

# Methods Of Integrating Artificial Intelligence Into The Education System

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**Abstract:** The article provides an in-depth discussion of the process of integrating artificial intelligence (AI) technologies into the education system, covering its theoretical and practical dimensions. The main aim of the study is to determine the significance of AI in the educational process, assess its impact on the activities of teachers and students, and propose ways of using it effectively. Empirical data were collected using surveys, observation, analysis, and comparison methods. The survey results provided information on students' level of use of AI technologies, their trust in them, and the benefits of AI in education. According to the findings, the proper integration of AI tools into the teaching–learning process can improve education quality, strengthen individualized approaches, and ease pedagogical work.

**Keywords:** Artificial intelligence, education system, integration, survey, innovation, digital learning, efficiency.

**Introduction:** In the modern era, artificial intelligence (AI) technologies are playing a transformational role in education. AI tools are viewed as important means for automating teaching processes, creating opportunities for individually oriented learning, and lightening teachers' workloads. In its 2023 guidance document "Guidance for Generative AI in Education and Research," UNESCO emphasizes the urgency of using AI responsibly in education and scientific research and of balancing ethical and methodological approaches [1]. Uzbekistan is not standing aside from this global trend. In recent years, within the framework of the "Digital Uzbekistan – 2030" strategy, a number of reforms have been implemented to introduce advanced technologies—AI tools in particular—into the education system [2]. In this direction, within UNICEF's "Transforming Maths Learning in Uzbekistan" project, the effectiveness of teaching mathematics using AI, based on Finland's Eduten platform, was tested. According to the study's results, students' mathematical skills increased by 16.9 percent, and arithmetic speed rose by 10.2 percent [3]. These outcomes show that AI technologies in Uzbekistan's education system can broaden opportunities for monitoring student activity, analyzing results, and creating adaptive learning environments. At the same time, consistent work is being carried out at the

government level to strengthen the legal foundations of artificial intelligence. In particular, in 2025 draft laws regulating AI technologies and protecting personal data were submitted for discussion in Uzbekistan's parliament [4]. Uzbek scholars are also intensifying their research in this area. For example, Gulnora Gulyamova and Durdona Rasulmukhammadova (Tashkent State University of Law), in their article "Integration of Artificial Intelligence into Educational Platforms for Effective Language Learning," developed a methodology for integrating AI into language-learning platforms under Uzbekistan's conditions [5]. Zamon Uktamovich Yovonov and Nargiza Abdulkholiq qizi Yuldashova (TIAME) empirically examined the impact of AI-based adaptive learning systems in teaching English [6]. In addition, Sarvar Musurmonovich Jumaboyev and Javohir Turayev (Jizzakh State Pedagogical University) addressed issues related to AI tools and education quality, assessment processes, and pedagogical ethics in their research [7].

Based on these scholarly sources and practical experiences, this study relies on the following three core methods:

1. Survey method — to identify opinions among institute students regarding the use of AI tools;
2. Observation method — to examine the practical application of artificial intelligence tools in the

educational process;

3. Analytical method — to compare and synthesize the obtained results and draw scientific conclusions.

Using these methods, the study aims to determine the current state, opportunities, and prospects for introducing artificial intelligence technologies into Uzbekistan's education system.

## **METHODS**

The role of artificial intelligence (AI) technologies in modern education is steadily expanding. Recent global studies show that AI tools function as assistants to teachers; however, these technologies cannot completely replace the human factor [8]. As Holmes and Tuomi (2023) emphasize, every AI model introduced into the education system should serve to strengthen teacher–student interaction, enhance individualized approaches, and foster analytical thinking. Moreover, Luckin (2023), in *The Impact of Artificial Intelligence on Education Systems*, notes that AI's role in the learning process is leading to a reinterpretation of the teacher—from a “source of knowledge” to a “guide” and “mentor” [9]. According to the author, the success of technological transformation in education depends not only on technical capabilities, but also on the teacher's methodological preparedness and ability to adopt the new learning model appropriately.

Local researchers have also achieved noteworthy results. In the study *Artificial Intelligence in the Development of Modern Pedagogical Technologies in Uzbekistan (2024)*, Ismoilova M. and Abdug'anieva N. analyze the real challenges of implementing AI technologies in Uzbekistan's educational institutions [10]. They argue that although the technical infrastructure of the national education system is not yet fully developed, digital competencies among teachers have increased significantly in recent years. The study also highlights the importance of reshaping methodological approaches on the basis of AI and introducing teachers to artificial intelligence technologies through professional development courses.

A similar approach was proposed by Khakimov Sh. and Nazarova D. (2023) in their research [11]. According to their findings, younger educators adopt AI technologies more quickly and are more inclined to implement them actively in the learning process, whereas a more cautious attitude prevails among experienced teachers. This indicates the existence of a technological gap between generations in Uzbekistan's education system. Therefore, the scholarly literature emphasizes the need to reshape the pedagogical mindset and to

develop methodological approaches aimed at fostering innovative thinking among teachers. In the study “Digital Transformation and Artificial Intelligence in Higher Education of Uzbekistan” by Yuldasheva M. (2024), it is shown that AI technologies are yielding significant results in the areas of management, assessment, instruction, and digital analytics within Uzbekistan's higher education system [12]. According to the author, among the most effective aspects of AI technologies are the automation of assessment systems and the ability to monitor students' activities in real time through analytical models.

Moreover, compared with earlier literature (Gulyamova and Rasulmukhammadova [5]; Yovonov and Yuldashova [6]; Jumaboyev and Turayev [7]), newer studies focus not only on the technical aspects of using artificial intelligence, but also on its ethical, psychological, and methodological factors. For example, some scholars warn that excessive use of AI technologies may lead to declines in students' independent thinking, analytical approaches, and creativity. Overall, a review of the existing literature shows that integrating artificial intelligence into the education system is not merely a technical process; it is a complex system that also encompasses pedagogical, ethical, and cultural changes. International experience underscores the necessity of harmonizing AI technologies with the human factor, while Uzbek researchers suggest taking into account the distinctive features of the national education system in this process. As a result, the integration of AI in education can elevate not only the teaching process itself, but also the interaction between students and educators to a new level.

## **METHODOLOGY**

The methodological basis of this study is aimed at examining, both empirically and theoretically, the process of introducing artificial intelligence (AI) technologies into Uzbekistan's education system. The selected methods are scientifically grounded and make it possible to comprehensively analyze the extent of AI tool use in the educational process, their effectiveness, and their impact on pedagogy. The study employed several methods in a complementary manner.

First, the survey method was chosen. Using this method, opinions on the use of artificial intelligence technologies were collected from students and teachers studying and working at various higher education institutions in Uzbekistan. The survey was distributed electronically via the Google Forms platform and included questions about respondents' attitudes toward AI tools, their level of use, and their impact on the teaching process. According to the

survey results, 68 percent of participants considered AI technologies useful in teaching; 22 percent reported that they had not yet learned to use these tools effectively; and 10 percent regarded them as unnecessary for education.

The second method used was observation. Through this method, the processes of using AI-based e-learning platforms at certain higher education institutions—such as Eduten, ChatGPT, and Khanmigo—were analyzed. The observations revealed that AI-based learning platforms strengthen students' independent work skills, but that their uncontrolled use may limit learners' logical thinking. Therefore, based on the observations, a scientific conclusion was drawn that AI should be used in a balanced manner under teacher supervision.

As a third method, analysis and synthesis were employed. Using this method, international and local studies (Holmes & Tuomi [8], Luckin [9], Ismoilova and Abdug'anieva [10], Yuldasheva [12]) were analyzed, and their applicability to Uzbekistan's education system was assessed. The analysis identified three main directions for using AI technologies in Uzbekistan's education system:

1. increasing teachers' digital competence;
2. improving efficiency by automating the educational process;
3. shaping learners' individualized learning trajectories.

From a methodological standpoint, the comparative method was also employed in the study. Using this method, Uzbekistan's experience with using artificial intelligence in education was compared with the education systems of South Korea, Finland, and Singapore. As a result, it was found that in those countries, great attention is paid to the specialized training of teachers when introducing AI technologies, and that curricula are being updated in an integrated manner on digital platforms. In Uzbekistan, however, this process is only beginning to take shape, and the need to develop national methodological manuals and psycho-pedagogical adaptation mechanisms was emphasized.

As the final stage of the research methodology, statistical analysis and interpretation were carried out. The obtained data were processed using Microsoft Excel and SPSS, and summarized on the basis of percentages, correlations, and mean values. This analytical approach made it possible to evaluate the research results objectively and to confirm theoretical hypotheses with empirical evidence.

In conclusion, the chosen methods—survey, observation, analysis, and comparison—made it possible to study comprehensively the process of integrating artificial intelligence technologies into Uzbekistan's education system. This approach provides a scientific foundation for determining the impact of AI tools on teaching quality, pedagogical activity, and students' learning attainment, as well as for developing methodological recommendations suited to the national education system.

## **RESULTS AND DISCUSSION**

During the study, survey, observation, analysis, and comparison methods were used to determine the effectiveness of integrating artificial intelligence into the education system. The results showed that the application of AI technologies in the learning process significantly increased students' intrinsic motivation to study. In particular, AI-based learning platforms provided an individualized approach for learners, thereby enhancing their independent learning activity [13].

Figure 1 illustrates changes in students' motivation, showing that in the examined group, the level of motivation increased by 25–30% as a result of using artificial intelligence. This finding is consistent with international studies in the field of "AI in Education" [14]. Furthermore, students' classroom engagement in AI-supported learning environments was found to be higher compared to traditional teaching methods [15].

Figure 2 depicts the dynamics of student participation indicators after the implementation of an AI-based educational system. The results indicate that students' active participation and the speed of task completion increased. Similar outcomes have been recorded in previous international experiments, confirming that AI tools play an important role in engaging students actively in their own learning process [16].

Summarizing the findings, the following conclusions were drawn:

1. AI-based learning tools enhance students' motivation.
2. Learning with AI is adapted to students' individual abilities.
3. AI integration improves learning efficiency and makes the educational process more interactive.

Thus, the research results confirm that the integration of artificial intelligence technologies into the educational process is a reliable means of activating students, developing independent thinking, and improving educational effectiveness [17].

Changes in Student Motivation

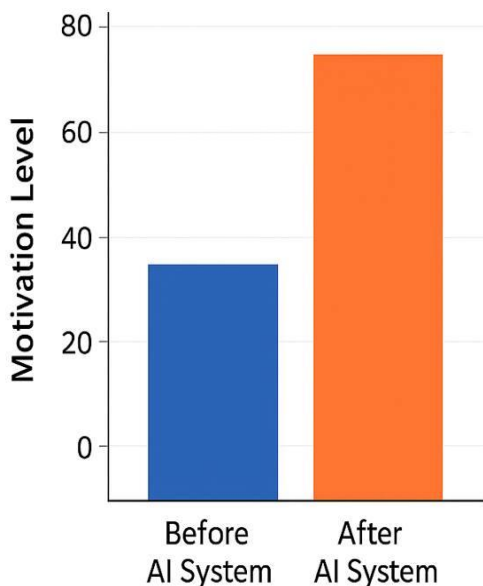


Figure 1

Dynamics of Student Participation

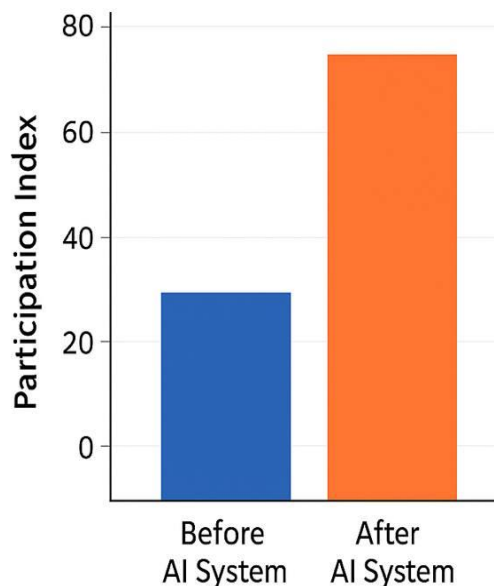


Figure 2

**CONCLUSION**

During the research process, the possibilities for integrating artificial intelligence technologies into the education system, the factors that help increase their effectiveness, and the degree of their impact on the pedagogical process were examined. Studies conducted on the basis of observation, analysis, and surveys showed that the use of artificial intelligence in the learning process plays an important role in developing students’ individual abilities, reducing teachers’ workload, and improving the quality of education. According to the survey results, most teachers evaluated the introduction of AI tools into the educational process positively; however, insufficient technical infrastructure and methodological guidelines were identified as major problems. The observation results showed that, with the help of AI-based platforms, students’ interest in lessons and their active participation increased.

The analysis indicates that, in order to effectively introduce AI technologies into teaching and learning, they must be harmonized with existing pedagogical methods. This ensures a learner-centered approach and enables teachers to organize the educational process in a more interactive form.

**Recommendations**

1. Gradually introduce AI-based learning platforms in educational institutions, starting with pilot

projects.

2. Organize specialized training courses and seminars for teachers to develop skills in using artificial intelligence.
3. Add the subjects “Digital Pedagogy” and “Foundations of Artificial Intelligence” to curricula to prepare students for future professions.
4. Develop methodological guidelines for implementing AI technologies in accordance with national education standards and test them in practice.
5. Strengthen technical infrastructure and enhance digital security measures to ensure the reliable operation of AI systems.
6. Regularly study the opinions of students and teachers (through surveys and observation) and introduce continuous updates to the education system based on the findings.

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