

METHODS AND TECHNIQUES OF CRITICAL THINKING TECHNOLOGY IN MATHEMATICS LESSONS

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Annotation

Mathematics as a science aims to develop general rules to be applied in specific situations. The article discusses ways to develop logical thinking in mathematics lessons.

Keywords: mathematical knowledge, critical thinking, logical thinking, mathematical problems, logic, trizpedagogy

Introduction

Traditional pedagogical technologies, to which we are all so accustomed, have their positive aspects, for example, a clear organization of the educational process, the systematic nature of teaching, the impact of the teacher's personality on students in the process of communication in the lesson. Widely used visual aids, tables, technical teaching aids are also of great importance.

Traditional technologies have been tested over the years and allow solving numerous problems that were set by the industrial society of the late 19th - mid-20th centuries. In this historical period, the tasks of informing, educating students, organizing their reproductive actions were relevant. This made it possible in a relatively short period of time to educate a generation of literate people with certain knowledge and skills necessary to involve each educated individual in the process of mass production. At present, society has already changed its priorities, the concept of a post-industrial society (information society) has arisen, it is more interested in its citizens being able to independently, actively act, make decisions, adapt flexibly to changing living conditions.

The modern world is oversaturated with information. Unbeknownst to himself, any person, and especially a child, receives a large amount of data every day, which is stored in his memory and affects behavior, psyche and character. Systematization of the information received is a difficult task and children deal with this in different ways and not always correctly. As a rule, information is analyzed and conclusions are drawn on a hunch, based on their own, internal, logic, which each person has his own.

With the development of progressive ideas in education, with the promotion of ideas and principles of student-centered learning, teachers' attempts to find the tools that

would ensure the stability of the achievement of the necessary educational results by the majority of students become more active.

Mental development, the development of thinking is an important aspect in the development of the personality of younger students, in particular its cognitive activity. Human thinking is characterized by an active search for links and relationships between different events, phenomena, things, objects. It is the focus on reflecting directly unobservable connections and relationships (for example, causal relationships, conditional), on highlighting the main and non-main, essential and non-essential in things and phenomena that distinguishes thinking as a cognitive process from perception and sensation.

The effective use of logical tasks in the learning process largely determines not only the quality of teaching mathematics, but also the upbringing of children, the development of their individual characteristics and the degree of their practical preparedness for life.

I agree with the opinion of famous mathematicians that it is mathematics that makes a great contribution to the development of the logical thinking of children, the education of such important qualities of thinking as generalization, the formation of the ability to analyze and synthesize. Mathematics brings up such qualities of the mind and speech as accuracy, clarity and clarity.

To successfully solve the tasks in my work, I use elements of modern pedagogical technologies: problem-based learning, level differentiation, a collective way of learning (A. G. Rivin, V. K. Dyachenko), elements of ICT and gaming technologies.

In mathematics textbooks there are exercises aimed at developing attention, observation, memory, and the development of logical thinking. However, I came to the conclusion that additional tasks of a developing nature, tasks of a logical nature, are needed. Such tasks are included in the lesson of mathematics. I begin to teach to notice patterns, similarities and differences with simple exercises, gradually complicating them. To this end, I select a series of exercises with a gradual increase in the level of difficulty.

Younger students are regularly and without fail placed in situations where they need to reason, compare different judgments, and carry out conclusions. Therefore, at primary school age, verbal-logical thinking begins to develop intensively, in contrast to the visual-figurative thinking of preschool children.

In the lessons in the primary grades, when solving learning problems, children develop such methods of logical thinking as comparison associated with the selection of common and different things in objects, analysis associated with the allocation and verbal designation in the subject of different properties and features, generalization associated with distraction from non-essential features of objects and their unification on the basis of the commonality of essential features.

As they study at school, the thinking of children becomes more arbitrary, more planned, that is, it becomes verbal-logical. Of course, other types of thinking develop further at this age, but the main burden falls on the formation of methods of reasoning and inference.

The main goal of working on the development of verbal-logical, abstract thinking in children is to use it to form in them the ability to reason, draw conclusions from those judgments that are proposed as initial ones, the ability to limit themselves to the content of these judgments and not involve other considerations.

In any creative activity, in study, in work, in play, and just in life - everywhere attention, intelligence, the ability to think logically - are necessary for a person, because they help solve problems, find a way out of difficult situations and, by the way, are good for health : maintain the tone of the brain.

Intelligence can be developed! Practice by solving entertaining problems, puzzles, sorting out mathematical games, jokes and tricks, that is, any tasks that require the work of the mind.

In elementary school, students can improve their math literacy by completing the following math tests.

Exercise 1. Which of the following ratios is equal to 1:4?

a) 4:16 b)4:7 c)4:5 d)4:1

Exercise 2. What number 4 corresponds to 40?

a) 1468 b)473 c)1249 d)2674

“Critical thinking (as a technology) is an intellectually organized process aimed at actively comprehending, applying, analyzing, summarizing or evaluating information received or created through observation, experience, reflection, reasoning or communication as a guide to action or the formation of beliefs” .

The main idea of the technology for the development of critical thinking is to create such an atmosphere of learning in which students, together with the teacher, actively work, consciously reflect on the learning process, track, confirm, refute or expand knowledge, new ideas, feelings or opinions about the world around them.

There is a certain algorithm for the formation of critical thinking, which involves answers to the following questions.

1. What is the purpose of this cognitive activity? Goals may include choosing one of the solution options, developing a solution in the absence of options; generalization of information; assessment of the reliability of arguments; assessment of the likely development of events; verification of the reliability of the source of information: a quantitative assessment of the uncertainty.
2. What is known? It is the starting point for directed or critical thinking. This stage also includes finding missing information.

3. What to do? What thinking skills allow you to achieve your goal? Knowing how to get from the start to the end of a route is the driving force behind critical thinking. This is where the use of previously formed intellectual skills is supposed to be used.

4. Has the goal been achieved? Accuracy in completing tasks is a critical success factor. Does the decision made make sense? For what?

Thus, critical thinking means "the art of judgment based on criteria."

All of the above once again confirms the effectiveness of teaching critical thinking. The real purpose of any learning to improve thinking is to put into practice the acquired skills. Practical application refers to the use of critical thinking skills in a wide variety of situations. Ideally, critical thinking skills should be used not only in the classroom or when solving problems similar to those considered in the classroom, but also to recognize unrealistic campaign promises, arguments that themselves need evidence, incorrect probabilistic estimates, weak arguments or purely rhetorical constructions. Critical thinkers are better at solving real-life problems, whether it's the threat of nuclear war or tweaking a newly purchased computer. These skills also have a long-term effect.

These tasks are not abstract at all. They are very specific and relevant.

The best way to ensure application in practice is to do so through the conscious and thoughtful use of critical thinking skills in a variety of situations. Students can expand this scope by looking for examples that require critical thinking and using them.

In conclusion, today's technology of critical thinking assumes an equal partnership both in terms of communication and in terms of the formation of knowledge born in the learning process.

A teacher working on the basis of critical thinking technology ceases to be the primary source of information and transforms it into a system of collective learning using technological methods.

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