MODERN TEACHING REQUIREMENTS OF THE SUBJECT "INFORMATION TECHNOLOGY IN MEDICINE"

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Abstract

This article analyzes modern approaches, digital tools, and interactive teaching methods in the instruction of the subject "Information Technology in Medicine." The role of information technologies in medical education, their importance in effectively organizing the learning process, and their contribution to developing students' information literacy and digital competencies are highlighted. Technological possibilities such as modular teaching, distance learning, simulation programs, and the use of clinical databases are also analyzed.

Keywords: information technology, medical education, digital competence, modern teaching requirements, electronic resources, simulation systems.

Introduction

The rapid development of information and communication technologies (ICT) is causing profound changes in all spheres, particularly in medical education. The digitization of medical sciences, the expansion of databases, clinical decision support systems, and the introduction of artificial intelligence tools have taken the medical profession to a new stage. Today, a modern physician must not only possess clinical experience and theoretical knowledge but also be proficient in processing medical information, working with electronic records, telemedicine, digital diagnostics, and

medical analysis software. Therefore, the subject “Information Technology in Medicine” is one of the most essential and strategically important areas of contemporary medical education.

This course aims to develop students’ deep understanding of digital technologies in medicine, as well as skills in working with medical information systems and software. One of its main objectives is to cultivate competencies in using information resources in medical practice, including electronic health records, clinical databases, health statistics analysis, and ensuring personal information security.

Modern teaching no longer relies solely on traditional classroom sessions; it encompasses distance, blended, and simulation-based learning formats. Widely used e-learning systems—such as LMS, Moodle, EdX, and Coursera—allow students to create individualized learning trajectories, automatically track learning progress, and provide feedback mechanisms.

In addition, the use of virtual laboratories, interactive simulators, and 3D modeling tools in teaching information technology in medicine allows the learning process to be visual, practical, and experience-based. Working with international medical databases such as PubMed, Medline, Scopus, and Cochrane Library enhances students’ research and analytical skills, familiarizing them with modern scientific research methods.

Moreover, students in this course become acquainted with practical examples related to medical information security, big data analysis, cloud technologies, electronic health systems (e-health), and telemedicine. This prepares future physicians to cultivate digital literacy, make informed decisions based on information, and develop professional competencies.

Overall, the subject “Information Technology in Medicine” is considered one of the key courses that foster innovative approaches, interactive teaching methods, and effective performance in an information-rich environment. It enhances the quality of the learning process and contributes to the training of specialists with digital competencies essential for modern healthcare systems.

Literature Review

In recent years, the use of information technologies in medical education, the improvement of teaching methodologies, and the development of digital competencies have been widely studied internationally. Researchers such as T. Bates, D. Garrison, N. Vaughan, M. Fullan, and A. Redecker emphasize that digital technologies are transforming all stages of the learning process, giving rise to new student-centered models of teaching and learning. According to them, a digitized learning environment allows the creation of individualized, flexible, and competency-oriented education.

Research Methodology

This study aims to identify didactic, methodological, and practical principles for organizing the course “Information Technology in Medicine” according to modern teaching requirements and to evaluate the effectiveness of ICT in medical education. The study is based on systematic, integrated, competency-based, and activity-oriented approaches, analyzing the role, impact mechanisms, and positive outcomes of information technologies in the learning process.

The systematic approach examined the course as a single pedagogical system, analyzing interrelated elements such as learning objectives, technological tools, didactic approaches, and interaction between teachers and students. The integrated approach combined technological, methodological, psychological, and organizational factors to enhance the effectiveness of education.

Results

The study was conducted among second-year students of the Faculty of Medicine at Andijan State Medical Institute. A total of 60 students participated, divided equally into an experimental group and a control group (30 students each). Both groups studied the subject “Information Technology in Medicine,” but the teaching methods differed.

The control group attended traditional lectures and seminars. The experimental group used modern ICT-based interactive methods, electronic educational resources,

virtual laboratories, medical databases (PubMed, Medline, Cochrane Library), and the LMS system (Moodle).

At the initial (diagnostic) test, both groups had similar performance, with an average score of 62.4%. At the final assessment:

- Experimental group: 86.7% average score
- Control group: 69.1% average score

These results indicate that ICT-based teaching methods increased learning effectiveness by 17.6% compared to traditional approaches.

Conclusion

The study demonstrates that teaching the subject “Information Technology in Medicine” using modern pedagogical and digital approaches significantly enhances the quality of medical education. Integrating information technologies into the learning process improves students’ motivation, develops practical skills, and shapes professional competencies in processing and analyzing medical information.

Experimental group students achieved an average score of 86.7%, compared to 69.1% in the control group, demonstrating that ICT-based teaching methods are 25–30% more effective than traditional approaches. The use of digital tools, electronic resources, virtual laboratories, and simulation technologies brings medical education to a new level, strengthens students’ professional competencies, and enhances their ability to analyze medical information and make practical decisions. Therefore, this course should be recognized as a priority area for innovative teaching in medical higher education.

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