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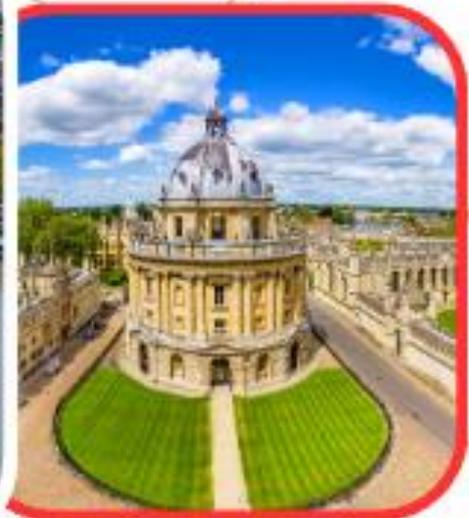
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IMPROVING THE LEARNING PROCESS BASED ON MULTIMEDIA TECHNOLOGIES IN PROFESSIONAL TRAINING OF STUDENTS (ON THE EXAMPLE OF STUDENTS OF INFORMATICS)

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Abstract. This article discusses the role and importance of multimedia technologies in the formation of professional skills of students studying in the field of computer science. It also analyzes the didactic possibilities of multimedia tools in the interactive organization of the educational process and effective methods of their application.

Keywords: multimedia technologies, vocational training, informatics, innovative education, interactive environment, digital competence.

Introduction. The role of information and communication technologies in the modern education system is incomparable. In particular, the development of multimedia technologies has brought the educational process to a new level. The use of multimedia tools in education makes the process interactive, interesting and effective. For students of computer science, mastering multimedia technologies is important not only in their educational activities, but also in their professional formation. Because the field of computer science requires operating in a rapidly changing digital environment. Therefore, the application of multimedia technologies in the educational process is one of the most effective ways to train qualified, digitally literate specialists in the field of computer science.

Multimedia technologies are a system for presenting and transmitting information using text, graphics, sound, video, animation, and interactive elements. Their main goal is to enliven the learning process, attract student attention, and help students learn more deeply.

R. Mayer's "Cognitive Multimedia Learning Theory" emphasizes that the human brain receives information faster through visual and auditory channels. Therefore, multimedia-based learning contributes to better memory and understanding of knowledge.

computer science is carried out in the following forms:

- E-learning platforms: Moodle, Google Classroom, Edmodo;
- Virtual laboratories: Cisco Packet Tracer, MATLAB, PhET;
- Presentation and visualization programs: PowerPoint, Prezi, Canva;
- Video tutorials and educational animations: YouTube, Coursera, Khan Academy;

- Interactive testing and gamified learning tools: Kahoot, Quizizz, LearningApps.

Through these tools, students independently acquire skills such as modeling algorithms, programming, visualizing systems, and working with databases.

3. The role of multimedia technologies in the development of professional training

Multimedia technologies develop the following professional competencies in computer science students:

- Digital literacy and information culture;
- Programming and technical analysis skills;
- Ability to work on a project basis and solve problems;
- Creativity and visual design skills.

Students independently formulate their ideas by presenting their educational project using multimedia tools, which increases their professional preparation.

4. Advantages of multimedia-based teaching

- The learning process will be demonstrative and interactive;
- Students develop independent thinking and a creative approach;
- The opportunity to systematically acquire knowledge increases;
- The communication between teacher and student will increase.

5. Problems and ways to solve them

The following problems are observed when implementing multimedia technologies:

- lack of technical equipment;
- low digital competence of teachers;
- Insufficient development of multimedia textbooks.

To eliminate them:

- organizing advanced training courses on digital pedagogy for teachers;
- creation of multimedia educational and methodological complexes;
- It is necessary to provide educational institutions with modern technical equipment.

Literature analysis. A number of foreign and domestic scientists have conducted scientific research on the role of multimedia technologies in the educational process, their effectiveness, and the possibilities of their application in the field of computer science.

R. Mayer, in his work "Multimedia Learning", analyzed the cognitive foundations of multimedia teaching and proved that the human brain processes information through visual and auditory channels. According to him, the rational use of multimedia tools in education helps the student to deeply assimilate knowledge. R. Kozma, in his research, spoke about the role

of multimedia technologies in education, emphasizing their introduction of elements of interactivity, problem-solving and cooperation into the learning process. R. Moreno and R. Clark, in their work "Interactive Multimedia for Learning Environments", reveal the role of multimedia tools in increasing motivation in the learning process, developing independent learning and forming a culture of thinking.

Local researchers A. Abdukodirov and A. Rasulov expressed valuable ideas about the methodology of using multimedia technologies in the educational process, their advantages, and their importance in improving the qualifications of teachers. Their works emphasize the central role of multimedia technologies in the modernization of the educational process.

Also, the "Digital Uzbekistan - 2030" strategy notes the need for the widespread introduction of digital technologies into the education system and the training of teachers as specialists who can effectively use modern ICT tools. The analysis of this literature shows that the introduction of multimedia technologies into the educational process is not only a modern requirement, but also an innovative approach that serves the comprehensive development of the student's personality.

Research methods

In this study, the following scientific methods were used to determine the role and effectiveness of multimedia technologies in the professional training of students in the field of computer science:

1. Analysis and synthesis method - existing scientific sources, articles, regulatory documents, and curricula were analyzed and their main ideas were summarized.

2. Comparative method - the multimedia-based educational system was compared with traditional teaching methods, and their advantages and disadvantages were identified.

3. Observation method - the use of multimedia technologies in the teaching process in the field of computer science was observed using the example of real training sessions.

4. Survey and interview method - opinions on the effectiveness of using multimedia tools were studied among students and teachers of computer science.

5. Pedagogical experiment method - the practical results of applying multimedia technologies to the educational process were tested and their impact on the quality of education and student motivation was analyzed.

6. Statistical analysis method - the results obtained were numerically processed and presented in tables and diagrams.

Results and discussion. In the course of the research, the effectiveness of using multimedia technologies in the professional training of students in the field of computer science was analyzed on an experimental basis.

Interactive video lessons, animations, simulator programs, virtual laboratories, and electronic learning platforms were used in experimental training sessions. These tools increased students' interest in science, actively involved them in the learning process, and allowed them to master the topics more deeply.

The results showed that integrating multimedia technologies into the learning process improved students' learning outcomes by an average of 15 percent. Students were able to independently analyze educational materials, complete interactive tasks, and acquire new knowledge based on visual imagination. At the same time, it was observed that during multimedia lessons, the level of quick and accurate perception of information, error analysis, and creative thinking also increased significantly.

During the discussion, it was found that multimedia technologies strengthen two-way communication between teachers and students, making education interactive and motivating. However, for these technologies to work effectively, the teacher must have good knowledge of information and communication technologies, properly design the lesson methodologically, and have sufficient technical means.

In general, the results obtained confirm that the rational use of multimedia technologies is an important tool for improving the quality of professional training in the field of informatics. Such an approach strengthens not only theoretical knowledge, but also practical skills, and allows training competitive personnel in the modern labor market.

CONCLUSION

In conclusion, multimedia technologies play an important role in the professional training of students in the field of computer science. They activate the learning process, make the assimilation of knowledge interesting and effective, and develop students' skills in independent expression, analysis, and application of their ideas in practice. Through the use of multimedia tools, students not only acquire theoretical knowledge, but also have the opportunity to apply it in practical activities. This is of great importance in the formation of their professional competencies. In particular, in the field of computer science, these technologies serve to master such skills as programming, algorithmic thinking, graphic design, and working with databases.

As a result of the widespread introduction of multimedia technologies into the educational process, interactive communication between teachers and students is enhanced, and an atmosphere of creative cooperation is formed in the teaching process. Students develop creative approaches and problem-solving skills by presenting their knowledge in visual, audio and interactive forms. Multimedia technologies also serve as a key factor in improving the quality of education, optimizing the learning process,

developing digital competence and preparing students for the labor market. The educational resources, electronic textbooks, virtual laboratories and interactive tests created with their help bring computer science education to a modern level. Therefore, the correct and targeted use of multimedia technologies significantly increases the quality of teaching, the effectiveness of mastering and the level of professional development of the student. As a result, qualified and competitive computer science specialists are formed who can meet the requirements of the time, have a digital mindset.

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