RESEARCH TASKS IN THE DEVELOPMENT OF CREATIVE THINKING OF STUDENTS

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Abstract. *The selection of a system of tasks can become an effective means of developing students' creative thinking in the process of solving problems. If it is based on specific principles arising from the basic laws of the processes of creativity and teaching mathematics.*
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In order to further improve the system in the field of education, as well as to ensure the implementation of the tasks defined in the State Program for the implementation of the Action Strategy in five priority areas of development of the Republic of Uzbekistan. The adopted resolution of the President "On measures to improve the quality of education and the development of scientific research in the field of mathematics" dated May 7, 2020 became an important historical event for us, mathematicians, and people of science and education in general. These and other opportunities within the framework of the implementation of the Action Strategy for the five priority areas of development of the Republic of Uzbekistan in 2017-2021 and in the Year of the Development of Science, Education and the Digital Economy are aimed at further improving the system of teaching mathematics at all stages of education, supporting the effective work of teachers, expanding the scope scientific research and increasing their practical significance, strengthening ties with the international community.

In order to develop students' creative thinking and increase interest in the lesson, in our opinion, it is necessary to select interesting tasks. The tasks selected for the lesson should form a certain system corresponding to the chosen methodology and meet a certain learning goal. Developing a system to solve problems is a difficult matter.

The methodological literature has not yet formulated general scientifically based criteria for the quantitative and qualitative selection of tasks, their logical sequence of distribution for each topic. Therefore, a math teacher needs such a selection of tasks on a separate topic, chapter and the whole course.

It should be noted that the selected system of tasks should meet certain methodological requirements:

1. A clear definition of the didactic purpose of the entire system of tasks and each task separately.

2. The sequence of complication.

3.The system should cover all types of tasks (calculation, construction, proof and research). This helps to find different ways to solve the same problem, and also provides rich material and great opportunities for problems and their solutions.

The content of the task should be based on the goals of teaching mathematics in secondary school. The statement of the question in the problem should, as a rule, be real. The assimilation of the task should be specific. and the selection of the necessary data should have both cognitive and practical value.

It should be noted that the selected tasks as a whole and each task individually would have pedagogical value if the component of the system could answer the following questions:

1. What is the purpose of this task?
2. The need for this particular task, and not another?
3. Why are such, and not other specific data taken in the task?
4. How interesting is the problem for students, does it
arouse students' interest in the answer and the method of solution? What exactly?
Is it possible to increase this interest?
5. Will the student be able to solve this
problem on his own? What does he need to know, remember, be able to do?
6. To what extent should the teacher help him in case of difficulty?
7. What do we want to achieve from students in the process of solving this problem?
8. How is this task related to the student's previous and subsequent work?

When selecting a system of tasks for the development of creative thinking of students, it is necessary to take into account the didactic principles of teaching.

The formulation of tasks in the process of teaching the basics of sciences, the principles of their selection are solved theoretically and practically.

"Problem solving as the main method of teaching, as a method of acquiring new knowledge by students, is, in our opinion, the way to solve the problem of student development." The author also believes that the solution of pedagogical issues of the application of tasks in training will not be complete without a logical and psychological analysis of the structure and types of those tasks that are used in this training.

The description of such principles determines the structure of a given material with a general orientation towards increasing the heuristic function of geometric problems. It will focus on two principles of systematization of exercises - the principle of a constant increase in the complexity of the proposed tasks and the principle of "guidance on discovery". These regulations determine the nature of the development of both a single given line and the entire system as a whole.

As for the ways of complicating the task, they can be built on the basis of one of the basic laws of dialectics - the law of negation. According to this law, the change of one task to another will occur not only on the basis of differences between them, but also on the basis of a certain connection, continuity between them.

The new task, replacing the old one, will not just deny the latter, but in a certain form retain (preserve) it. This makes it possible to reverse the transition from a complex (subsequent) task to a simpler (previous) one. Such interpenetration of qualitatively different tasks forming one link of a given line is a necessary condition for the implementation of an important methodological technique - reducing a complex task to a simple one related to it by removing certain conditions. In turn, the preservation of certain connections between tasks will provide the possibility of transferring knowledge from one learning situation to another with their subsequent generalization.

The natural connection between the following and previous tasks in each of the links of a given line stems from the internal unity of qualitatively different levels of the content basis of their organization. This unity determines the integrity and self-development (self-reproduction) of each link, each given line and the entire system as a whole.

In traditional teaching, each task is usually considered as some kind of cognitively limited educational unit. This leads to the fact that the student, as a rule, after receiving an answer that satisfies the requirement of the task, does not think about what else can be learned from its conditions. But in the situations under consideration (including standard ones), questions may arise that are much more interesting than those indicated in the tasks themselves.

For example: students prove that the angle inscribed in a circle is equal to half of the arc on which it rests, i.e.

$\angle\alpha = \frac{1}{2}\breve{AB}$**,**where $\alpha = \angle ACB$ the angle inscribed in the circle**.**

After proving this theorem, the teacher can complicate this task as follows: is there no point outside the circle that is the vertex of an angle based on the same arc and equal α ?

A problematic situation is created in the classroom.

It is proposed to first find out the question: is there no such point outside the circle?. Each student can calmly, without hurrying, complete the drawing. Denote $\angle ACB = \varphi$.

Let A_1 and B_1 be the intersection points of secants with A and With B with a circle.

Consider the case when none of the lines With A and with B is tangent to the circle. One student suggests to draw a segment of BA1 and consider the angles $\alpha = \angle BA_1B_2$ и $\beta = \angle A_1BC$.

After that, students notice from the drawing, what is the angle α - is the outer angle of the triangle CA_1B at the vertex A_1. Then $\alpha = \varphi + \beta$, where from $\varphi = \alpha - \beta$, where $\alpha = \angle BA_1B_2$ and $\beta = AA_1BC$ the angles inscribed in the circle, based respectively on the arcs AB and A_1B_1. Thus, $\varphi = \frac{1}{2}(\breve{AB} - \breve{A_1B_1})$. Now many in the class see that, i.e. in the case under consideration, there are no such points outside the circle. As a homework assignment or out of time, it is proposed to independently investigate the case when one of the lines CA, CB, or both are tangent to a circle.

After that, in the classroom, students proceed to find out the following question: is there a point inside the circle that is the vertex of an angle based on the same arc AB and equal to α ?

After completing the drawing and marking individual data on it, the students proceed to the discussion. One of the students offers to conduct direct AS and VS. The offer is accepted because they see the course of further reasoning. Let A_1 and B_1 be the points of intersection of the lines AC and BC with the circle. Connect the points B and A_1 with a rectilinear image.

From the drawing it is noticed that the desired angle $\varphi = \angle ACB$ is the outer angle of the triangle C_1 at the vertex C. Then $\varphi = \alpha + \beta$ где $\alpha = \angle AA_1B$, $\beta = \angle A_1BB_1$ the angles inscribed in the circle,

which are based respectively on the arcs AB and A_1B_1. From here $\varphi = \frac{1}{2}(\breve{AB} + \breve{A_1B_1})$.

The question of which tasks should be chosen as the initial ones is quite complicated.

There is no doubt, however, that in all the nodal topics of the school geometry course, exercises to identify the most complete information from these conditions of the problem are necessary.

In conclusion, it should be noted that the selection of a system of tasks in order to develop students' creative thinking into a single system through the principles of gradual increase in the complexity of the proposed tasks and "guidance on discovery" may be the basis for a versatile and at the same time holistic impact on the student's personality.

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