха и психологического давления на общество [1, с. 44].

Историческое развитие терроризма демонстрирует его трансформацию от локальных форм политического насилия к глобальным сетевым структурам. В XIX веке террористические акты чаще носили индивидуальный характер и были направлены против конкретных политических фигур. В XX веке терроризм приобрел организованные формы, а в XXI столетии стал частью международных гибридных конфликтов [2, с. 113].

Социально-экономические причины распространения терроризма связаны с неравномерностью развития государств, ростом безработицы, социальной изоляцией и кризисом идентичности. Отсутствие эффективных механизмов социальной мобильности формирует среду, в которой экстремистская идеология находит благоприятную почву [3, с. 61].

Политическая нестабильность также способствует росту террористической активности. Ослабление государственных институтов, коррупция и снижение доверия к власти создают условия для радикальных движений. Террористические организации используют подобные кризисы для расширения влияния и вербовки новых участников.

Идеологическая составляющая терроризма выражается в использовании религиозных, националистических либо псевдореволюционных доктрин. Пропаганда распространяется через цифровые платформы, что значительно ускоряет процесс радикализации. Особую роль играют социальные сети, где формируются закрытые сообщества с экстремистским контентом.

Международный терроризм характеризуется транснациональной структурой и высокой степенью координации действий. Современные террористические сети используют финансовые инструменты, включая криптовалюты, а также нелегальные каналы перемещения ресурсов [4, с. 90]. Это усложняет выявление и пресечение преступной деятельности.

Отдельное направление составляет кибертерроризм. Атаки на объекты критической инфраструктуры — энергетические системы, банковские сети, транспортные узлы — способны вызвать масштабные социально-экономические последствия. Специалисты отмечают, что цифровая уязвимость становится одним из факторов стратегического риска [5, с. 27].

Правовое регулирование противодействия терроризму в Российской Федерации закреплено в Федеральном законе № 35-ФЗ «О противодействии терроризму» [6]. Документ определяет полномочия государственных органов, порядок проведения контртеррористических операций и меры профилактики.

Международное сотрудничество осуществляется в рамках Организации Объединенных Наций и иных межгосударственных структур. Международные конвенции направлены на борьбу с финансированием терроризма, предотвращение захвата заложников и усиление контроля за трансграничными потоками [7].

Профилактика экстремизма предполагает системную работу в образовательной, культурной и информационной сферах. Формирование правовой культуры и развитие критического мышления позволяют снизить восприимчивость молодежи к радикальной идеологии [8, с. 78].

Экономические последствия террористических актов выражаются в снижении инвестиционной привлекательности регионов, росте бюджетных расходов на безопасность и восстановление инфраструктуры. Кроме того, усиливаются меры контроля, что влияет на экономическую активность населения.

Психологический аспект терроризма связан с воздействием на массовое сознание. Даже единичные акты насилия способны вызвать эффект масштабной паники. Средства массовой информации играют двойственную роль: информируя общество, они одновременно усиливают эмоциональное восприятие угрозы.

Таким образом, терроризм представляет собой комплексное междисциплинарное явление, включающее политические, социальные, экономические и информационные компоненты. Эффективная стратегия противодействия возможна лишь при условии интеграции усилий государства, общества и международного сообщества, совершенствования законодательства и укрепления профилактических механизмов.

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СОВРЕМЕННЫЕ ТЕХНОЛОГИИ УПРАВЛЕНИЯ ОРГАНИЗАЦИЕЙ

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МАРКЕТИНГОВОЕ ИССЛЕДОВАНИЕ СТРАТЕГИИ ЛОКАЛИЗАЦИИ БРЕНДОВ CHERY (XCITE И TENET) НА АВТОМОБИЛЬНОМ РЫНКЕ РОССИИ

Аннотация: в статье представлены результаты анализа стратегии вывода китайским автоконцерном Chery на российский рынок суббрендов Xcite и Tenet. В условиях геополитической неопределенности и санкционного давления Chery адаптирует свою маркетинговую и производственную политику, переходя от прямого импорта к локальной сборке через российские производственные мощности. Исследование фокусируется на сравнении производственных моделей (крупноузловая сборка Xcite на бывшем заводе Nissan в Санкт-Петербурге и полный цикл производства Tenet на бывшем заводе Volkswagen в Калуге) и их влиянии на потребительское восприятие. В работе использованы данные открытых источников, экспертные оценки и сравнительный анализ рыночных показателей. Статья будет полезна маркетологам, специалистам по стратегическому планированию и исследователям международных рынков, изучающим феномен «брендов-масок» в современной автопромышленности.

Ключевые слова: китайский автопром, автомобильный рынок, локализация производства, суббренды, маркетинговая стратегия, промышленная сборка, утильсбор, «бренды-маски».

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MARKETING RESEARCH OF THE DEMAND FOR CHERY AUTOMOBILES IN RUSSIA

Annotation: this article presents the results of a study analyzing the strategy of introducing the Xcite and Tenet sub-brands to the Russian market by the Chinese automaker Chery. Amidst geopolitical uncertainty and sanctions pressure, Chery is adapting its marketing and production policies by shifting from direct imports to local assembly using Russian production facilities. The research

focuses on comparing production models (CKD assembly of Xcite at the former Nissan plant in St. Petersburg vs. full-cycle production of Tenet at the former Volkswagen plant in Kaluga) and their impact on consumer perception. The work utilizes data from open sources, expert assessments, and comparative analysis of market performance indicators. The article will be useful for marketers, strategic planning specialists, and international market researchers studying the phenomenon of "mask brands" in the modern automotive industry.

Keywords: Chinese car industry, automotive market, production localization, sub-brands, marketing strategy, industrial assembly, recycling fee, "mask brands".

Введение

Китайский автоконцерн Chery сегодня является одним из лидеров российского рынка, однако формы его присутствия претерпевают значительную трансформацию. В 2023–2025 годах компания инициировала запуск двух новых брендов, ориентированных исключительно на российского потребителя – Xcite и Tenet. Формально это «российские» марки: Xcite развивается при партнерстве с АвтоВАЗом на бывшем заводе Nissan в Санкт-Петербурге, а Tenet – продукт кооперации холдинга «АГР» (бывшие активы Volkswagen и Hyundai) и китайской компании Defetoo, за которой, по мнению экспертов, стоит именно Chery.

Этот шаг продиктован несколькими факторами: стремлением снизить политические риски (выход Chery на Гонконгскую фондовую биржу требует «чистоты» от вторичных санкций), оптимизацией логистических издержек и желанием получить государственные преференции в виде компенсации утильсбора через специальные инвестиционные контракты (СПИК). Однако успех данной стратегии неочевиден и требует анализа, так как история Xcite демонстрирует провал маркетинговой коммуникации, в то время как Tenet с первых месяцев показывает взрывной рост продаж. В данной статье мы исследуем, как различия в производственных подходах и маркетинговой политике повлияли на востребованность этих суббрендов Chery в России.

Методика исследования и гипотезы

В связи с тем, что бренды Xcite и Tenet являются новыми, традиционное анкетирование потребителей пока затруднительно из-за недостаточной осведомленности респондентов. Поэтому в основу данного исследования легли качественные и аналитические методы:

- Изучение открытой информации о производственных площадках, объемах выпуска и продаж (по данным «Автостата», «Фонтанки», экспертных интервью).
- Сравнительный анализ: сопоставление производственных характеристик моделей Xcite и Tenet.

Ключевая гипотеза исследования заключается в том, что успех или провал суббрендов Chery в России определяется не столько качеством самих

автомобилей (они идентичны оригинальным моделям Tiggo), сколько двумя факторами:

1. Глубиной локализации производства (возможность получения господдержки и ценового маневра).
2. Эффективностью маркетинговой коммуникации (донесение до потребителя ценности бренда помимо простого указания на китайское происхождение).

Результаты исследования: две модели локализации Chery

В ходе исследования были выявлены принципиальные различия в подходах к выводу на рынок суббрендов Xcite и Tenet, которые предопределили их текущую рыночную судьбу.

1. Производственная стратегия: полный цикл против крупноузловой сборки

Основное преимущество Tenet перед Xcite – ставка на полный цикл производства со сваркой и окраской кузова с самого старта производства. На бывшем заводе Volkswagen в Калуге «АГР Холдинг» подписал СПИК с Минпромторгом, что позволяет претендовать на компенсацию утильсбора. В условиях, когда утильсбор на импортные автомобили достигает 800 тысяч рублей, это дает критическое преимущество в ценообразовании.

Xcite, напротив, изначально ориентировался на отверточную (крупноузловую) сборку на мощностях бывшего завода Nissan в Петербурге. Это не позволяло получать те же льготы. Как следствие, Xcite X-Cross 7 (копия Chery Tiggo 7 Pro) не имел очевидного ценового преимущества перед оригиналом, а маркетинговая поддержка была минимальной. Результат – затоваривание складов и продажи, в разы уступающие планируемым.

Таблица 1.
Сравнение производственных и рыночных показателей суббрендов Chery в РФ

Параметр	Xcite (X-Cross 7, X-Cross 8)	Tenet (T4, T7, T8)
Производственная площадка	Бывший завод Nissan, СПб	Бывший завод Volkswagen, Калуга
Технология сборки	Крупноузловая (SKD)	Полный цикл (CKD): сварка, окраска
Наличие СПИКа	Нет	Да (компенсация утильсбора)
Модели-доноры (Chery)	Tiggo 7, Tiggo 8	Tiggo 4, Tiggo 7, Tiggo 8
Маркетинговая стратегия	Пассивная, отсутствие коммуникации	Использование дилерской сети Chery
Рыночный результат	Низкие продажи, складские	Вход в топ-5 продаж РФ в

Параметр	Xcite (X-Cross 7, X-Cross 8)	Tenet (T4, T7, T8)
	запасы, проект "забуксовал"	октябре 2025, обгон оригинального Chery

2. Маркетинговая политика и коммуникация

Анализ показывает, что Chery (и ее российские партнеры) сделали важные выводы из провала Xcite. Проект Tenet изначально получил мощную маркетинговую поддержку через уже существующую инфраструктуру. Продажи Tenet стартовали в автосалонах Chery с двойным брендированием. Это позволило решить главную задачу для нового бренда – обеспечить трафик. Потребитель, приходя за известным ему Chery Tiggo, сталкивался с аналогичным по цене и оснащению Tenet и, что важно, с более "свежей" машиной (более поздней сборки).

Важным маркетинговым преимуществом Tenet T4 стало его включение в государственную программу льготного автокредитования. С 17 октября 2025 года кроссовер Tenet T4 стал доступен для покупки со скидкой по госпрограмме для медицинских работников, педагогов, военнослужащих и членов их семей, а также граждан с инвалидностью. Размер скидки составлял 20% от стоимости автомобиля (и 25% для жителей Дальневосточного федерального округа). Базовая версия MT Line с учетом господдержки стоила менее 1,6 млн рублей, что делало ее крайне привлекательным предложением в своем сегменте. Программа действовала на протяжении осени и зимы 2025 года, однако с января 2026 года Tenet T4 был исключен из списка участников льготного кредитования в связи с повышением требований к уровню локализации производства с 2000 до 2500 баллов. Тем не менее, сам факт участия в госпрограмме в течение нескольких месяцев сыграл важную роль в первоначальном продвижении бренда и формировании его имиджа как "отечественного" продукта.

В случае с Xcite такой синергии не произошло. Продажи велись через дилерскую сеть "Лада", что создавало когнитивный диссонанс у покупателя: автомобиль на базе Chery, но продается там же, где и Vesta. Четкого позиционирования бренда не сложилось. Xcite так и не был включен ни в одну из программ господдержки, что при прочих равных условиях (отсутствие ценового преимущества перед оригинальным Chery) стало дополнительным фактором, сдерживающим продажи.

Эксперты отмечают, что Tenet, в отличие от Xcite, ведет активную коммуникацию с потребителем, делая акцент на "российской прописке", адаптации к местным условиям и доступности благодаря госпрограммам, хотя технически автомобили остаются китайскими.

3. Фактор конкуренции с Geely и другими китайскими брендами

Geely является сильным конкурентом для Chery благодаря ассоциациям с Volvo. Однако новые суббренды Chery решают еще одну важную задачу.

Выводя на рынок Xcite и Tenet, головная компания Chery Holdings оставляет поле для своих более премиальных или специализированных линеек (как Jaecoo, EXEED, Jetour) и одновременно подстраховывается на случай ухудшения политической ситуации. Если бренд Chery столкнется с репутационными или санкционными рисками, его долю на рынке мгновенно закроют "российские" Tenet и Xcite (после исправления ошибок).

Матрица решений для укрепления позиций суббрендов Chery

На основе проведенного анализа можно предложить следующие маркетинговые решения для улучшения позиций суббрендов Chery в России, учитывая как успешный опыт Tenet, так и ошибки Xcite.

Таблица 2.

Матрица стратегических решений для суббрендов Chery в РФ

№	Проблема / Зона роста	Причина	Решение	Формат реализации	Ожидаемый эффект
1	Низкая осведомленность о российском происхождении брендов	Стереотип о "чистом" китайском импорте без адаптации	Массовая кампания "Сделано в России" с акцентом на локализацию	Интеграция в новостные сюжеты о заводе в Калуге, экскурсии на производство для блогеров	Рост лояльности патристически настроенной аудитории
2	Негативный шлейф от провала Xcite	Страх потребителей, что бренд может исчезнуть (как Xcite)	Акцент на гарантийных обязательствах и долгосрочности СПИКа	Прямые заявления топ-менеджмента, публикация стратегии развития на 5 лет	Восстановление доверия, переход покупателей Xcite к Tenet
3	Непонимание разницы между Tenet и оригинальным Chery	Отсутствие четкого позиционирования, каннибализация продаж	Позиционирование Tenet как более "русской" и адаптированной альтернативы	Сравнительные тест-драйвы с акцентом на адаптацию подвески и защиту от коррозии	Формирование четких потребительских сегментов
4	Работа с китайской диаспорой в РФ	Слабая информированность о проектах для	Презентация производственных успехов как примера	Мероприятия в Торговых представительствах, контент	Привлечение дополнительных инвестиций в локализацию

№	Проблема / Зона роста	Причина	Решение	Формат реализации	Ожидаемый эффект
		потенциальных инвесторов	успешного сотрудничеств а	на китайских платформах	

Вывод

Проведенное исследование демонстрирует, что стратегия Chery по выводу на российский рынок суббрендов Xcite и Tenet представляет собой уникальный кейс адаптации международной корпорации к работе в условиях жестких санкционных ограничений и высокой волатильности рынка.

Ключевой вывод заключается в том, что маркетинговый успех данных проектов напрямую зависит от производственной стратегии. Проект Tenet, базирующийся на полноценной локализации со сваркой и окраской кузова (и, как следствие, доступе к господдержке через СПИК), имеет все шансы стать основой российского автопрома, заняв нишу ушедших массовых брендов. Напротив, проект Xcite стал антипримером, подтверждающим, что даже хороший продукт (копия Tiggo) не будет востребован без внятной маркетинговой стратегии и ценовых преимуществ, которые дает глубокая локализация.

Таким образом, эволюция стратегии Chery в России идет по пути от простого импорта через суббренды к полноценному технологическому партнерству, где маркетинг и производство неразрывно связаны. Это позволяет компании не только сохранить долю рынка, но и создать "тыловой" бренд на случай дальнейшего ухудшения внешнеполитической конъюнктуры.

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К ВОПРОСУ О ПРОЦЕССАХ РАЗРАБОТКИ, УТВЕРЖДЕНИЯ И ПЕРЕСМОТРА НОРМ ТРУДА В ОРГАНИЗАЦИЯХ

Аннотация: Особую актуальность приобретает не столько само установление нормативов, сколько регламентированный жизненный цикл их существования – от зарождения идеи до своевременной корректировки. Данная статья делает акцент на то, чтобы показать слаженность процессов разработки, легитимации и регулярного пересмотра норм труда в организациях, а также описывает адекватную систему, способную гибко реагировать на вызовы динамичной бизнес-среды. В статье рассмотрены этапы процесса разработки норм труда в организациях.

Ключевые слова: нормы труда, этапы процесса разработки норм труда, модификация норм труда.

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ON THE PROCESSES OF DEVELOPMENT, APPROVAL AND REVIEW OF LABOR RATES IN ORGANIZATIONS

Abstract: It is not so much the establishment of regulations that is of particular relevance, but rather the regulated life cycle of their existence – from the inception of an idea to timely adjustment. This article focuses on demonstrating the coherence of the processes of developing, legitimizing, and regularly revising labor standards in organizations, as well as describing an adequate system that can flexibly respond to the challenges of a dynamic business environment. The article explores the stages of the process of developing labor standards in organizations.

Key words: labor standards, stages of the labor standards development process, and modification of labor standards.

В современных экономических условиях, основанных на регламентации и нормировании труда в цифровой экономике наиболее актуальным является показ слаженности процессов разработки, легитимации и регулярного пересмотра норм труда в организациях.

Первичный этап процесса разработки норм труда в организациях, именуемый фазой разработки от эмпирических исследований к созданию

цифровых прототипов создания норм труда, сопряжен с глубоким погружением в специфику трудовой операции.

Исторически сложилось, что для сбора первичных данных применяются классические методики хронометража и фотографии рабочего дня, позволяющие зафиксировать фактические затраты времени в рамках конкретного технологического процесса.

Однако в условиях цифровой трансформации этих инструментов становится недостаточно.

Современные организации все чаще прибегают к комплексному анализу, используя системы видеонаблюдения с компьютерным зрением и платформы для сбора больших данных (Big Data). Это позволяет перейти от выборочных замеров к тотальному мониторингу и выявлению скрытых закономерностей.

Например, на современных автоматизированных складах логистических гигантов, таких как «Wildberries», нормы подбора товара формируются алгоритмами, которые анализируют не только время выполнения операции, но и маршрут передвижения сотрудника, эргономику движений и даже сезонные колебания спроса.

Таким образом, разработка нормы эволюционирует от субъективной экспертной оценки к созданию цифрового рабочего места, что значительно повышает объективность исходных данных.

Второй этап процесса разработки норм труда в организациях связан с процедурой утверждения, подразумевающий институционализацию и баланс интересов.

Разработанный нормативный проект не может быть внедрен директивно. Стадия утверждения – это сложный переговорный процесс, в котором участвуют ключевые стейкхолдеры.

Процесс разработки норм труда в организациях базируется на Трудовом кодексе Российской Федерации, в соответствии с которым «локальные нормативные акты, устанавливающие системы нормирования, принимаются работодателем с учетом мнения представительного органа работников» [1, ст. 162].

Данный аспект предполагает, что экономисты по труду и руководители структурных подразделений в своей практической деятельности должны не просто представить расчеты, но и аргументировать их перед профсоюзным комитетом.

Данный подход выступает в качестве защитного механизма от произвола и завышения планов.

Роль высшего руководства на этапе процесса разработки норм труда в организациях сводится к тому, что топ-менеджеры должны выступать в качестве арбитров, обеспечивающих соответствие норм стратегическим целям компании, определяющим:

- рост производительности труда,
- снижение себестоимости,

- экономическое обоснование.

Окончательное закрепление норм труда в организации происходит через издание приказа или положения, с которым каждый сотрудник знакомится под личную подпись.

Данная процедура придёт статус законности нормам труда в организации, переводя ее из разряда рекомендаций в категорию обязательного для исполнения организационного стандарта.

Следующий, третий, этап процесса разработки норм труда в организациях направлен на принципиальную потребность модификации норм труда, что напрямую связано с факторами инициации и управления изменениями в компании.

Ранее утвержденные нормы труда нельзя рассматривать как некую устоявшуюся не догму. Нормы труда представляют собой динамическую категорию и её пересмотр является не признаком ошибки в первоначальных расчетах, а индикатором здоровой адаптации предприятия к изменениям.

Факторы, обуславливающие необходимость корректировок, можно разделить на две группы.

Первая группа представляет собой технологические факторы, к которым относится:

- модернизация оборудования,
- внедрение роботизированных линий.

Вторая группа включает организационно-рыночные факторы:

- изменение ассортимента,
- появление новых конкурентов,
- трансформация бизнес-процессов.

Одним из примеров успешной модификации норм труда является практика горно-металлургической компании «Норникель».

«При запуске новой обогатительной фабрики, оснащенной интеллектуальными системами контроля, был проведен полный пересмотр норм выработки для операторов.

Этот процесс включал не только технические расчеты, но и масштабную программу переобучения персонала, что позволило смягчить сопротивление изменениям и обеспечить плавный переход на новые стандарты» [5].

Анализируя принципиальную потребность модификации норм труда в организации следует отметить, что процедура пересмотра, как правило, регламентирована целым рядом локальных нормативных документов и может быть, как плановой, связанной с истечением установленного срока, так и внеплановой.

Исходя из выше сказанного, следует обозначить основную задачу менеджмента, которая сводится к созданию прозрачного механизма инициации изменений.

Причём, механизм инициации изменений в обязательном порядке должен учитывать, что предложения по оптимизации норм могут поступать

не только сверху, но и от самих работников, что значительно повышает их лояльность и вовлеченность.

Таким образом, процессы разработки, утверждения и пересмотра норм труда представляют собой взаимосвязанный управленческий цикл, от слаженности которого зависит конкурентоспособность организации.

На основании этого можно утверждать, что главное преимущество такой систематизированной работы будет способствовать:

- созданию прозрачной, объективной и справедливой основы для планирования, оплаты и организации труда,
- росту производительности труда,
- минимизации трудовых конфликтов.

Однако, необходимо указать и на ключевой недостаток пересмотра норм труда, который связан со значительной ресурсоемкостью и сложностью внедрения, требующей высокой корпоративной культуры и готовности к постоянным изменениям.

В заключении рассматриваемого вопроса, связанного с процессом разработки, утверждения и пересмотра норм труда в организациях, отметим опыт успешных отечественных компаний, который подтверждает эффективность данного подхода.

Одним из примеров эффективного процесса разработки, утверждения и пересмотра норм труда является ПАО «Магнит». Данное предприятие относится к сети розничной торговли, использующей сложную алгоритмическую систему для нормирования труда мерчендайзеров и кассиров, которая ежеквартально пересматривается на основе данных о проходимости магазинов и среднего чека.

В качестве другого примера можно обозначить Объединенную авиастроительную корпорацию, внедрившую отраслевую систему нормирования, основанную на цифровых макетах сборки самолетов.

Нормы пересматриваются синхронно с модернизацией производственных линий, что позволяет точно планировать затраты на выпуск новых моделей лайнеров.

В перспективе развитие технологий искусственного интеллекта позволит перейти к прогностическому планированию норм труда.

Данный подход предполагает, что система будет не только фиксировать текущие показатели, но и прогнозировать оптимальные нормативы для еще не запущенных в производство продуктов, что откроет новые горизонты для повышения эффективности труда.

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