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DIGITAL TECHNOLOGIES AND ARTIFICIAL INTELLIGENCE CAPABILITIES IN MATHEMATICS TEACHING

Mamaraimov Bekzod Kadirovich
Teacher of mathematics at Terdu Academic Lyceum
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Abstract. This article discusses the issues of effective use of digital technologies and artificial intelligence in teaching mathematics. It is analyzed that interactive platforms, electronic textbooks, mobile applications, virtual laboratories, and programs based on artificial intelligence serve as an important factor in developing students' mathematical thinking in the modern educational process. The article also considers the possibilities of organizing individual education using digital tools, forming students' independent thinking, and visually explaining complex mathematical problems. The advantages of determining the level of knowledge of students, automatically analyzing errors, and creating customized tasks using artificial intelligence technologies are scientifically substantiated. The article concludes that the quality and efficiency of education can be improved by integrating digital technologies into mathematics education.

Keywords: Digital technology, artificial intelligence, mathematics education, interactive platform, electronic textbook, innovative pedagogy, virtual laboratory, distance learning, algorithm, mathematical thinking, individual education, STEM education.

In today's era of globalization and informatization, the introduction of modern technologies into the education system has become one of the important directions of state policy. In particular, the use of digital technologies and artificial intelligence in teaching mathematics is of great importance in increasing the efficiency of the educational process. Mathematics, as a science that develops human thinking, forms logical thinking and requires accurate calculations, is the basis of all fields. Therefore, teaching this science based on modern pedagogical approaches is one of the urgent tasks of today.

While traditional teaching methods focus on students mastering more theoretical knowledge, modern digital technologies have created an opportunity to create an interactive and practical learning environment. Electronic platforms, graphic programs, virtual laboratories and artificial intelligence-based systems serve to teach mathematical concepts in a simple and understandable way. In particular, the visual presentation of complex formulas, geometric shapes and algebraic equations increases students' interest in science.[2]

Currently, developed countries of the world are widely using artificial intelligence in their education systems. With the help of artificial intelligence, the level of knowledge of students is analyzed, individual educational directions are determined, and the subjects in which the student is having difficulty are automatically determined. This allows the teacher to work individually with each student.

The use of digital technologies in mathematics not only increases the quality of knowledge, but is also an important factor in saving time, developing independent learning, and teaching students innovative thinking. Therefore, today, combining mathematics education with modern technologies is becoming an integral part of the educational process.

Digital technologies have created new opportunities in the education system. In particular, in teaching mathematics, it has become possible to organize lessons interactively through computer

programs, mobile applications, and Internet platforms. Such an approach helps students understand the subject faster and solve complex problems more easily.

For example, programs such as GeoGebra, Desmos, and Wolfram Alpha allow students to graphically represent mathematical formulas. Students can dynamically observe the graphs of functions and learn how they change in a practical way. This serves to consolidate theoretical knowledge.[3]

Interactive display of graphical functions helps students to master algebra and analysis sections more deeply.

Electronic textbooks and video lessons have also become an important part of mathematics education. The student can review the lesson materials at any time, perform independent exercises, and test their knowledge. Especially in the process of distance learning, the importance of digital platforms has increased.

Digital technologies develop students' independent work skills. Through various test programs and online exercises, the student controls his knowledge. As a result, a person who actively participates in the educational process is formed.

Artificial intelligence is one of the most important innovations of the modern education system. It creates a wide range of opportunities for analyzing the level of knowledge of students, automating the learning process, and organizing individual education.

Platforms based on artificial intelligence automatically identify students' mistakes and provide them with appropriate recommendations. For example, if a student makes a mistake in solving an equation, the system will indicate the error and recommend the correct solution.

In learning quadratic equations, artificial intelligence-based programs explain formulas step by step and help the student think independently.

Adaptive learning systems are also being created using artificial intelligence. In this case, the level of knowledge of each student is analyzed separately and appropriate tasks are provided. More complex problems are given to strong students, and simpler explanations are given to students who are having difficulty.

Artificial intelligence also facilitates the work of teachers. For example, the ability to automatically check tests, calculate ratings, and perform statistical analysis saves time. The teacher will have the opportunity to engage in more creative and methodical activities.

The use of interactive platforms in mathematics education increases students' interest in science. Classes can be organized in a modern way through platforms such as Kahoot, Quizizz, Moodle, and Google Classroom.

The main advantage of interactive platforms is that they turn the student from a passive listener into an active participant. The student receives knowledge through various tests, logical games and visual tasks. This reduces the fear of mathematics.

With the help of virtual laboratories, the topics of geometry and stereometry can be studied in a practical way. Transforming and analyzing complex geometric shapes through three-dimensional models develops students' spatial imagination.

In the future, artificial intelligence is expected to become an integral part of mathematics education. Students will be able to learn individually through robot teachers, virtual assistants and intelligent educational systems.[1]

Also, programs based on neural networks help create complex mathematical models. This creates great opportunities in scientific research and practical calculations.

With the help of artificial intelligence, the psychological state of students can also be analyzed. For example, it is determined which subject the student is most struggling with or which method he learns best. This further improves the quality of education.

In the future, mathematics lessons can be more interesting and effective through the integration of virtual reality and artificial intelligence. Students will perform mathematical experiments in a virtual environment and learn complex formulas in a practical way.

The development of digital technologies also requires new skills from the teacher. A modern mathematics teacher must have not only scientific knowledge, but also the competence to use information and communication technologies.

In conclusion, the use of digital technologies and artificial intelligence in teaching mathematics significantly increases the effectiveness of education. Modern programs, interactive platforms, and artificial intelligence-based systems help students develop mathematical thinking, develop independent work skills, and easily master complex topics.

References

1. Pedagogika nazariyasi va tarixi. Azizxo‘jayeva N.N. – Toshkent: O‘qituvchi, 2018. – 320 b.
2. Ta’limda axborot texnologiyalari. Ishmuhamedov R.J. – Toshkent: Fan va texnologiya, 2020. – 256 b.
3. Matematika o‘qitish metodikasi. Jumayev M.E. – Toshkent: Ilm ziyo, 2019. – 280 b.
4. Artificial Intelligence in Education. Holmes W. – London: Routledge, 2021. – 410 p.