

GOOD PRACTICES AND STRATEGIES FOR INCREASING MOTIVATION TO LEARN MATHEMATICS

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***Abstract:** This article examines contemporary approaches to increasing motivation in mathematics education. The discussion revolves around approaches such as setting specific and measurable (SMART) goals, using a variety of resources, practical application through project-based learning, collaboration, gamification, regular feedback, and cultivating a positive attitude. By reviewing these strategies, it explains how their implementation can create an active learning space that encourages students to further master mathematical concepts and improves critical thinking.*

***Keywords:** motivation, mathematics education, SMART goals, gamification, project-based learning, feedback, positive attitude.*

1. INTRODUCTION

Motivation is one of the key factors influencing the learning process in mathematics. Lack of motivation slows down the understanding of complex concepts, while best practices for motivation offer the potential for achieving stable educational outcomes [1],[2]. The aim of this article is to analyze and synthesize proven pedagogical practices that motivate students by integrating theoretical principles with empirical methods.

2. THEORETICAL CONTEXT AND STRATEGIES

2.1 Setting specific goals

The use of SMART [3] goals-specific, measurable, achievable, relevant, and time-bound-facilitates the learning process for schools, teachers, and students. Breaking down a major task into small, simple steps to follow creates a sense of accomplishment and makes learning easier. Example: A student may set a goal to complete five tasks on a specific topic within a given time frame, which can be encouraged by monitoring progress.

2.2 Using a variety of resources

The use of textbooks, video lectures, interactive websites (e.g., Khan Academy), and educational games offers a variety of ways to learn mathematical concepts and break down abstract concepts through visual and real-life illustrations. Such variety maintains interest and helps students remember information better [4].

2.3 Practical and project-based approaches

Applying mathematical knowledge to real-world projects-for example, budget modeling in finance or working with real data-gives students the opportunity to see the practical usefulness of mathematics. This not only increases motivation but also the desire to acquire analytical skills [5].

2.4 Teamwork and exchange of ideas

Teamwork, study groups, and math clubs also provide spaces for discussion, sharing ideas, and mutual support. This is a social aspect of learning that helps develop a supportive environment, which is essential for promoting motivation. Teamwork is one of the most important methods for increasing student motivation and participation in mathematics education [6]. In secondary school, group activities not only improve understanding of difficult mathematical concepts, but also communication, critical thinking, and teamwork skills. We will give an example of planning a lesson on rational fractions for active student participation by dividing the tasks into groups.

Students are divided into groups, each of which has a unique activity on rational fractions. This allows for a personalized approach to the topic while encouraging group problem solving.

Group 1 – „Researchers“. They explore the real-world applications of rational fractions (recipes, measurements, financial calculations). They report on their research in the form of graphs or tables, or through a poster or short presentation.

Group 2 – „Builders“. They create visual models of operations with rational fractions by creating diagrams of addition and subtraction of fractions, which makes the operations more understandable. They explain the logic behind the operations through graphical representation.

Group 3 – „Gamers“. They develop game-type math problems – for example, a quiz or math escape room or a short math game – for example, a quiz or puzzle with rational fractions. They present the game and engage other students in solving it.

Group 4 – „Practitioners“. They solve real-world problems related to comparing rational fractions (optimizing budgets, time, and distances). They present their observations to the class and talk about the everyday relevance of fractions.

In conclusion, it can be said that the application of teamwork in the study of rational fractions encourages student participation, deepens understanding of mathematical operations, and stimulates innovative thinking. In addition, the model leads to the acquisition of communication and analytical skills that are essential for students' future education and career development.

2.5 Gamification and challenges

The inclusion of game elements in the form of online competitions, challenges, and incentives makes learning a fun and interactive process. Gamification provides immediate feedback and rewards, which is largely responsible for active learning [7].

2.6 Regular feedback and self-assessment

Regular self-assessment and feedback are necessary to check progress. This encourages students to analyze their own mistakes, improve their strategies, and master the material at a deeper level [8].

2.7 Building a positive attitude

Rewarding successful efforts, no matter how small, encourages a positive approach to learning. Creating a motivational climate through rituals and small rewards can serve as a powerful catalyst for sustained effort and self-improvement [9].

The approach depends on the age and interests of the students, but the most important thing is to emphasize that efforts are valuable, whether large or small! Small symbolic rewards can be shiny stickers, fun stamps, or tokens that can be accumulated and exchanged for larger rewards, „Wheel of Rewards“ – a spinning wheel with various nice surprises (extra play time, choice of math problem, special seat in class) „Math superheroes“ – badges or titles for achievements: „Master of Fractions“ „Master of Equations“ etc. Praise – words can work by writing down good achievements on a „Math Stars“ board or giving them to parents. Personalized rewards – allow the student to choose the reward – this engages them even more, gamification – turning math into a game where each completed task earns points or achievements.

Mathematics is generally considered a difficult subject, especially for high school students. The complexity of the ideas, abstract thinking, and the need to relearn material can lead to demotivation. However, positive reinforcement and motivational techniques can change students' attitudes and create a supportive learning environment.

Gamification is the process of turning learning into a game through the use of tournaments, math missions, and even escape room concepts. Students can earn points for solving problems, which can be converted into rewards. Rewarding success on a „Wall of Achievement“ or giving titles such as „Math Expert“ boosts students' self-esteem and motivation. Real-life activities such as budgeting, construction blueprints, and programming provide tangible value to mathematics and demonstrate its application in any career. Asking students to create their own incentives encourages personal motivation. This could be in the form of extra days off, skipping homework, or even the opportunity to teach a lesson. Showing successful people who use mathematics in their profession (bankers, engineers, computer programmers) will inspire students and illustrate the real-world application of mathematics education.

3. DISCUSSION

The above strategies are synergistic when combined. Setting goals provides a clear purpose, and using different resources and a project-based approach makes the content more accessible and interesting. Teamwork and gamification are already proven successful tools for creating a learning environment, and positive feedback and a supportive attitude maintain students' determination and hard work. These methods not only enable more effective learning of mathematics but also offer a means for long-term academic and personal development.

4. CONCLUSION

It has been established that integrating effective methods and practices, such as setting SMART goals, using various multimedia materials, applying acquired knowledge through projects, collaborative efforts, gamification, and constant feedback, increases motivation to study mathematics. Such an integrated process leads to the creation of an interesting and dynamic learning environment conducive to intensive thinking and long-term enthusiasm for the learning process. It is proposed that future studies be conducted to assess the effect of the strategies on different learning groups and to adjust the strategies according to the needs of individual learners.

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