INNOVATIVE TECHNOLOGIES AND CYBERSECURITY ISSUES IN THE DIGITAL EDUCATION SYSTEM

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Abstract: *In this article, the role and significance of innovative information technologies in the digital education system, as well as the cybersecurity issues that arise during their implementation, are analyzed. The possibilities of using artificial intelligence, cloud technologies, distance learning platforms, and mobile applications in the educational process are examined. In addition, modern approaches aimed at protecting students' personal data, ensuring information security, and preventing cyberattacks are highlighted. The results of the study provide practical recommendations for the safe and effective implementation of innovative technologies in the digital learning environment.*

Keywords: *digital education, innovative technologies, cybersecurity, information security, distance learning, artificial intelligence, cloud technologies, personal data protection.*

In recent years, rapid digitalization processes have significantly influenced all sectors of society, with the education system being no exception. The development of digital education systems is closely associated with the integration of innovative technologies, which contribute to improving the quality of education, personalizing the learning process, and expanding access to educational resources.

Currently, the use of artificial intelligence, cloud technologies, distance learning platforms, mobile applications, and other digital tools has become an integral part of modern education. These technologies enable the modernization of teaching methods, enhance the efficiency of educational management, and promote interactive communication between teachers and learners.

At the same time, the expansion of the digital learning environment has led to the emergence of various information security and cybersecurity challenges. In particular, ensuring the protection of students' personal data, maintaining data integrity, and preventing unauthorized access and cyberattacks have become critical issues. Insufficient attention to cybersecurity may result in data breaches, loss of confidentiality, and disruptions in the educational process.

Therefore, the comprehensive study of cybersecurity issues in the implementation of innovative technologies within the digital education system is of great importance. This article analyzes the role of innovative technologies in digital education, identifies existing cybersecurity challenges, and discusses effective approaches to ensuring secure and efficient integration of digital technologies in the educational environment.

The essence of the formation of scientific bases of interaction of information technologies and innovative educational processes in the professional activity of the

person is the need to create a framework for the transition from the information processes to information technology [1]. The catalyst for education reform has been the development of information technology. Informatization of the society - a global social process, a feature of which is that the dominant activity in the sphere of social production is the collection, storage, production, processing, storage, transmission and use of the information carried on the basis of modern microprocessor and computer technology, as well as on the basis of a variety of means of information exchange. Informatization of the society provides:

- active use of ever-expanding intellectual potential of society,
- concentrated in the print fund, scientific, industrial and other activities of its members;
- the integration of information technology with scientific, industrial,
- a high level of information services, the availability of any member of the public to sources of reliable information, the visualization of the information provided, the significance of the data used. The leading purpose of education in the new economy of Uzbekistan is to prepare the person, in a competitive labor market, which has professional qualities, providing the ability to solve the problem in all its activities and take responsibility for their decision. New technical, information, printing, audiovisual media are an integral component of the educational process, making it the specificity of the inseparability of teaching methods and techniques.

This quality can already speak about the unique pedagogical technologies based on the use of modern information and communication tools, the main advantages are:

- Individualization of the learning process, while maintaining its integrity due to programmability and dynamic adaptability of information training programs;
- The possibility of building an open education system that ensures every individual his own path of learning and self-study.

Information technologies – can be considered as one of the most important means of implementing the new educational priorities:

- The integrity of education as introduction of uniform cycles of university courses with a focus on inter-disciplinary communication;
- Focus on teacher development interests of the individual, the individualization of the educational process. Because of the vast diversity of modern information technology used, which found its application in education in the educational process of training, seems to be the most attractive are the information educational technologies used in distance learning.

In the complex, information and innovative educational technologies involved in the formation of personality of specialist training can be attributed to modern and reliable, if they basically have general philosophical and didactic roots. Practice shows that the specific feature of the impact of information technology on the development of innovative educational processes and training of the individual trainees is that the information in them is the subject of, and the result of labor, and information communications as an instrument of labor are also a information product[2].

Thus it seems that to the laws constituting the scientific foundations of information technology include:

- Focused innovative education, providing guaranteed the formation of an information product, the relevant requirements of the user;

- Patterns of innovative organization of the internal structure of the educational process, the composition and interaction of the elements of information technology;

- Methods of modeling the formation of information technology in innovative educational process;

- Species interactions provide new information technology.

During the integration of innovative technologies in the educational process attracted some attention that information technology, as well as the educational process, inherent properties and laws: dynamism; focus; stability of development; communicativeness. The properties of information technology, on the one hand, cannot be reduced to a certain amount of the individual elements, and, on the other hand, depend on them; change in the properties of individual elements causes a change in the properties of an information technology in general. Functional purpose of information technology defines its integrity.

Thus, in our view, it is very important, rational combination of focus, dynamism, integrity and relatively conservative in developing information technologies enables their stable development. The integration and complementarity of properties of innovative educational technologies and information technology, taking into account the characteristics and specifics of the future performance of university graduates and the needs of modern society, have a significant impact on the effectiveness of the training of the person in the course of its formation[3].

The study and analysis of the status and prospects of development of modern vocational education, providing conditions for the process of training, forms of interaction of education, the impact of the information educational technologies for innovative educational processes, as well as our results suggest the following conclusions. I.e. requirements to improve the efficiency of the training process must be applied not only to improve the methods of the terms of the educational process, but also their rational organization, i.e. an innovative approach to the organization and management of educational process, introduction in the educational process of information technology. Planning for the introduction and development of innovative educational technologies aimed at improving the quality of training requires special, specific and professional approach to solving the problem.

The findings of this study demonstrate that innovative technologies play a crucial role in enhancing the effectiveness and accessibility of digital education systems. The integration of artificial intelligence, cloud computing, distance learning platforms, and mobile applications has significantly transformed traditional teaching and learning practices. These technologies enable personalized learning, real-time feedback, flexible access to educational content, and improved communication between educators and learners.

However, the results also indicate that the widespread adoption of digital technologies increases exposure to cybersecurity risks. The reliance on cloud-based platforms and online learning environments leads to the collection, storage, and processing of large volumes of sensitive data, including students' personal and academic information. As a result, educational institutions become potential targets for cyberattacks such as data breaches, phishing, ransomware, and unauthorized system access.

The discussion highlights that while innovative technologies offer substantial pedagogical benefits, insufficient cybersecurity measures can undermine their effectiveness. Weak authentication mechanisms, lack of data encryption, and limited cybersecurity awareness among users are identified as key vulnerabilities in digital education environments. These issues emphasize the need for a balanced approach that aligns technological innovation with robust security frameworks.

Furthermore, the study suggests that effective cybersecurity in digital education requires not only technical solutions but also organizational and educational measures. The implementation of cybersecurity policies, regular risk assessments, staff and student training, and compliance with data protection regulations are essential components of a secure digital learning ecosystem. Integrating cybersecurity considerations into the early stages of technology adoption can significantly reduce potential risks.

Overall, the discussion underscores that the successful development of digital education systems depends on the harmonized integration of innovative technologies and comprehensive cybersecurity strategies. Addressing cybersecurity challenges proactively will ensure the sustainability, reliability, and trustworthiness of digital education platforms, thereby maximizing their educational potential.

CONCLUSION

Innovative technologies, such as artificial intelligence, cloud computing, and distance learning platforms, enhance digital education by enabling personalized learning and interactive communication. However, their widespread use also introduces cybersecurity risks, including data breaches and unauthorized access. Effective integration of these technologies requires robust security measures, user training, and data protection policies. Addressing cybersecurity proactively ensures safe, reliable, and high-quality digital learning.

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