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USING COMMUNICATION APPLICATIONS IN TEACHING TECHNICAL SCIENCES IN PROFESSIONAL EDUCATIONAL UNIVERSITIES

Abstract: This article discusses and describes the role of information technology in teaching technical sciences in vocational schools, their features, advantages, benefits, general and methodological approaches to learning.

Key words: vocational education research, information technology, approaches, engineering sciences, interactive teaching methods, artificial intelligence in education, virtual and realizable reality, online learning platforms and open online courses.

Introduction

In recent decades, information technology has become an integral part of our daily life and has radically changed various fields, including education. Technical vocational education institutions have recognized the importance of incorporating information technology into their teaching methodology. These advances in technology offer many opportunities to enhance the learning experience for students and teachers. This article examines the crucial role of information technology in the teaching of technical sciences in vocational educational institutions, explores the advantages, problems and opportunities for future development of this field.

Currently, measures taken to increase the efficiency of the system of vocational training and retraining in the field of information technologies create a solid foundation for providing state bodies and network organizations with qualified IT specialists. At the same time, the lack of qualified personnel in the labor market of the republic requires the improvement of educational programs

and methods in the field of information technologies, and the strengthening of cooperation between educational institutions and IT companies.

Below we will briefly touch on the advantages of information technology in teaching technical sciences:

1) Advanced interactive education. Information technology provides many interactive learning tools, such as multimedia presentations, simulations, and virtual laboratories, which allow students to actively engage with the subject. These tools facilitate understanding of complex concepts and allow students to experience and practice in a safe, controlled environment.

2) Personalized learning experience. With the integration of information technology, teachers can tailor the learning experience to the individual needs of students. Adaptive learning platforms and data analytics enable assessment of each student's progress and learning preferences, leading to personalized learning paths that improve overall academic performance.

3) Global cooperation and networking. Information technology facilitates global collaboration and networking opportunities between students and teachers from around the world. Through online platforms, students can share knowledge, share experiences, and work on joint projects, creating a sense of global community and encouraging a diversity of perspectives.

4) Access to a vast knowledge base. The Internet offers a vast repository of educational resources, including e-books, online courses, scientific articles, and academic journals. Using information technology, students and teachers can stay abreast of the latest developments in their technical fields and have access to the latest information and research.

Information technology provides a number of advantages in the teaching of technical sciences (Figure 1).

These benefits are briefly discussed below:

Enhanced visual and interactive learning: Information technology provides tools such as multimedia presentations, animations, and simulations that can effectively illustrate complex technical concepts. These visual aids make the learning process more interesting and help students understand abstract or difficult ideas more easily.

Access to a wide range of learning resources: The Internet is a vast repository of knowledge, providing access to online textbooks, academic journals, research articles, and educational websites. Information technology

provides students and teachers with easy access to these resources and enables them to stay abreast of the latest developments in their fields.

Virtual labs and simulations: Information technology enables the creation of virtual labs and simulations that provide students with hands-on learning experiences without requiring expensive equipment or physical resources. These virtual environments allow students to conduct experiments, make observations, and analyze data, enhancing their understanding of practical applications in technical sciences.

Personalized Learning: Information technology facilitates a personalized learning experience tailored to the individual needs and preferences of students. Learning management systems and online platforms can track student progress, provide instant feedback, and recommend personalized learning paths. This personalized approach helps students learn at their own pace, focus on areas that need the most help, and ultimately improve their understanding and performance.

Collaboration and communication: Information technology allows students to collaborate with peers and experts in their field, regardless of geographic limitations. Online discussion forums, video conferencing tools, and collaboration platforms facilitate effective communication and knowledge sharing, foster a collaborative learning environment among students, and facilitate the exchange of ideas and perspectives.

Distance learning and flexibility: Information technology has become even more important in the era of distance learning, such as during the COVID-19 pandemic. Online learning platforms, video conferencing tools, and digital resources allow students to pursue technical education remotely, ensuring continuity in their learning journey. In addition, information technology provides flexibility in terms of accessing learning materials and attending classes, and accommodates students' different schedules and learning styles.

Real-time feedback and evaluation: Information technology offers real-time feedback and evaluation tools that allow immediate assessment of student performance. Online quizzes, interactive assignments, and automated grading systems provide students with real-time feedback on their progress, identifying areas for improvement and making necessary adjustments.

Career Readiness: Information Technology equips students with the digital skills and competencies needed to succeed in today's technology-driven workforce. By incorporating information technology into technical education,

students develop skills in using relevant software, tools and technologies, and improve their employability and career prospects.

In summary, information technology-based enhancement of visual and interactive learning, provision of access to a wide range of resources, facilitation of personalized learning, collaboration and communication, flexibility in distance learning, real-time feedback deliver and assess and serve to prepare students as mature professionals in the digital world. By effectively using these technologies, vocational education institutions can create a dynamic and engaging learning environment that allows students to succeed in the technical sciences.

Today, we can face the following main problems in the introduction of information technologies in technical education:

1) Infrastructure and access disparity. In many areas, there may be limitations related to the availability of robust Internet connections and computer resources, which hinder the effective integration of information technology in technical education. Addressing these disparities requires significant investment and public support.

2) Training and support of teachers. Although information technology offers great potential in this regard, some teachers may face difficulties in using these tools effectively. Proper training and ongoing support are essential for teachers to fully utilize technology in the classroom.

3) Data privacy and security issues. In this case, the use of information technologies in education includes the collection and storage of sensitive data of students. Organizations must implement data privacy and security measures to protect this data from unauthorized access and potential breaches.

Infrastructure limitations: Some regions or educational institutions have limited access to a reliable Internet connection or insufficient computer resources. Inadequate infrastructure can hinder the effective integration of information technology into technical education, as students and teachers require the necessary hardware, software, and Internet connectivity for seamless implementation.

Resistance to change: The integration of information technology into traditional teaching methods may be met with resistance by teachers who are unfamiliar with or uncomfortable with technology. Some teachers may be hesitant to adopt new teaching methods or tools, which can slow down the learning process and hinder the potential benefits of information technology.

Training and support: Teachers need adequate training and support to effectively integrate information technology into their teaching practice. Lack of proper training and ongoing support can lead to a lack of understanding and knowledge of technical equipment, how to use it optimally, and how to solve technical problems that may arise. Curriculum and support systems must be in place to provide teachers with good equipment for using information technology in technical education.

Costs and Financing: Integrating information technology into technical education often requires significant investment in infrastructure, software licenses, and maintenance. Some educational institutions may experience financial difficulties, which make it difficult to allocate funds for the purchase of necessary equipment, software and training programs.

Data Privacy and Security: Use of information technology includes the collection and storage of student data. Ensuring data privacy and security is critical to protecting sensitive student information from unauthorized access, breaches or misuse. Educational institutions must take robust data privacy and security measures to address potential concerns and maintain the trust of students and parents.

Pedagogical Adaptation: Integrating information technology requires rethinking and adapting pedagogical approaches to maximize their benefits. Teachers should learn innovative teaching methods and instructional design principles that effectively use information technology to enhance student learning. This adaptation may require time, experience and professional development for teachers.

Technological obsolescence: Technology is evolving rapidly, which puts educational tools at risk of becoming obsolete. Educational institutions must keep abreast of emerging technologies and regularly update their information technology infrastructure and tools to ensure they are relevant and effective in teaching technical subjects.

Equity and Access: Access to information technology may be disparate, especially for economically disadvantaged students or students in marginalized areas. Ensuring equitable access to technology and bridging the digital divide is critical to preventing further disparities in technical education.

Solving these problems requires cooperation between educational institutions, entrepreneurs and stakeholders. It includes investing in infrastructure, comprehensive training and support for teachers, establishing clear protocols for data privacy and security, addressing financial issues, and

ensuring equity in technology access. Addressing these barriers can pave the way for successful integration of information technology in technical education, ultimately enhancing the learning experience and preparing students for careers in a technology-driven world.

Future developments and trends in teaching technical sciences in professional educational institutions:

1. Artificial Intelligence (AI) in Education:

AI-powered educational applications can analyze student performance, identify learning gaps, and provide personalized recommendations for improvement. As AI technology advances, it may become an integral part of the technical education landscape.

2. Virtual and augmented reality (VR/AR) applications:

VR/AR technologies have tremendous potential for technical education, allowing students to experience hands-on activities and realistic simulations. These immersive experiences can revolutionize the way technical concepts are taught and understood.

3. Online education platforms and massive open online courses (MOOC):

The popularity of online learning platforms and MOOCs is constantly growing. Professional educational institutions can partner with such platforms to reach a wider audience by offering technical courses and certifications to students worldwide.

The future of technical education in vocational education institutions is expected to witness significant changes and trends due to advances in information technology and educational methodology. Here are some potential future changes and trends.

Increasing Virtual and Augmented Reality (VR/AR) Integration: Virtual and augmented reality technologies are expected to play an increasingly important role in technical education. VR/AR applications can create immersive and interactive learning experiences that allow students to visualize complex concepts, practice practical skills in simulated environments, and conduct virtual experiences. These technologies can enhance participation and understanding, particularly in fields such as engineering, medicine, and architecture.

Personalized Learning Paths: Advances in artificial intelligence and data analytics enable more sophisticated personalized learning paths. AI-powered learning platforms can analyze individual data to understand students' strengths,

weaknesses, and learning preferences. Based on this analysis, customized learning content and exercises can be delivered to optimize the learning experience for each student.

Collaborative Learning Environments: Future technical education may favor collaborative learning environments that encourage teamwork and interdisciplinary interactions. Students from different technical disciplines can work together on projects, solve real problems and find innovative solutions. Cooperative learning develops communication skills, critical thinking, and creativity while preparing students for the collaborative nature of today's technical workplace.

Mobile Learning and Microlearning: Mobile learning supported by smartphones and tablets is expected to become more prevalent in technical education. Microlearning, which involves short, focused learning modules, is popular for its flexibility and convenience. Students can access a large amount of educational content on the go, allowing for continuous learning and rapid acquisition of knowledge.

Gamification of Education: Gamification, the use of game-like elements in education, is likely to become more prevalent in technical classrooms. Gamified learning experiences can increase motivation, engagement and retention by introducing elements such as rewards, achievement and progress tracking. Gamification can be particularly effective in teaching technical skills and problem solving.

Focus on developing soft skills: While technical skills are critical, the future of technical education will also focus on developing soft skills such as communication, teamwork, flexibility and critical thinking. These skills are essential for success in the modern workplace, where cross-functional collaboration and effective communication are highly valued.

Blended Learning Models: Blended learning, which combines traditional classroom instruction with online and digital components, will continue to gain popularity. Educational institutions can use a mix of in-person lessons, online modules and independent study to create a flexible and personalized learning experience for students.

Lifelong Learning and Continuing Education: As technology and industry continue to advance, technicians will need to engage in continuous learning throughout their careers. Vocational education institutions can offer more lifelong learning opportunities, short courses, and certifications to help people stay abreast of the latest advances in their fields.

In conclusion, the future of technical education in vocational education institutions is characterized by a focus on immersive technologies, personalized learning, collaboration, mobile learning, and the development of technical and soft skills. These trends are driven by the need to adapt to a rapidly changing technological landscape and prepare students for successful careers in an increasingly connected and dynamic world.

Conclusion:

Information technology has proven to be a transformative factor in the teaching of technical sciences in vocational education institutions. Their integration offers many advantages such as interactive learning, personalized experience, global collaboration and access to vast knowledge repositories. However, infrastructure, training and data security issues need to be addressed. Future advancements include AI, VR/AR applications, and online learning platforms.

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