

MATHEMATICAL THOUGHT'S AND METHODS OF LEARNING

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Astract: This article learns mathematical thought's and methods of learning.

Key words: mathematical thought, methods off learning, educational process, I.A Kibalchenko.

Nowadays, one of the important requirements of education industry is to teach young people in the way of thinking both critically and creatively. Despite the fact that this issue has been sufficiently studied and is being studied, less attention is paid to it in the course of practical work. In most cases, the teaching of mathematics is focused on the implementation of the program, and the issue of developing students' thinking is lagging behind. The lecturer has to consider his tasks to give students a new set of knowledge, however his main task is to comprehensively develop students' cognitive abilities.

It is essential to teach students in the context of independent perception and self-management during educational process. The basis of being a subject of a certain process is activity, self-management and experience in this process, and its main features are active perception, understanding, creativity. The student's perceptual experience consists of a pedagogically organized system of knowledge, skills, and abilities, as well as the student's emotional-regulatory relationships.

I.A.Kibalchenko classified students' perception experience as low (perform elementary actions consciously), medium (perform actions requiring a higher level of knowledge and self-management), high (high level of knowledge and self-control based on performing the actions understood by 'la) divided into levels. In order to enrich the perceptual experience of students, he used differentiated problems and instructions given by the lecturer in the process of solving them. Psychological-pedagogical (activity, independence, organization of a positive emotional state by the teacher), organizational-pedagogical (the teacher brings each student's perceptive experience to the educational process) involvement, use of various forms and methods of educational organization in order to enrich it, cooperative relations of the teacher and students), didactic (evaluating the student's activity during the educational process, by the teacher and students mastering a rational way based on the analysis of the ways and methods of other students' work, using varied didactic materials, expanding the content of the educational material, systematically and timely diagnosing the student's perceptual experience) determined the conditions [27].

As a result of this organization of classroom activities, the interest of talented students in the group decreases, and the deep layers of the thinking process are not used. It does not require a creative approach that cognitive students solve problems quickly and with little effort. As a result, such assignments bore them. As a result, lecturer could not pay strong attention to the consistent development and deepening



of the mental activity of talented students, the goal of developing an active creative person, who is considered a national treasure, cannot be achieved.

The process of teaching mathematics is a process of continuous development of students' mathematical thinking. According to P.I.Ivanov, thinking is "a mental activity of a person that allows the most accurate, complete, deep and generalized reflection of reality, and allows a person to engage in more reasonable practical activities." In addition, if one takes into account the features of thinking emphasized by A.V. Brushlinsky - searching for and discovering new things, forecasting hypotheses and theories, and noticing in advance, then in the process of teaching mathematics, it is an important task to develop and improve students' mathematical thinking. is self-evident [51].

A student's homework and independent learning, the appearance of a given problem, thinking about the possibilities of solving it (creating a hypothesis), starting to solve a problem or task, solution options, ways and his mental activity is evaluated by choosing methods, periodically moving internal speech to external speech during solving, and observing the process of manifestation of psychophysiological behaviors. By conducting a conversation with the student aimed at solving a certain problem, his mathematical thinking, intelligence, and reasoning style are determined. With the aid of conversation, it is possible to study the characteristics of thinking, such as self-control, self-evaluation, criticality, productivity, and depth of thinking.

By analyzing visual aids, drawings, written works, worked examples and problems prepared by students, conclusions are made about the creativity, ingenuity, perception, and scope of thinking of the student.

The test method in the study of thinking has been widely used since 1905, when A. Bine put forward the idea that it is possible to measure the levels of mental growth of a person according to his age and divide them according to the levels of mental talent. Ilanila started. Since mathematical tests are considered a necessary task to be completed in a short time, as a result of quantitative and qualitative analysis of its solution, it is determined how much mathematical thinking has improved (entrance exams, current, intermediate, final controls).

The mentioned methods have advantages and disadvantages. In particular, the observation method cannot determine the reason for sudden changes; in the conversation method between the teacher and the student, the student feels uncomfortable, hesitant, lacks time; that it is not possible to obtain information about the course of the thinking process in the method of analyzing the activity product; that the solution of some task in the test method does not depend on thinking, but depends on educational skills and qualifications.

The experiment-test method is considered to be the most important method of learning mathematical thinking. Therefore, it is possible to form artificial concepts, solve a problem situation, and determine the student's resourcefulness. Subtle internal connections, laws, and complex mechanisms of the mathematical thinking process are studied with the help of experiments. Therefore, the test material should be carefully selected by the teacher, it should be suitable for the age, intelligence, and level of knowledge of the student. The experiment consists of descriptive, formative and control parts, and the information collected in them is the basis for how the teacher plans the next lessons.

In order to determine the level of students' knowledge of spatial figures, each student participating in the experiment is given 20 or more regular equilateral triangles and is instructed to make tetrahedrons, octahedrons, and icosahedrons within a certain period of time. Students who know that a tetrahedron is



a regular figure with three edges at each end, an octahedron with four edges at each end, and an icosahedron with five edges at each end will be able to start building the figure in an instant.

Observing the process of making figures of students, which figure was made first by the student, how much time he spent on it, the mistakes he made and attempts to avoid repeating them, consistency in making figures and other circumstances, and relevant conclusions is released.

S. L. Rubinstein, who studied the problem of developing students' thinking, "the path that develops abstract thinking is a problematic situation", N. D. Levitov "independence of thinking, quick and thorough assimilation of educational material, mental ingenuity, deep understanding of the essence of the problem for the development of thinking" who put forward the opinion that learning, criticality of thinking is necessary.

To develop the student's mathematical thinking, lecturers needs to pay a close attention on teaching mathematical concepts, correctly describing the objects, to analyze and summarize them. In order to express one's opinion correctly, fluently and clearly, independently it is necessary to form proper judgment and acquiring decision-making skills.

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