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EFFECTIVE METHODS FOR DEVELOPING STUDENTS' CREATIVE THINKING IN MATHEMATICS CLUBS

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Abstract: This article analyzes effective pedagogical methods aimed at developing students' creative thinking, skills in solving non-standard problems and logical reasoning within mathematics club activities. The study highlights the educational efficiency of innovative approaches, group-work technologies, as well as tasks based on mathematical sophisms and riddles.

Keywords: creative thinking, non-standard problems, sophism, logical reasoning, riddles, innovative methods.

In modern education, students' creative thinking, the ability to find unconventional solutions, and independent logical reasoning have become essential competencies that determine the quality of learning and long-term academic success. The rapid development of science and technology requires learners not only to reproduce ready-made formulas or follow familiar algorithms, but also to approach mathematical tasks from multiple perspectives, experiment with ideas, and generate original solutions. In this context, mathematics clubs serve as an effective and dynamic platform for cultivating these competencies, as they allow students to explore mathematics beyond the limits of the standard curriculum.

Unlike traditional classroom lessons, mathematics club activities provide a flexible space where students can engage with non-standard problems, logical riddles, sophisms, paradoxes, and intellectually stimulating tasks that trigger deeper cognitive processes. These activities encourage curiosity, problem exploration, hypothesis formulation, and the comparison of alternative approaches. Moreover, the integration of interactive teaching methods such as group debates, collaborative problem-solving sessions, mathematical games, and guided discovery further accelerates students' creative development. Through such meaningful and engaging experiences, mathematics clubs not only strengthen students' creative and logical thinking skills but also build confidence, motivation, and a lifelong interest in mathematical inquiry.

Methods

The study employed the following methods:

1. Selection and analysis of non-standard mathematical problems;
2. group work, debates, brainstorming, and problem-based discussions;
3. analysis of sophisms and mathematical tricks;
4. observation and diagnostic testing to assess students' creative thinking levels;
5. modeling collaborative decision-making in small groups.

These methods were practically implemented during mathematics club sessions.

Results

The experiment showed that activities based on non-standard problems and sophisms helped students to:

- strive for unconventional approaches;
- strengthen logical sequencing skills;
- increase the speed of creative reasoning;

• compare and evaluate multiple solution strategies;
• actively participate in group discussions and collaborative explanations.

Additionally, mathematical debates conducted in small groups enhanced students' abilities to justify their opinions, defend arguments, and provide logical evidence.

Discussion

The results demonstrate that instructional methods rarely used in traditional classroom lessons are highly effective in mathematics club settings. Identifying logical errors in sophisms, solving riddles, and exploring various solution paths foster creativity and strengthen problem-solving abilities. The use of innovative teaching strategies increases students' interest in mathematics and encourages independent inquiry.

Developing creative thinking in mathematics clubs requires a methodologically rich and engaging educational environment. The use of non-standard problems, sophisms, riddles, group work, and discussion-based methods significantly enhances students' creativity and improves their motivation toward mathematics. Organizing club activities based on innovative approaches increases their educational and developmental value.

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