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PROBLEM-BASED LEARNING IN MATHEMATICS CLASSES

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Abstract

This article is about problem-based education.

Keywords: problem-based education, reproductive thinking, problem situation, teaching process, reflection.

Academic lyceums have always responded to important changes in the socio-economic and cultural life of society. A certain content of the development of the theory of education is suitable for each period of the development of society. In other words, the content of educational programs, principles of education, forms and methods of organizing the educational process, and educational periods are suitable for each stage of the development of society. It is known from the course of pedagogy that the process of clarifying the educational method is based on the principle of interaction between the student and the teacher, in which the teacher explains the knowledge to the students, organizes the personal activities of the students to achieve this knowledge, and explains the topic material is approached from the point of view of how the teacher himself describes it.

In the process of oral instructional education, students consciously acquire knowledge through the teacher's explanation and develop the skills to apply it in practice.

Gradually, the content of the process of teaching mathematics was fundamentally changed, that is, a new, much improved explanatory and illustrative method was created, which corresponds to the goals and tasks of the school. In descriptive-illustrative education, the essence of the studied object is explained, connected with real facts, and with the teacher's confirming conclusion through the examples and various visual aids shown in relation to this studied object. will be completed.

In descriptive-illustrative education, the teacher explains the facts himself, analyzes them and explains the essence of new concepts, that is, defines theorems, rules and laws himself.

The descriptive-illustrative teaching method has become a tradition in terms of the level of use in academic lyceums and is still being used today. In the era of the modern scientific and technical revolution, the descriptive-illustrative method of education cannot sufficiently develop students' thinking ability, cannot satisfy their needs for thorough knowledge of the studied subject material, and cannot form their interest in science at a high level. Therefore, from the beginning of 1960, the idea of accelerating the educational process in our schools spread widely, and a new method of education - the method of problem-based education - began to emerge.

Determining the type of educational methods depends not only on the principles of organizing the educational process, but also on the nature of mental activity, which in turn is determined by combining reproductive and productive types of thinking. In the process of descriptive-illustrative education, all knowledge, skills and skills are implemented on the basis of the reproductive method of assimilation, that is, students learn ready-made results of science, ready-made methods of activity, which forms memory and reproductive thinking skills in them. . Only the skills of productive creative thinking are acquired while solving problems or examples related to the material of the studied theoretical topic. However, a certain amount of knowledge and skills accumulated as a result of reproductive thinking will not be enough for the development of independent knowledge and creative abilities of students. That is

why the idea of accelerating education was experimented by different scientists (M.A.Bankov, M.A.Danilov, M.Makhmutov, Yu.K.Babansky, etc.) and from a theoretical point of view proved.

As a result of the experiments and observations, the general principles of accelerating students' cognitive activities and using their intellectual capabilities at a high level during the educational process were developed. These rules are as follows:

1. Compilation of a system of problematic questions related to the materials of the subject being studied.
2. To teach the material of the topic explained by the interview method based on the system of structured problem questions and to reveal its essence.
3. To set research tasks based on problematic questions.

When the educational material is explained on the basis of the above stages, students face facts and concepts that they do not immediately understand, as a result, a problematic situation is created between the studied material and the students.

Description. A unique type of interaction between the studied object (theoretical material or problem of knowledge) and the learning subject (student) is called a problem situation.

A problematic situation is that students are not aware of how the facts and concepts are formed in the subject material being studied.

It is an intellectual difficulty that arises during the inability to apply mathematical concepts, axioms and theorems to the material of the subject being studied.

Determining the role and importance of the problematic situation determines the main idea of problem-based education, restructuring the educational process based on taking into account the psychological and pedagogical laws of quick thinking of students. In problem-based education, almost a large part of knowledge is not given to students ready, but acquired by students in the process of being able to independently solve problem situations.

Description. The learning process created on the basis of solving problem situations is called problem-based education.

From the above considerations, it can be seen that the theory of problem-based education is an educational process that explains the psychological, pedagogical ways and methods of educational organization of a developmental character that reveals the student's intellectual capabilities.

In problem-based education, the teacher's activity consists in the fact that he explains the content of the most complex concepts in necessary cases and regularly creates problematic situations among the students with the subject material being studied, informs the students about the facts, as a result, the students understand these facts. based on analysis, they draw conclusions and generalize independently, they learn to clearly express concepts, rules and theorems with the help of the teacher, or learn to apply certain knowledge in new situations, as a result, students develop the skills of mental operation and practical application of knowledge. .

Theoretical subject materials, problems and examples studied in the mathematics course of the academic lyceum can be divided into problematic and non-problematic types according to their content.

If the process of solving problems and examples in the studied subject material contains new mathematical concepts, facts and rules for students, and it is not possible to solve them with the previous method, and new methods of solving are required, then such a problem or example is problematic in content, on the contrary, such problems or examples can be given by the teacher to students for solving, such problems and examples will not be problematic for students, because they will not independently search for new ways of solving problems and examples, they learn depending on the teacher's explanation, the given problem or example differs from the previous ones only with its coefficients.

1. example. If the teacher finds the general solution of the complete quadratic equation $ax^2+bx+c=0$

and after showing the example 5x2+7x+2=0, tells the students to solve the equation 6x2+5x+1=0 , this situation does not create a problem situation for students, because there is a pattern for them to solve this example. In the process of solving this example, the students replace the coefficients in the previous example with new ones without using any new mathematical law or rule, but the thinking skills of the students are not formed.

2. example. After passing the subject of quadratic equation, the teacher can create the following problem situations in the process of passing the biquadratic equation.

Teacher: What kind of equation do we call the equation 6x4+5x2+1=0?

Students: It is called a 4-level equation.

Teacher: that's right, you can say that, but in mathematics, equations of this form are called biquadratic equations, and their general form is ax4+bx2+c=0. So, how to solve this equation?

Students: We have not solved such equations.

This is where a problematic situation arises between the students and the material of the subject being studied.

Teacher: If we define x2=y, how do we define x4?

Pupils are convinced that x4=u2 is correct by reasoning and recalling what they have learned before.

Teacher: How can this equation be written according to the current definitions?

Students: 6y2– 5y + 1 = 0.

Teacher: what is this equation called?

Students: it is called a complete quadratic equation.

Teacher: how do we solve this equation?

Readers: we can find the general solution of the complete quadratic equation in the formula:

Teacher: we now solve the equation, which did we find the unknown?

Students: we found the unknown y.

Teacher: What was asked to find?

Students were asked to find x.

Teacher: How do we find x?

The process of finding the unknown x here also creates a problematic situation for most students.

Pupils can find the unknown x by themselves, the teacher will help the more lazy pupils:

$$x^2 = \frac{1}{2}; \qquad x_{1,2} = \pm\sqrt{\frac{1}{2}};$$

$$x^2 = \frac{1}{3}; \qquad x_{1,2} = \pm\sqrt{\frac{1}{3}};$$

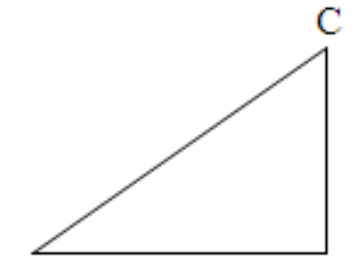
So, since the equation is of the 4th degree, we found 4 solutions. After solving this example, students can find the general solution of the biquadratic equation ax4+bx2+s=0 under the guidance of the teacher:

$$x^2 = y,$$
$$ay^2 + by + c = 0,$$
$$y_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a},\ x_{1,2} = \pm\sqrt{\frac{-b + \sqrt{b^2 - 4ac}}{2a}},$$
$$y_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a},\quad x_{3,4} = \pm\sqrt{\frac{-b - \sqrt{b^2 - 4ac}}{2a}},$$
$$y_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a},$$

Thus, a problematic question, a problematic issue is a different expression of an educational problem, the application of which leads to the emergence of a problematic situation and research activities of students.

2 - example. In order to learn the theorem of cosines, the teacher together with the students solves problems related to finding one of the elements of a right triangle.

1 - issue. In the right triangle AVS, if □A=90o, |BC|=15 cm and |AV|=9 cm, then |AS| - find the length of the side (diagram 29).



29-chizma.

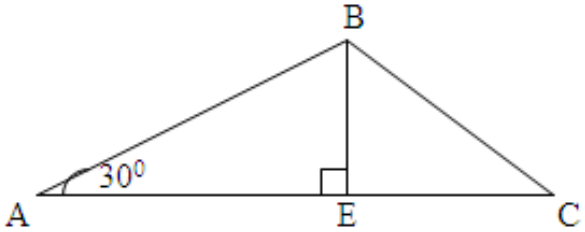
Given: □ABC , □A=90o, |BC|=15 cm and |AB|=9 cm.

Need to find: |AC| - ?

Solving. According to the Pythagorean theorem: |BC|2=|AB|2+|AC|2

□|AC| = □ □ |AC|= |AC|=12 cm.

Issue 2. In □AVS, if □A=30o, □B=90o, |AB|=2 cm, |AC|= cm, then |BS| Find the length of (Figure 30).



Given: □A=30o, □B=90o, |AB|=2 cm, |AC|= cm in □ABC

Need to find: BC - ?

Solving. From the drawing:

$$\Delta ABE \backsim \Delta BEC, \quad \frac{AB}{AE} = \frac{BC}{BE}, \quad BE = \frac{AB}{2} = 1 \quad sм,$$

$$\frac{2}{\sqrt{3}} = \frac{BC}{1}, \qquad |BC| = \frac{2}{\sqrt{3}} \quad sм.$$

c After the discussion of these solved issues, the following problematic questions can be put before the students. If two sides of an arbitrary triangle and the angle between them are given, is it possible to find its third side? Finding an answer to this problematic question leads us to study the theorem of cosines.

REFERENCES:

1. Algebra va analiz asoslari: o'rta maktablarning 10-11 sinflari uchun darslik (Sh.O.Alimov, Yu.M.Kolyagin, Yu.V.Sidorov, M.I.Shabunin) T., «O'qituvchi», 1996 yil.
2. Alixonov S. «Geometriya darslarida umumlashtirish» T., «O'qituvchi», 1989 yil.
3. Alixonov S. « Matematika o'qitish metodikasi » Qayta ishlangan II nashri. T., «O'qituvchi» 1997 yil.
4. Galitskiy M.A. va boshqalar «Algebra va matematik analiz kursini chuqur o'rganish» T., «O'qituvchi», 1995 yil.
5. Давидов В.В. «Возростная и педагогическая психология» М., Педагогика, 1992.
6. Кларин М.В. «Инноватсионние модели обучения в зарубежних педагогических поисках», М., «Просвешение», 1994.
7. Колягин Ю.Н. ва бошқалар Методика преподавания математики в средней школе. Обҳая методика., М., «Просвешение», 1988.