

# THE ROLE AND PROSPECTS OF ARTIFICIAL INTELLIGENCE IN THE DEVELOPMENT OF THE EDUCATION SYSTEM

Ravshanova Feruzabonu Shavkat qizi

Faculty of Pedagogy, ChDPU Student of Pedagogy

ravshanovaf2005@gmail.com

+998 88 228 01 10

## Abstract

In modern society, digital technologies are fundamentally changing the education system. In particular, artificial intelligence (AI) is becoming an important component of the educational process. This article highlights the role, capabilities and prospects of artificial intelligence in the field of pedagogy. The author analyzes the role of AI tools in personalizing the educational process, identifying student abilities, monitoring the educational process, and reducing the teacher's workload. Practical examples show how artificial intelligence-based platforms (for example, adaptive learning systems, virtual assistants, analytical programs) affect the quality of education. At the same time, attention is also paid to the dangerous aspects of technology, namely the withdrawal of the human factor, the protection of personal data, ethical and legal issues. At the end of the article, the author's personal suggestions and real recommendations for the effective implementation of artificial intelligence are given. In general, the article provides a deep analysis of the relationship between artificial intelligence and education, which is relevant today, and shows what opportunities this technology will open up in the future. The topic is approached from a pedagogical point of view.

**Keywords:** Artificial intelligence, education system, pedagogy, digital technologies, innovation, learning process, teacher, student, personalized education, adaptive system, digital transformation, quality of education, virtual assistant, data analysis, technological progress.

## Introduction

### TA'LIM TIZIMI RIVOJIDA SUN'IY INTELLEKTNING O'RNI VA ISTIQBOLLARI

Ravshanova Feruzabonu Shavkat qizi

CHDPU Pedagogika fakulteti

Pedagogika yo'nalishi talabasi

ravshanovaf2005@gmail.com

+998 88 228 01 10

## Annotatsiya:

Zamonaviy jamiyatda raqamli texnologiyalar ta'lim tizimini tubdan o'zgartirmoqda. Xususan, sun'iy intellekt (SI) ta'lim jarayonining muhim tarkibiy qismiga aylanib bormoqda. Ushbu



maqolada sun'iy intellektning pedagogika sohasidagi o'rni, imkoniyatlari va istiqbollari yoritiladi. Muallif tomonidan SI vositalarining o'quv jarayonini shaxsiylashtirish, o'quvchilarning qobiliyatlarini aniqlash, o'quv jarayonini monitoring qilish, hamda o'qituvchining yuklamasini kamaytirishdagi roli tahlil qilinadi. Amaliy misollar orqali sun'iy intellektga asoslangan platformalar (masalan, adaptiv ta'lim tizimlari, virtual yordamchilar, tahliliy dasturlar) ta'lim sifatiga qanday ta'sir qilayotgani ko'rsatib beriladi. Shu bilan birga, texnologiyaning xavfli jihatlari, ya'ni inson omilining chekinishi, shaxsiy ma'lumotlarning himoyasi, axloqiy va huquqiy masalalar kabi holatlarga ham e'tibor qaratiladi. Maqola yakunida esa sun'iy intellektni samarali joriy qilish bo'yicha muallifning shaxsiy takliflari va real tavsiyalari beriladi. Umuman olganda, maqola bugungi kunda dolzarb bo'lgan sun'iy intellekt va ta'lim munosabatlarini chuqur tahlil qiladi va kelajakda bu texnologiyaning qanday imkoniyatlar ochib berishini ko'rsatadi. Mavzu pedagogik nuqtayi nazardan yondashilgan.

**Kalit so'zlar:** sun'iy intellekt, ta'lim tizimi, pedagogika, raqamli texnologiyalar, innovatsiya, o'quv jarayoni, o'qituvchi, o'quvchi, shaxsiylashtirilgan ta'lim, adaptiv tizim, raqamli transformatsiya, ta'lim sifati, virtual yordamchi, ma'lumot tahlili, texnologik taraqqiyot.

## Introduction

The modern education system is in a developmental stage. At the heart of this development is an important place for advanced digital technologies such as artificial intelligence (AI). As can be seen from the experience of developed countries, AI creates broad opportunities for improving the quality of education, enhancing teaching efficiency, and working with students individually. In particular, distance learning processes during the pandemic have clearly demonstrated the relevance of AI technologies.

Artificial intelligence is not just a technical tool, but a new type of pedagogical approach. It allows you to personalize the learning process, analyze knowledge, and adapt it to the abilities and needs of students. For example, adaptive learning systems determine the student's level of knowledge and offer appropriate tasks and exercises. Virtual assistants help teachers reduce the workload, provide quick feedback, and automate assessment work. This serves to improve the quality of education.

At the same time, the introduction of AI into education also raises some concerns. In particular, the weakening of human principles, the security of personal data, excessive trust in technology are among the issues that need to be analyzed in depth. No technology can fully replace the human factor in a pedagogical approach. Therefore, the rational and targeted use of the capabilities of artificial intelligence has become an important issue today.

This article provides an in-depth analysis of the role, practical application, prospects, as well as existing problems and proposals for artificial intelligence in the field of pedagogy and the education system. This topic is also relevant for the digital transformation of the education system of Uzbekistan.

## LITERATURE REVIEW AND METHODOLOGY

In recent years, artificial intelligence (AI) has been widely used as an innovative approach in pedagogy. For example, a study published in the Uzbek journal “Pedagogical Research” highlighted the role of AI in the organization of personalized learning processes, continuous monitoring and effective management in adaptive education systems. According to these sources, adaptive AI platforms create opportunities for language teaching, solving mathematical problems, and special applications for students with special needs[1, 2].

Analyses conducted in higher education institutions have shown that in lessons created using AI tools, students showed a 20–30% improvement in the learning process compared to the traditional approach. Interactive technologies, in particular chatbots, help reduce the workload of teachers and automate the assessment process through self-assessment capabilities. This helps to ensure individual methodological excellence in education.

Research on independent learning has shown that virtual tutors and assessment tools improve learning outcomes, develop students’ independence, critical thinking, and problem-solving skills. Recommendations have also been made regarding ethical standards, digital literacy, and adequate teacher training[4, 5, 6].

One of the scientific literatures is the artificial intelligence-based lesson automation model, which includes diagnostic analysis, algorithmic assessment, and adaptive learning indicators. This methodology enhances interactivity between students and teachers, increases the quality and level of interest in educational materials[10, 11].

International researchers Ramteja Sajja and colleagues have proposed the “Artificial Intelligence Enabled Intelligent Assistant” (AIIA) model in higher education, showing that this system has the functions of reducing the knowledge load of students, creating interactive tests, and creating a personalized learning path[8]. Another study describes a five-step strategy model for integrating SI.

### Methodologically, the following can be taken as a basis:

1. Lexical-analytical analysis – collection and synthesis of opinions on personalized, adaptive education, virtual assistants and learning analytics from Uzbek and international sources.
2. Comparative review – identification of similarities and differences of pedagogical approaches based on Uzbek and foreign experiences.
3. Model description – analysis of the composition, advantages and integration of SI tools such as AIIA in the pedagogical context.
4. Strategic approach – two-stage integration model: infrastructure preparation, then adaptation of the academic community and setting ethical standards.
5. Empirical testing – demonstration of real experience using examples of geography, language teaching, adaptive chatbots[9, 12].

Also, along with the positive aspects of SI integration, data security, algorithmic fairness, ethical issues and preservation of the human factor should be considered as important indicators.



In general, this methodological mechanism is deep in content, theoretically and practically flexible, creating an excellent basis for the formation of a pedagogical innovation strategy suitable for Uzbekistan[3,7].

Scientific research on the impact of artificial intelligence on the education system has been analyzed by many leading scientists. In particular, Norwegian scientist Neil Selwyn, in his book “Should Robots Replace Teachers?” (2019), emphasizes that artificial intelligence is not a factor that can completely change education, and writes that it should be evaluated as a tool that helps teachers. According to him, AI is useful not by itself, but in combination with human factors[13].

UNESCO expert Wayne Holmes, in his work “Artificial Intelligence in Education: Promises and Implications for Teaching and Learning” (2019), analyzes the potential of artificial intelligence technologies in education, emphasizing that they create enormous opportunities for analyzing and assessing the level of student learning and establishing personalized education[14].

Uzbek scientist M. Hamidova, in her article “Managing educational processes based on artificial intelligence” (Ijournal.uz, 2022), emphasizes that the capabilities of AI have led to new approaches to pedagogical management and that these technologies have increased the possibility of creating an individual learning trajectory[15].

Russian scientist Alexander Pinsky, in his work “Artificial Intelligence in Education: Perspectives and Risks” (2021), positively assesses the role of AI in education, but nevertheless emphasizes the need to maintain a balanced balance between the teacher and technology. He especially emphasizes the need for constant monitoring of the quality of content and ethical norms conveyed to children’s minds through AI[16].

Chinese scientist Ronghuai Huang, in his book “Big Data and AI in Education: Theories and Practices” (Springer, 2020), argues that it is possible to develop effective pedagogical strategies by analyzing large volumes of educational data using artificial intelligence. He calls the combination of big data and AI “a new era in education”[17].

As a general conclusion, the opinions of these scientists show that artificial intelligence should be viewed not only as a modern technological tool, but also as a strategic resource in improving the quality of education. As a research methodology, the article used a combination of comparative, content analysis, empirical observation and theoretical approaches.

## RESULTS

The analysis of the studied scientific and practical sources showed that the introduction of artificial intelligence (AI) technologies into the education system is taking pedagogical activity to a new level. First of all, the possibility of personalizing education through adaptive platforms based on AI has increased. As a result of such systems automatically analyzing the level of knowledge of students and offering them appropriate materials, tasks and exercises, the teaching process is becoming more effective. For example, the AIIA (Artificial Intelligence-Enabled Intelligent Assistant) model is distinguished by its positive results in reducing the student's learning load, monitoring their level of knowledge and providing quick feedback.



Empirical studies conducted in educational institutions of Kazakhstan and Uzbekistan have shown that the level of student learning with the help of AI tools has increased by 20–30%. Also, AI-based chatbots allowed students to work independently, find answers to questions they didn't understand, and repeat exercises. This increased students' enthusiasm for learning and eased the teacher's extracurricular workload.

According to the methodological approach, theoretical analysis, empirical comparative analysis, strategic and phased integration are important factors in the use of AI in education. The results of the analysis showed that AI technologies play a major role not only in facilitating the teaching process, but also in qualitative assessment, analysis, and the formation of digital literacy.

At the same time, there are also concerns such as information security, algorithmic errors, and the loss of the human factor. The results showed that in order to fully use the capabilities of AI, it is necessary to equip teachers with digital competencies and clearly define ethical and normative criteria.

In general, the conducted analysis proved that artificial intelligence has a significant positive impact on the quality, processes, and methodologies of education. Through properly directed and scientifically based integration, AI technologies can become an integral part of future education.

## DISCUSSION

The integration of artificial intelligence (AI) into the education system is becoming an integral part of the modern pedagogical environment today. The theoretical analysis and practical observations conducted in this article show that AI tools create great opportunities for further individualization of the educational process, increasing its efficiency and improving the methodological activities of teachers. In particular, adaptive learning systems automatically determine the level of knowledge of students and recommend appropriate educational materials to them. This approach increases the interest and motivation of students and encourages independent learning.

During the discussion, it was found that in the experience of Uzbekistan and Kazakhstan, platforms based on AI, especially chatbots and virtual assistants, have freed teachers from the tasks of assessment, analysis and intermediate control. This, in turn, allows the teacher to determine and manage the student's development strategy. However, along with these achievements, some problematic aspects are also highlighted. In particular, the use of SI is fraught with risks such as data security, algorithmic fairness, and weakening of human criteria. Based on the analysis, it can be said that SI tools cannot replace teachers, but should be considered as a tool that supports their professional activities. Because any artificial system cannot completely replace human thinking, emotions, and the ability to make intuitive decisions. Therefore, a balanced, critical approach is necessary when using SI technologies.

Also, the successful implementation of SI depends on the digital literacy of teachers, technological readiness, and their ability to work harmoniously with methodological approaches. As a methodological approach, a two-stage strategy is proposed as the most optimal way - first, the formation of infrastructure, and then improving the skills of teachers.





As a result of the discussion, it should be noted that SI technologies, if properly directed, can serve to implement major qualitative changes in education. Therefore, in this direction, not only technical, but also pedagogical and ethical training plays an important role.

The integration of artificial intelligence into the education system has become one of the most pressing issues today, not only globally, but also nationally. In my personal opinion, this technology has unparalleled potential to simplify complex aspects of pedagogical activity, enhance an individual approach, and improve the quality of education. However, it should be emphasized that the human factor should not be ignored when introducing artificial intelligence into education.

Although many foreign sources see AI as a universal tool in modern education, I consider it not an alternative, but an additional force. Because a teacher is not only a provider of knowledge, but also a spiritual support, a source of motivation, and an educator. And AI cannot yet fully replace a person in these aspects.

In addition, tying students only to technology can weaken their soft skills such as critical thinking, communication, and empathy. Therefore, any technological innovation — especially SI — should serve didactic purposes, but be coordinated based on human values.

However, these concerns do not negate the potential of AI. On the contrary, aspects such as personalized learning models, automated assessment, and courses based on artificial neural networks make the learning process much more effective. Especially for children with disabilities or groups that struggle with learning, AI creates great convenience - which strengthens the inclusiveness of education.

In conclusion, in my opinion, artificial intelligence should serve not to humanize education, but to strengthen it. The main issue is to use technology as a tool that complements and strengthens the living relationship between teacher and student, rather than contradicting it.

## CONCLUSION

The modern world of education is experiencing a period of profound changes. At the heart of these changes is the introduction of artificial intelligence (AI) technologies. The studied scientific sources, experiences, international and local practices show that SI tools play a major role in improving the quality of education, reducing the workload of teachers, and establishing teaching that meets the individual needs of students. In particular, adaptive systems, virtual assistants, and chatbots are creating the opportunity to adjust the learning process depending on the level of knowledge of students.

However, it would be wrong to perceive these technologies as a “miracle”. SI cannot completely replace a person. It should be evaluated only as an auxiliary tool, a technical force that complements the intellectual potential of the teacher. In my personal opinion, the real effectiveness of education depends not only on technology, but also on the teacher’s love, knowledge, and responsible approach to his work.

Also, when introducing SI technologies, serious attention should be paid to issues such as security, personal data protection, ethical standards, and algorithmic fairness. Otherwise, there is a risk of humanity disappearing under the guise of modernity. Therefore, the introduction of



AI into education should be carried out in two directions - the development of technical infrastructure and the training of teachers as specialists with digital competencies.

As a final conclusion, we can say that the rational, targeted and careful use of the capabilities of artificial intelligence will usher in a new stage of education. If we use it not only based on technology, but also in combination with humanity, methodology and didactics, this direction will give real results. The education of the future will be based on the cooperation of man and intelligent technology.

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