RESEARCH ARTICLE

Application of New Methods in the Teaching of Mathematics

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Abstract

In this article, we discuss the application of new methods aimed at increasing students' interest and engagement in the subject of mathematics. A variety of innovative and effective methods can be implemented in mathematics education, such as the use of experiments and practical activities, interactive technologies, the flipped classroom model, gamification, and more.

By incorporating enjoyable and innovative methods into mathematics lessons, students become more engaged with the subject. The application of new methods in mathematics teaching is of great importance in modern education systems, as it facilitates better comprehension of topics and increases students' interest in mathematics. When such effective methods are applied, students grasp the material more easily, leading to enhanced motivation. A highly motivated student develops a deeper interest in the subject and enjoys the learning process.

In a world where science and technology are rapidly evolving, the significance of mathematics continues to grow, making it essential for everyone to learn. Traditional methods that have been used for years but have lost their effectiveness are being replaced with alternative instructional strategies and experiences. Therefore, in mathematics education, it is necessary to employ alternative learning approaches such as technology-supported teaching, collaborative learning, learning through drama and games, concept mapping, visualization techniques, and problem-solving methods.

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Introduction

The rapid development of science and technology has significantly influenced all fields of knowledge, including mathematics. As students' interests and expectations evolve, there has emerged a growing need to apply new methods in the teaching of mathematics. Since mathematics plays a leading role in the development of students' logical and analytical thinking, modernizing teaching methods in this subject has become essential.

Traditional instructional methods often result in passive student participation and focus primarily on the memorization of ready-made knowledge. These conventional models—centered on the teacher and based on explanation and repetitive exercises—no longer meet the demands of modern education. To support students' individual development and link mathematical knowledge to real-life contexts, there is a need for new, student-centered teaching methods that foster critical thinking.

Modern pedagogical approaches ensure active student involvement in the learning process and help create a sustainable learning environment. The use of new technologies in mathematics education can significantly increase students' interest in the subject. In addition to information technologies, the integration of animations and various interactive activities can make mathematics lessons more accessible, understandable, and enjoyable.

Research

In today's modern era, student-centered education has replaced traditional teacher-centered approaches. In the teaching of mathematics, organizing learning around the student requires that the teacher's role shift from simply transmitting knowledge to guiding students in exploring and discovering information independently. In this context, the teacher acts as a facilitator of learning.

Contemporary mathematics education should not only aim to transfer knowledge but also focus on developing students' creative and critical thinking skills (Mammadov Q., *Methods of Teaching Mathematics*, Baku: ADPU, 2015, p. 47). One of the most effective methods in mathematics instruction is problem-based learning. Through this method, the teacher presents students with tasks based on concrete and real-life situations. Students attempt to solve these problems by applying the knowledge and skills they have acquired. The use of problem-based learning enhances students' analytical thinking and fosters creative reasoning.

Another modern teaching method is the flipped classroom model. This approach allows for more instructional time during class and increases student engagement (Alizade A., *Modern Teaching Methods*, 2020, p. 65). In this method, students study the new topic at home in advance using videos and other educational materials. During classroom time, the teacher facilitates deeper understanding by guiding students through practical tasks, individual and group activities, and discussion-based methods. The flipped classroom ensures active participation of every student and promotes independent research and self-directed learning.

To make mathematics lessons more engaging, interactive technologies can be integrated into instruction. For instance, applications such as Desmos, GeoGebra, and Khan Academy can be used during lessons to construct graphs and conduct

visual analysis of mathematical functions. These platforms are also highly suitable for homework and personalized learning. Video lessons and animations can enrich the explanation of new topics. If the classroom is equipped with a smart board, its active use would further enhance the effectiveness of the lesson.

Another modern instructional method that can be utilized in mathematics education is gamification. Gamification fosters a positive attitude toward mathematics by creating an environment of competition and motivation in the learning process (Boaler, J., *Mathematical Mindsets*, Jossey-Bass, 2016, p. 104). To implement this method, mathematics competitions and quizzes can be organized. Rewarding students based on their performance in these activities can further increase their interest in mathematics. For example, events such as "Math Night" or "Pi Day" can be organized as thematic quizzes. Online platforms such as Kahoot and Quizizz can be used to present quiz questions in game format. During class, using point and reward systems can enhance student motivation. A highly motivated student is more likely to achieve academic success.

To make learning in mathematics lessons more engaging and appealing, the experimental and hands-on approach—a modern method—can be adopted. This involves reinforcing theoretical content through practical experience and experimentation. For instance, constructing models of geometric figures or relating mathematical concepts to real-life objects can strengthen understanding.

One of the most effective approaches in mathematics education is the personalized learning method. In this method, the teacher prepares differentiated tasks based on each student's level of knowledge and individual learning style. The application of this method upholds the principles of equity and accessibility in education. Moreover, it helps ensure inclusivity in the learning process.

Based on research and classroom observations, the application of modern teaching methods leads to the following positive outcomes:

1. Increased attendance and interest in learning the subject;

2. Formation of positive attitudes toward mathematics;

3. Development of students' ability to comprehend the essence of problems and find appropriate solutions;

4. Strengthening of collaboration and teamwork skills as students solve problems together through group work.

Conclusion

The application of the new teaching methods outlined above in mathematics education not only enhances classroom engagement, academic achievement, and lesson effectiveness but also positively contributes to the development of students' mathematical worldview and thinking skills. These modern instructional approaches make the learning process more dynamic, engaging, and outcome-oriented.

Given that contemporary educational philosophy emphasizes active student participation and the guiding role of the teacher, the integration of innovative methods supported by pedagogical and technological tools becomes essential. Every teacher must adapt to this evolving educational environment by updating their teaching strategies and instructional resources accordingly.

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