



INTRODUCTION AND DEVELOPMENT OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN THE EDUCATION SECTOR OF UZBEKISTAN

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Annotatsiya: Maqolada O'zbekiston ta'lim tizimida sun'iy intellekt texnologiyalarini joriy etish jarayonlari, ularning imkoniyatlari va rivojlanish istiqbollari tahlil qilingan. Xususan, “Raqamli O'zbekiston – 2030” strategiyasi, Sun'iy intellektni rivojlantirish milliy strategiyasi va oliy ta'lim muassasalarida olib borilayotgan islohotlar asosida sun'iy intellektning ta'limdagi roli yoritilgan. Sun'iy intellekt asosida shaxsiylashtirilgan ta'lim, avtomatlashtirilgan monitoring va baholash, masofaviy ta'limni qo'llab-quvvatlash kabi afzalliklarni hamda mavjud muammolar haqida bayon etilgan.

Kalit so'zlar: Sun'iy intellekt, ta'lim tizimi, raqamli transformatsiya, O'zbekiston, shaxsiylashtirilgan ta'lim, raqamli kompetensiya.

Аннотация: В статье анализируются процессы внедрения технологий искусственного интеллекта в систему образования Узбекистана, их возможности и перспективы развития. В частности, освещается роль искусственного интеллекта в образовании на основе стратегии «Цифровой Узбекистан – 2030», Национальной стратегии развития искусственного интеллекта и проводимых реформ в высших учебных заведениях. Описаны преимущества персонализированного образования на основе искусственного интеллекта, автоматизированного мониторинга и оценки, поддержки дистанционного обучения, а также существующие проблемы.

Ключевые слова: Искусственный интеллект, система образования, цифровая трансформация, Узбекистан, персонализированное образование, цифровые компетенции.

Annotation: The article analyzes the processes of introducing artificial intelligence technologies in the education system of Uzbekistan, their capabilities and development prospects. In particular, the role of artificial intelligence in education is highlighted based on the “Digital Uzbekistan - 2030” strategy, the National Strategy for the Development of Artificial Intelligence and reforms being



carried out in higher education institutions. The advantages of artificial intelligence-based personalized education, automated monitoring and assessment, and support for distance learning, as well as existing problems, are described.

Keywords: Artificial intelligence, education system, digital transformation, Uzbekistan, personalized education, digital competence.

Introduction

Artificial intelligence has deeply penetrated the education sector by the present day, making its role in the education system immeasurably incomparable. In particular, artificial intelligence helps automate the main activities in education.

In recent years, digital technologies, especially in the field of artificial intelligence, are developing rapidly on a global scale. This process is not bypassing Uzbekistan's education system either. Within the framework of the digital transformation policy, a number of measures are being implemented in our country to introduce artificial intelligence technologies, modernize the educational process, and align with international education standards. The role of artificial intelligence in education not only organizes the knowledge acquisition process efficiently but also serves personalized teaching, analysis of student activities, management of educational resources, and improving the quality of education. Artificial intelligence is currently considered one of the most important innovative directions in the education system.

In world experience, artificial intelligence technologies are widely used in personalizing the educational process, automating it, and increasing its efficiency [1]. In Uzbekistan as well, modernizing and digitizing the education system is one of the priority directions of state policy. Within the framework of the "National Strategy for the Development of Artificial Intelligence" adopted in 2021 and the "Digital Uzbekistan – 2030" concept, a number of measures are being implemented to integrate artificial intelligence technologies into the education system [2-3].

Materials and Methods. In preparing the article, the following scientific-methodological approaches were used: analytical analysis, comparison method, statistical and legal sources analysis:

At present, teachers can almost effortlessly evaluate multiple types of alternative tests and assignments, make changes to them, without causing difficulties in assessing tasks completed by students. In such cases, students have the opportunity to receive additional help from artificial intelligence teachers.



These programs teach students the procedure for completing assignments, but they are not ideal for teaching higher-order thinking and creative thinking to students in the current era, which is a program necessary to facilitate the work of real-world teachers.

Results

Artificial intelligence-based programs provide useful feedback to students and teachers. Artificial intelligence cannot only help academics and students create tailored courses according to their preferences, but it can generally provide opinions on the success of the course for each person. Such types of artificial intelligence systems help students support themselves and professors search for areas to improve teaching.

Artificial intelligence changes the role of teachers. There will always be work for teachers in the education sector, but what this role is and what it means may change due to new technologies like intelligent computing systems. Artificial intelligence can take on tasks such as assessment, help students improve their learning, and even replace real tutoring.

Intelligent data collection managed by computer systems is already making changes to interactions with future students. From hiring to helping students choose the most effective courses, and assisting in adapting intelligent computer systems to students' needs and goals.

Artificial intelligence automating routine tasks allows humans to focus on more complex tasks and frees up time for rational use, which significantly increases work efficiency. In addition, artificial intelligence enables the development of new ideas and technologies, and the creation of products and services that were previously impossible. However, the development of artificial intelligence also raises questions in the areas of ethics, privacy, and security, so it is necessary to develop relevant rules and laws, train specialists to effectively use and protect artificial intelligence.

In general, studying artificial intelligence is of great importance to keep pace with the rapidly developing world and to harness the power of artificial intelligence. This helps develop skills required in the future and understand how to effectively use technology to achieve various student goals in the educational process.

The introduction of artificial intelligence technologies in Uzbekistan's education system is leading to the following results:

1. Personalized teaching – individual programs are being developed based on artificial intelligence algorithms according to students' knowledge level, interests, and abilities.





2. Automatic assessment systems – the possibility of quick and impartial online evaluation of tests, detection of plagiarism has been created [4].

3. Support for distance learning – electronic platforms (kundalik.uz, edu.uz) are being improved based on artificial intelligence.

4. Personnel training – "Artificial Intelligence and Data Analysis" directions have been opened at Tashkent University of Information Technologies (TATU), Tashkent State Technical University (TSTU), and other higher education institutions.

5. State policy support – since 2023, professional development courses on artificial intelligence and digital competencies for teachers have been launched [5].

Discussion

In recent years, comprehensive work is being carried out in Uzbekistan's education sector to introduce and develop artificial intelligence technologies [6]. The main aspects in this direction are presented in Table 1.

Table 1:

Introduction and Development of Artificial Intelligence Technologies in the Education Sector of Uzbekistan

1.	E-learning platforms and distance learning
Distance education systems are developing in Uzbekistan, some of which are trying to provide an individual approach using artificial intelligence.	
2.	Data analysis and education monitoring
Artificial intelligence systems that automatically analyze student performance are being tested in higher education institutions.	
3.	Language processing technologies
Programs based on artificial intelligence are being developed in the fields of text analysis, speech recognition, and translation in the Uzbek language.	
4.	Virtual teachers and intellectual professors
Some higher education institutions are working to create virtual professors and chatbots for students.	
5.	Artificial intelligence technologies to improve the quality of education
Efforts are being made to reduce the burden on teachers and make the assessment process fairer through automated grading systems for tests and exams.	
6.	Innovative startups and project activities





Innovative startups in the field of education based on artificial intelligence are operating in Uzbekistan, creating products aimed at improving the quality of education.

Although the process of introducing artificial intelligence technologies in Uzbekistan's education system is still at the initial stage, it has great potential. However, the following problems exist:

- shortage of qualified specialists;
- insufficiency of educational programs in artificial intelligence;
- incomplete formation of technical infrastructure;
- insufficiency of funding allocated for scientific research projects.

Foreign experience shows that cooperation between the state, private sector, and scientific institutions plays a significant role in effectively introducing artificial intelligence technologies [7]. Therefore, in Uzbekistan as well, it is necessary to support artificial intelligence education projects on the basis of public-private partnerships.

Conclusion

The process of introducing artificial intelligence technologies in Uzbekistan's education system is developing step by step. These technologies help improve the quality of education, widely implement personalized approaches, and effectively manage the activities of students and pupils. In the future, if the existing problems are gradually resolved, Uzbekistan's education system can become internationally competitive and integrate with advanced innovative approaches.

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