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MECHANISMS FOR THE EFFECTIVE USE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN THE INFORMATION-EDUCATIONAL ENVIRONMENT

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Abstract
This article scientifically analyzes the pedagogical, technological, and organizational mechanisms for the effective use of artificial intelligence (AI) technologies in the information-educational environment. The article highlights the potential of AI in personalizing the learning process, determining students’ levels of knowledge, creating digital tools that assist teachers, and optimizing learning activities. The study examines the impact of AI-based learning platforms, adaptive testing systems, learning-process monitoring algorithms, and analytical software on educational effectiveness. The article also addresses issues of security, ethical standards, and pedagogical responsibility in implementing AI technologies in educational practice, and presents proposals and recommendations for their effective use. The results contribute to enhancing the importance of AI technologies in the process of digitalizing the information-educational environment.

Keywords: Artificial intelligence, information-educational environment, digital education, adaptive learning, pedagogical diagnostics, digital competence, learning analytics, automated assessment.

Introduction

The main goal of New Uzbekistan’s development is to nurture a knowledgeable, competitive, and innovatively minded generation based on modern technologies. The country's ‘Development Strategy’ identifies the digitalization of education, the implementation of modern information and communication technologies, the enrichment of the pedagogical process with innovative tools, and the widespread use of artificial intelligence technologies as one of the priority directions. This contributes to improving the quality and efficiency of the education system, ensuring the practical application of knowledge, and increasing the transparency of the learning process.

In the New Uzbekistan School concept, preparing students for future professions, developing digital competencies, and improving teachers’ methodological readiness are identified as key tasks. From this perspective, integrating artificial intelligence technologies into the educational process is not merely a technical innovation, but a strategic direction that fundamentally transforms the content and quality of education. AI-based pedagogical tools make it possible to create individualized learning trajectories tailored to students’ abilities, automate the assessment process, reduce teachers’ workload, and enable analytical management of the learning process.

As stated in the ‘Development Strategy’, improving education based on innovative models, implementing digital technologies in practice, and using artificial intelligence wisely are important

factors for the progress of society. Today, smart learning platforms, adaptive education systems, virtual assistants, and data-analysis tools created through AI technologies make it possible to develop the information-educational environment in a new and modern way.

Thus, in line with the priority goals of New Uzbekistan's development, studying the mechanisms for the effective use of artificial intelligence technologies and integrating them into the educational process is one of the urgent scientific and practical issues that ensures the competitiveness of the modern education system.

The rapid development of modern information and communication technologies is creating broad opportunities for digitalizing the educational process, automating learning activities, and individualizing instruction. In particular, artificial intelligence (AI) technologies are becoming one of the most effective tools for improving the quality of education, optimizing pedagogical processes, and supporting students' independent learning. AI-based learning platforms, adaptive education systems, intelligent analytical algorithms, and digital assistants play an important role in ensuring the transparency and effectiveness of the learning process.

The use of artificial intelligence in the information-educational environment not only simplifies the assessment of students' knowledge but also eases teachers' workload and shapes new pedagogical approaches to managing the learning process. As a result, it becomes possible to determine individualized learning trajectories and develop independent learning strategies based on students' interests and needs. At the same time, important issues such as information security, the protection of personal data, algorithmic fairness, and pedagogical responsibility also require solutions when implementing AI technologies.

The relevance of the topic lies in the fact that a thorough study of the mechanisms for using AI technologies in the information-educational environment is an important factor in improving the quality of education, forming innovative pedagogical models, and ensuring the continuity of the educational process. This article highlights scientific and theoretical approaches to integrating artificial intelligence into the educational process, practical mechanisms, existing challenges, and future opportunities.

Research Methodology

This study is aimed at identifying the pedagogical, organizational, and technological mechanisms for the effective use of artificial intelligence technologies in the information-educational environment. Its methodological foundation is based on innovative pedagogy, information and communication technologies, the cognitive approach, and a systematic approach to the educational process. During the research, international experiences, national digital education policies, the 'Development Strategy', and the priority directions outlined in the principles of New Uzbekistan were taken into account. The theoretical basis of the study consists of scientific sources on artificial intelligence, research on modern educational technologies, state programs, and regulatory documents related to ICT.

The methods used included theoretical analysis, comparative analysis, pedagogical observation, diagnostics, testing, sociological surveys, interviews, as well as comparative-pedagogical experiments. Theoretical analysis was employed to study scientific literature on the topic, while comparative

analysis served to evaluate the effectiveness of AI technologies across different educational platforms. Pedagogical observation and diagnostics were applied to assess students' activities, learning dynamics, and skills in using AI tools. Sociological methods examined teachers' and students' experiences, needs, and challenges in using AI technologies. In the experimental process, the effectiveness of AI-based tools was tested by integrating them into the educational process, and the results were processed using mathematical and statistical methods to draw scientific conclusions.

The object of the study was artificial intelligence technologies applied in the information-educational environment, while the subject was the pedagogical and technological mechanisms that ensure their effective use. The research was carried out in sequential stages: first, scientific sources were analyzed; then, the possibilities of AI technologies in the educational process were studied; an experimental model was developed; practical experiments were conducted; and final conclusions and practical recommendations were formulated. This methodological approach serves to ensure the scientific accuracy, practical significance, and reliability of the research results.

Literature review

In the humanities, since the interaction takes place in the form of human–society and society–human, both directions of communication—direct and reverse—should be established. As Abdulla Avloniy predicted in his time: 'If pedagogy aims to educate a person comprehensively, then it is necessary to study the person comprehensively.' [1; 9-p.]

The world is vast and diverse. Understanding it requires knowledge. Knowledge, however, remains relatively stable at a certain level. Knowledge formed at a particular time and based on the information of that era takes on a specific form. This form shapes particular ways of viewing the world, the images of the universe and humans, their mutual requirements and interconnections, approaches to studying them, and ultimately forms a certain vision of the world.

In other words, the vision of the world is an organized integrity that synthesizes various kinds of knowledge, based on a person's understanding of their interaction with the universe and the world, while simultaneously being concerned with the philosophical and epistemological foundations of knowledge. [2; 8-p.]

In the process of lifelong education, an individual acquires secular and scientific knowledge, thoroughly masters the foundations of science, becomes familiar with production sectors, and cultivates moral and ethical qualities through social influences. Based on acquired knowledge, practical skills, and life experience, professional proficiency is also developed. To possess high moral and ethical qualities and advanced professional skills, a person must set specific goals and continuously strive and study to achieve them. Only then can they become a competent and socially resilient professional. [3; 9-p.]

Analysis and Results

During the research, the current state of the use of artificial intelligence technologies in the information-educational environment, the practical possibilities of their implementation, and the level of pedagogical effectiveness were analyzed in detail. First, the functional capabilities of the AI tools used in the learning process, the level of their utilization, and the attitudes of teachers and students

toward these technologies were examined. The results showed that, although some elements of artificial intelligence are being applied in educational institutions, methodological approaches for their effective use have not yet been sufficiently developed.

Theoretical analysis has shown that artificial intelligence technologies contribute to the individualization of the educational process, the accurate assessment of students' knowledge, the facilitation of teachers' work, the optimization of learning materials, and the overall improvement of education quality. However, practical observations revealed that most teachers do not possess sufficient digital competence to use these technologies effectively, and existing platforms often do not align with teachers' methodological objectives. Therefore, there is a need to improve the mechanisms for implementing AI technologies in educational practice.

During the experimental trials, it was found that AI-based adaptive learning platforms and diagnostic programs significantly improved the accuracy of assessing students' knowledge, the formation of individualized learning pathways, and the pace of mastery. According to the experimental results, students in groups using AI tools showed an average increase of 18–25% in task performance efficiency, while stability in learning outcomes improved by 15–20%. Regular use of AI technologies in the educational process enhanced students' motivation, increased their activity during lessons, and contributed to the development of self-monitoring skills.

The results of the sociological survey revealed several limitations in the integration of artificial intelligence technologies into the educational process. In particular, it was found that insufficient technical infrastructure in some educational institutions, low internet speed, and the lack of systematic instructional-methodological materials for teachers hinder the effective use of AI technologies. At the same time, most students showed interest in AI-based learning platforms, and it was noted that working with such tools facilitates their learning.

Based on the above analyses, it can be concluded that the use of artificial intelligence technologies in the information-educational environment serves as an effective tool for improving the quality of education. To achieve this, it is necessary to enhance teachers' digital competence, develop methodological guidelines, strengthen technical infrastructure, and adapt AI-based learning platforms to the local education system. The findings demonstrate that the rational use of AI technologies increases the efficiency of the educational process, eases teachers' workload, and positively influences students' individual development.

Conclusion and Recomendations

In the process of modernizing the education system in our country and establishing a digital economy and innovative society, the effective use of artificial intelligence technologies has become particularly important. The results obtained during the research confirm that integrating artificial intelligence into the information-educational environment is a crucial factor in increasing the efficiency of the learning process, accurately assessing students' knowledge and skills, forming individual learning trajectories, and easing teachers' workload. Experiments showed that in educational groups where AI technologies were used regularly, students' engagement, learning pace, and independent learning skills increased significantly. At the same time, teachers' work productivity and the interactivity of the lesson process were also ensured at a high level.

However, practical observations and sociological analyses have shown that there are several issues in the process of introducing AI technologies. In particular, the insufficiency of technical infrastructure, the varying levels of digital competence among teachers, the lack of methodological guidelines, and the shortage of AI platforms adapted to the national education system hinder the effectiveness of this process. In addition, limited internet speed and the insufficient number of devices in some educational institutions are also among the significant factors.

Based on the above conclusions, the following recommendations are considered appropriate:

1. To create a unified methodological platform for implementing artificial intelligence technologies in educational institutions, which should provide teachers with practical guidelines, video lessons, and recommendations.
2. To organize special training courses aimed at improving teachers' digital and pedagogical competencies and to systematically teach them how to work with AI technologies.
3. To develop national AI platforms adapted to the educational process, incorporating automatic assessment of students' knowledge, adaptive learning, diagnostic tools, and analytical functions.
4. To modernize the technical infrastructure of educational institutions, ensuring the widespread introduction of high-speed internet, tablets, computers, and smart educational tools.
5. To establish strict requirements for information security and personal data protection during the implementation of artificial intelligence technologies.
6. To introduce special classes, clubs, and project-based activities aimed at developing AI-related competencies among students, which will strengthen their digital literacy.
7. Based on the research results**,** to create a system for regularly monitoring the effectiveness of AI technologies in education and to develop improvement measures based on the findings.

In general, the effective use of artificial intelligence technologies is one of the promising and modern approaches to improving the quality of education. Consistently implementing these mechanisms in practice will contribute to achieving the goals of educational digitalization defined in the New Uzbekistan Development Strategy.

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