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DEVELOPMENT OF STUDENTS' CREATIVE THINKING ABILITY

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Abstract: This article provides important recommendations on how to develop students' creative abilities. An important task of teaching mathematics is to educate students about a dialectical-materialistic worldview, a sense of patriotism and national pride. In mathematics lessons, you need to show that the main driving force in the development of mathematics is the productive activity of people, and all objects studied at school are taken from the real world. Mastering the idea of functional dependence in a school mathematics course develops dialectical thinking in students. Materials, tasks that rely on vital evidence, in our country, nurture a sense of love and pride in the country.
Key words: Creative, mathematics, independent, ability, initiative, upbringing, creativity, conclusion, logic, teacher.

1. Introduction

Students' activities in the educational process are manifested through their intellectual and creative activities, such as listening carefully to the lessons, analyzing the educational material, comparing, drawing conclusions. It is known that in traditional education, students learn by listening to the prepared, summarized and ordered information given by the teacher in lectures and practical sessions, and by working out examples based on the prepared instructions. In the process of such reproductive education, students engage in activities such as memorizing the proofs written by the teacher, working examples similar to the examples he has created, repeating what they heard from the teacher, and become ordinary observers and listeners of the educational process [1-6].

Such traditional methods are no longer effective in teaching and educating students based on the requirements of the present day. For this reason, many methods of question-and-answer, debate, problem-based, modular, imitation games, and open dialogue, which turn the student and the teacher into active participants in the educational process, are being extensively experimented with.

Questionnaires, test controls, writing assignments that determine the students' interest in this subject, their knowledge, qualifications and skills in the departments that make up the school mathematics course in this subject, as well as conducting a comprehensive analysis of their results to the topics that make up the content of mathematical education in vocational colleges approach, it is necessary to carefully develop the methods of their education, and in this, of course, paying great attention to the interaction with professional sciences [2], [3].

To improve the ability of students to work creatively in mathematics classes, which is more important than in any subject, it should encourage students to be persistent, accurate, control their own conclusions and judgments, and develop accuracy and clarity in judgments [1].
Working with the subject of mathematics should cultivate independence, creativity and initiative skills in the student.

On the first day of mathematics, the student learns to make independent conclusions through observation, and then logical proof. In fact, a mathematics teacher should aim to develop children's independent inquisitiveness, inference, and curiosity [3-6].

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Concentration is important in learning any subject, a slight inattention in mathematics can lead to a big mistake: In this case, mathematics itself educates the student's attention.

Preparation for practical activities in teaching mathematics is as follows: students should have the ability to apply theorems in practice, be able to find answers to mathematical questions and problems that arise in everyday life and creativity. For this, students should be able to distinguish mathematical relationships and laws when observing events. Students should learn to use tables, measurements, graphs, logarithms, and calculation books. It is appropriate to give the following theoretical and practical exercises in order to increase creative ability [2].

2. For example: $\boldsymbol{a}=(x_1,y_1,z_1)$ va $\boldsymbol{b}=(x_2,y_2,z_2)$ the coordinates of the vector product of vectors are found by the following formulas: $\boldsymbol{a}\times\boldsymbol{b}=(x, y, z)$

$x=y_1z_2 - z_1y_2$, $y = z_1x_2 - x_1z_2$, $z=x_1y_2 - y_1x_2$

But these formulas are not easy to remember. Therefore, in order to write these results in a more convenient form, we express the results found for the coordinates by second-order determinants:

$$x = y_1z_2 - z_1y_2 = \begin{vmatrix} y_1 & z_1 \\ y_2 & z_2 \end{vmatrix}; \qquad y = z_1x_2 - x_1z_2 = -\begin{vmatrix} x_1 & z_1 \\ x_2 & z_2 \end{vmatrix}; \qquad (1)$$

$$z = x_1y_2 - y_1x_2 = \begin{vmatrix} x_1 & y_1 \\ x_2 & y_2 \end{vmatrix};$$

Using Laplace's theorem, we arrive at this third-order determinant:

$$\boldsymbol{a}\times\boldsymbol{b} = x\boldsymbol{i}+y\boldsymbol{j}+z\boldsymbol{k} = \begin{vmatrix} y_1 & z_1 \\ y_2 & z_2 \end{vmatrix}\mathrm{i} - \begin{vmatrix} x_1 & z_1 \\ x_2 & z_2 \end{vmatrix}\mathrm{j} + \begin{vmatrix} x_1 & y_1 \\ x_2 & y_2 \end{vmatrix}\mathrm{k} = \begin{vmatrix} \mathrm{i} & \mathrm{j} & \mathrm{k} \\ x_1 & y_1 & z_1 \\ x_2 & y_2 & z_2 \end{vmatrix}.$$

So, $\boldsymbol{a}=(x_1,y_1,z_1)$ va $\boldsymbol{b}=(x_2,y_2,z_2)$ the vector product of vectors can be found by the formula through the determinant:

$$\boldsymbol{a}\times\boldsymbol{b}= \begin{vmatrix} \mathrm{i} & \mathrm{j} & \mathrm{k} \\ x_1 & y_1 & z_1 \\ x_2 & y_2 & z_2 \end{vmatrix} \qquad (2)$$

One of the important requirements of today is to educate young people who think creatively. Despite the fact that this problem has been sufficiently studied and is being studied, little 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 development of students' thinking is lagging behind. The teacher sees his task as giving students new knowledge, but his main task is to comprehensively develop students' cognitive abilities.

As a result of such organization of lessons, the interest of gifted students in the group decreases, the deep layers of the thinking process are not used. An example that does not require a creative approach is that gifted students solve problems quickly and with little effort. As a result, such assignments bore them. As a result of the teacher not paying 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.

In order to develop students' mathematical thinking, it is first necessary to determine the level of their mathematical thinking using thinking methods. The 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, choosing solution options, ways and methods, periodically moving from internal speech to external speech during solving his mental activity is evaluated by observing the process of manifestation of psycho-physiological 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 help 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, 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. 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 their pros and cons. In particular, the observation method cannot determine the reason for sudden changes; in the dialogue between the teacher and the student in the conversation method, the student feels uncomfortable, hesitates, 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; in the test method, the solution of some task does not depend on thinking, but depends on learning skills and competencies.

REFERENCES

1. Selevko G.K., Zamonaviy ta’lim texnologiyalari - M, 2001 y. 236 b.
2. Muslimov N.A va boshqalar. Innovatsion ta’lim texnologiyalari. O‘quv-metodik qo‘llanma. – T.: “Sano-standart”, 2015. – 208 b.
3. Universitetic, N.R.C.D.P.(2023). Matematika fanining raqamli texnologiyalarga bo’lgan ehtiyoji. *Academic research in educational sciences*, *4* (CSPU Conference 1), 303-304.
4. Razokova N. K., Sonlarni 99 soniga ko‘paytirish. *Golden brain*, *1*(10), (2023). 167-172.
5. Daukeyeva N., Asadullayeva M. Ikkinchi tartibli sirtlarni o’qitishda maple dasturi imkoniyatlaridan foydalanish. Ilmiy axborotlari, 120.
6. Daukeyeva N., System Of Problems Based On Competent Approach From Geometry In Academic Lyceums. Pedagogical Cluster-Journal of Pedagogical Developments, (2024). 2(9), 75-82.
7. Seitov, A. Z., & Khanimkulov, B. R. (2020). Mathematical models and criteria for water distribution quality in large main irrigation canals. Academic research in educational sciences, (2), 405-415.
8. Roxmonqulovich, X. B. (2024). MAKTABLARDA RAQAMLI TA’LIM RESURSLARI VA TA’LIMNING TEXNIK VOSITALARI BILAN BOG ‘LIQLIGI: Yangi O'zbekiston taraqqiyotida tadqiqotlarni o'rni va rivojlanish omillari. Yangi O'zbekiston taraqqiyotida tadqiqotlarni o'rni va rivojlanish omillari, 6(1), 92-95.