

**THE ROLE OF MODERN TECHNOLOGIES IN TEACHING MATHEMATICS IN
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Abstract: This article analyzes the role of modern technologies in mathematics education, their importance in the educational process, their effectiveness and practical application. The impact of artificial intelligence, digital learning platforms, interactive tools and gamification elements on the process of student learning is highlighted. International experiences, statistical data and recommendations for improving education are also presented.

Keywords: mathematics education, innovative technologies, digital education, artificial intelligence, interactive methods, gamification, distance learning, electronic textbooks.

The development of information technologies is having an impact on all areas, including the education system. Unlike traditional teaching methods, modern technologies are creating an opportunity to revitalize the learning process, increase students' interest and deepen their understanding of subjects. The use of digital technologies in teaching mathematics allows developing students' logical thinking skills, strengthening theoretical knowledge and making practical classes more interesting. Modern technology in teaching mathematics has a huge database, which helps the educational process interactively, understandably and effectively. Today, computer technologies allow teachers and students to effectively use modern learning processes in addition to traditional teaching methods, and modern technology makes the complexity of mathematics more understandable by visualizing it. For example, GeoGebra and Desmos interactive programs help to analyze functions and mathematical possibilities more clearly in algebra and geometry lessons. These programs give students the opportunity to manipulate mathematical objects independently, sparking interest in the subject.

Secondly, modern technologies are available to organize distance learning processes. Through platforms such as Google Classroom, Moodle, teachers can deliver educational materials to students, provide support and software. In addition, through programs such as Zoom, Microsoft Teams, it is possible to organize live classes and conduct interactive discussions. This is especially useful in a situation where education is possible during a pandemic. Artificial intelligence-based technologies are also playing an important role in teaching mathematics. For example, programs such as Photomath or Microsoft Math Solver help students solve complex problems and provide step-by-step mathematical solutions. This is to develop students' independent problem-solving and reasoning skills. Adaptive learning systems based on AI are developed by providing tasks adapted to the knowledge level of each student.

Another important aspect of modern technologies is gamification, that is, making the learning process interesting through the game process. Today, there are gamified mathematical programs such as Prodigy and DragonBox, through which students can learn new knowledge without

realizing it. This method is especially effective for young children, who can understand mathematics more easily and quickly through these game programs through interest.

The technology of gamification allows you to conduct tests and automate the process. By trying out Quizlet, Kahoot!, you can learn in real time and buy them. This technology greatly helps in analyzing students' knowledge and giving them the necessary recommendations.

Modern technology in mathematics teaching makes additional lessons more effective, interactive and interesting. Visualization, distance learning, artificial intelligence, gamification and automated production processes facilitate pedagogical processes and increase students' mathematical load, developing analytical thinking. Therefore, modern technologies not only directly enhance the learning process, but also improve the quality of education.

Since mathematics is a subject that requires complex concepts and clear logical consistency, there is a need to improve teaching methods. Electronic textbooks, interactive whiteboards, virtual laboratories and technologies based on artificial intelligence play an important role in this regard. This article discusses the role of modern technologies in mathematics education, their advantages and impact on the educational process.

Modern technologies provide several important advantages in teaching mathematics:

Demonstrative learning - Students better master topics by explaining mathematical concepts visually. Graphic animations, 3D modeling, and video tutorials make concepts clearer.

Independent learning opportunities – Online platforms and mobile apps allow students to learn independently. This develops their ability to work on themselves.

Creating an interactive learning environment – Students will have the opportunity to directly participate in mathematics lessons, solve problems and create various mathematical models.

Personalized learning – Systems based on artificial intelligence will determine the level of knowledge of each student and recommend lessons that are suitable for him. This will increase the efficiency of the educational process.

Efficient use of time – Digital technologies will help optimize lesson time. Students and teachers will have the opportunity to quickly find and use the necessary information.

Today, the following modern technologies are widely used in teaching mathematics: Electronic textbooks and online resources: Electronic textbooks and online platforms allow students to learn independently at any time. For example, platforms such as Khan Academy, Coursera, EdX offer mathematics courses at various levels.

Interactive whiteboards: Interactive whiteboards allow teachers to make lessons lively and interesting. They make it easier to visually explain mathematical formulas, graphs, and statistical data.

Mobile applications: Mobile technologies expand students' opportunities for independent learning. Applications such as Photomath, GeoGebra, and Desmos allow for automatic analysis and explanation of problems.

Artificial intelligence-based programs: Educational platforms using artificial intelligence recommend educational materials according to the level of knowledge of each student. This helps to identify students' strengths and weaknesses.

In the last decade, the use of computers in teaching mathematics has been carried out in several main directions. These include computer-assisted assessment of knowledge, the development and development of various types of educational programs, the development of mathematical games for cognition, etc. Another area of the convenience of computers in teaching mathematics is the modeling of certain learning situations. The purpose of

using modeling programs is to ensure the understanding of materials that are difficult to visualize and visualize when using other teaching methods. With the help of modeling, it is possible to present information to students in a graphical mode in the form of computer multimedia. Due to this, they are more inclined to study mathematics in depth and demonstrate a significant degree of independence in the learning process.

Artificial intelligence technologies help create an educational process tailored to the individual needs of each student.

Examples: ALEKS Learning System – Analyzes the student's level of knowledge and recommends appropriate exercises. Photomath and Microsoft Math Solver – Analyzes mathematical problems and explains step-by-step solutions.

AI Chatbots (Artificial Intelligence Assistants) – Gives advice to students in real time. Interactive technologies make mathematics lessons visual and interesting.

Examples: Smart Board – Allows teachers to conduct live lessons.

GeoGebra – Creates a graphical environment for algebra, geometry, and statistics.

Desmos – A program for interactive analysis of functions and equations.

In short, the introduction of modern technologies in mathematics education increases the efficiency of the educational process. With the help of interactive textbooks, artificial intelligence-based systems, and digital platforms, students' learning in mathematics becomes much more convenient. Digital technologies increase student engagement, expand opportunities for independent learning, and improve the quality of education. In the future, with the further development of modern technologies, mathematics education is expected to become more effective. The education system must adapt to digital innovations and create a more comfortable learning environment for students.

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