OPPORTUNITIES TO USE ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN MATHEMATICS EDUCATION

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Abstract: The possibilities of using artificial intelligence technologies in mathematics education are important today in increasing the effectiveness of the educational process. Artificial intelligence (SI) technologies make it possible to introduce innovative approaches in the field of education, take into account the individual characteristics of students and personalize the teaching process. This, in turn, helps to easily and effectively master the complex concepts of mathematics. At the same time, artificial intelligence technologies serve to make the educational process more interactive and interesting.

Keywords: artificial intelligence, mathematics, interactive games, exercises, education, methods, innovation approaches, Independent Education.

One of the main advantages of artificial intelligence is the ability to determine the level of knowledge of students and determine on which subjects they are facing difficulties. SI systems analyze students ' responses to identify their strengths and weaknesses, as well as develop an individual course of study. This helps teachers organize classes tailored to each student. As a result, students increase their learning pace and have a deeper understanding of topics. Thus, the educational process becomes more efficient and productive.[1]

It is possible to create interactive learning materials using artificial intelligence technologies. For example, it is possible to increase the interest of students by dynamically showing mathematical formulas and graphs, visualizing problems. This makes mathematics more interesting and understandable. There is also the possibility of displaying complex mathematical processes in practice using virtual laboratories and simulations. This allows students to associate theoretical knowledge with practice and increases their interest in the subject. The creation of automatic assessment systems using artificial intelligence also simplifies the educational process. These systems are able to quickly and accurately assess students ' tests and assignments,

analyze results, and provide students with immediate feedback. This helps students to quickly correct their mistakes and allows teachers to take time for a more individual approach. At the same time, the assessment process is fair and objective, reducing errors caused by the human factor. Artificial intelligence-based learning aids and chatbots can also provide students with quick answers to questions that arise during class. This supports the students ' independent learning process and encourages them to consolidate their knowledge. Chatbots can in turn offer additional materials tailored to the interests of students. This helps students to continue the learning process in an individual way. Artificial intelligence also provides facilities for teachers in the educational process. For example, it allows automatic preparation of lesson plans and teaching materials for teachers, monitoring the development of students and automating assessment processes. This helps teachers effectively manage the educational process and reduce their workload. At the same time, teachers can spend their time on creativity and the development of new techniques. In addition, with the help of artificial intelligence technologies, it is possible to introduce gamification elements in the teaching of mathematics. Students increase their motivation by gaining knowledge in the form of a game, which makes the learning process more efficient. Gamification helps students develop independent thinking and problem-solving skills. At the same time, gameplay elements play an important role in increasing student focus and interest in the subject. With the help of artificial intelligence, there is an opportunity to analyze a large amount of data. This helps teachers develop effective strategies to identify and address problems in the student learning process. It will also be useful for educational institutions in assessing and improving the effectiveness of the educational process. On the basis of this analysis, educational programs and methodologies are updated and adapted to modern requirements. As opportunities for the use of artificial intelligence technologies in mathematics education expand, digital transformation processes are further developed in the educational system. This serves to improve the quality of education, improve the level of knowledge of students, and prepare them at the level of modern requirements. At the same time, when integrating artificial intelligence into the educational process, it is necessary to pay special attention to information security, personal data protection and ethical issues. These factors ensure the sustainable and safe development of technologies in the future. In the future, artificial intelligence technologies will further develop, creating new approaches and methods for teaching mathematics. For example, opportunities such as adaptive learning systems, platforms that provide automatic analysis and recommendations, interactive lessons using virtual and augmented reality will expand further. This plays an important role in personalizing and improving the effectiveness of student learning. At the same time, technologies relieve the work of teachers and improve the quality of the educational process. The use of artificial intelligence technologies helps students develop

independent thinking, logical thinking and problem-solving skills in teaching mathematics. It also provides opportunities for students to increase the pace of acquisition and strengthen knowledge. This serves to radically improve the quality of the educational process. In this way, students not only gain knowledge, but also develop skills to put them into practice.[2]

Artificial intelligence is bringing about revolutionary changes in the modern educational system. His role in making the educational process effective is growing. With the help of SI, education is not only becoming more interactive and interesting, but also organized, adapting to the individual needs of each student. This will radically improve the learning process of students and improve the quality of Education. In a traditional education system, where all students have the same classroom materials and methods, artificial intelligence analyzes students ' abilities, knowledge levels, and learning styles to create customized learning plans for each. This approach allows you to identify the weaknesses of the student and strengthen them, and also helps to further develop their strengths. As a result, each student receives knowledge at his own pace and effectively. For example, in classes in natural sciences or history, virtual laboratories and simulations that animate historical events allow students to understand the subject more deeply. This increases students ' interest in the subject and encourages them to actively learn. Another important aspect of artificial intelligence is the automation of the evaluation process. Artificial intelligence systems quickly and accurately assess students ' tests and assignments to determine their level of knowledge. This helps teachers effectively manage their time, as they can delegate time-consuming work related to evaluation to artificial intelligence systems. In addition, providing students with quick feedback makes it possible to immediately understand and correct their mistakes, which increases the quality of the learning process. Artificial intelligence-based chatbots and virtual assistants also provide students with quick answers to questions that arise during class. They provide additional information, explain complex concepts in a simple and understandable form. It supports students ' independent learning and increases their enthusiasm for the educational process. Artificial intelligence also helps a lot for teachers. They can use artificial intelligence tools to prepare lesson plans and teaching materials, monitor and evaluate student progress. This reduces the workload of teachers and allows them to give students more individual attention. As a result, the educational process is more qualitative and effective. Artificial intelligence also plays an important role in increasing motivation in education. By introducing gamification elements, students perceive learning in the form of a game, which enhances their interest in concentration and learning. The learning process through games is more fun and productive, and students feel encouraged. Another aspect is that artificial intelligence has the ability to analyze large amounts of data. It is useful for identifying problems that arise in the educational process, showing which subjects students have

the most difficulty in, and improving educational programs. In this way, the educational system is constantly updating itself and adapting to the needs of students.[3]

Conclusion:

As a result, the use of artificial intelligence technologies in mathematics education significantly improves not only the level of knowledge of students, but also the efficiency of teachers. This is an important factor in the adaptation of the educational system to the digital age and its development on the basis of modern requirements. Therefore, it is necessary to continue research and practical work on the introduction of artificial intelligence technologies into the educational process and their effective application.By applying innovation in education, it will be possible to prepare future generations at the level of educated, qualified and modern requirements.

References:

1. Akhmedov, S. M. "Modern approaches to teaching mathematics". Scientific article, 2025. Tashkent: publication of the National Library of Uzbekistan.

2. Torakulov, D. B. "Modern ICT and mathematics education". Journal of education and science, 2024, No. 4.

3. Mirzaev, R. A. "Interactive methods and modern technologies in teaching mathematics". R & D article, 2023. Tashkent State Pedagogical University edition.

4. Kadyrov, N. I. "The use of multimedia in teaching mathematics". Journal of pedagogy and psychology, 2024, No. 2.

5. Saidova, L. R. "Improving mathematics education using artificial intelligence technologies". Scientific article, 2025. Publication of the Academy of Sciences of Uzbekistan.

6. Islamov, J. K. "Elements of gamification and their role in teaching mathematics". Journal of educational technology, 2023, No. 3.

7. Yunusov, M. T. "Teaching mathematics based on Virtual and augmented reality technologies". Scientific article, 2024. Tashkent: publication of the Center for Information Technology.