

# IMPROVE THE METHODOLOGICAL TRAINING OF FUTURE TEACHERS TO DEVELOP STUDENTS' CREATIVE ABILITIES USING NON-STANDARD TASKS

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## ABSTRACT

It is very important to select tasks that have difficulty that is adequate to the capabilities of students. If the task is too difficult, the student will lose hope of completing the task. On the contrary, if it is too light, the student makes no effort to solve it. In both cases, interest in solving problems is lost. Therefore, the task should be in the "zone of proximal development".

**Keywords:** Teacher, creativity, student, methodology, creativity.

## INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

The main direction of the development of students' creative activity is the inclusion of students in the process of solving creative problems (Yu.M. Kolyagin, JI.M. Friedman, D.N. Bogoyavlensky, J. Poia and others).

Yu.M. Kolyagin [70], considering the function of tasks in teaching mathematics, he comes to the conclusion that solving problems is the leading means of mathematical development of students, a means of developing elements of creative thinking, significantly improving the quality of teaching and upbringing in the process of studying school course of mathematics.

DI Epiphany, substantiating the legitimacy of the widespread use of tasks in learning, notes that "... any content becomes an object only when it takes on the form of a specific task for teaching and directing educational activity" [17, p.247].

M. Fridman notes: "Problem solving as the main method of learning, as a method of acquiring new knowledge by students, is, in our opinion, a way to solve the problem of student development" [183, p. 8].

The literature emphasizes that learning through tasks is the most important learning method, and the ability to solve problems contributes to the conscious and lasting mastery of the system of knowledge and skills of independent work, the development of students' mental abilities, i.e. a means of enhancing creative activity. The tasks that perform the learning functions can contribute to the formation of various mental skills among students, for example, such as:

- a) the ability to switch from a direct train of thought to a reverse one (compiling and solving an inverse problem to a given problem);
- b) spatial imagination, drawing construction according to the condition of the problem
- c) the ability to find various ways to solve the same problem;
- d) the ability to find a more rational solution;
- e) the ability to draw inferences by analogy.

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contrary, if it is too light, the student makes no effort to solve it. In both cases, interest in solving problems is lost. Therefore, the task should be in the "zone of proximal development."

It is important to organize the cognitive activity of students so that students have at least small successes from the first steps. This contributes to the formation of students' cognitive interest in the subject.

Methodist mathematicians are considering various ways of developing students' creative skills needed in creative activities. One of these ways is to engage students in research. The works of I.I. Volkova, B.A. Vikola, and T.B. Rajabov and others are devoted to this problem. A number of authors: G.K. Levitskaya, M.L. Levitsky, and others indicate that the research principle is the basis for the development of creative student abilities.

An effective means of developing students' creative activity, according to I.I. Volkova, Yu.M. Kolyagin and others, is problem-based learning. V.V. Repyev, J. Poia, Yu.M. Kolyagin believe that the formation of students' creative activity is promoted by heuristic teaching methods: observation, comparison, generalization, analogy, experiment.

The formation of creative activity can take place at all stages of solving a problem. Moreover, for the successful course of each of them, it is necessary to form the appropriate skills. So, at the first stage, the student becomes aware of the problem contained in the problem being solved. It is advisable to teach students to draw up a plan for solving the problem, isolating what is given and what needs to be found, to build a sequence of actions and to think out forms of verification that guarantee the exclusion of extraneous solutions. Then comes the hypothesis. The ability to put forward hypotheses is an important skill that contributes to the formation of creative activity.

An important role is played by supporting questions. Auxiliary questions should have the character of "regulation" by the students' thought process, helping them to abandon secondary hypotheses and decisions. Moreover, any auxiliary question as a way of controlling the thinking of students should not be a hint, since with the development of creative abilities, we mean the formation of prerequisites for the implementation of independent creative activity.

At the next stage of solving the problem, an important skill is the theoretical or practical verification of the hypothesis made by students.

Thus, in the process of solving problems, the following main points can be distinguished:

- ✓ recognition of the situation, its ordering;
- ✓ allocation of unknown elements;
- ✓ understanding of the problem, highlighting the main thing;
- ✓ solution hypothesis, finding
- ✓ a specific solution method;
- ✓ implementation of the decision on the basis of the hypothesis put forward,
- ✓ checking the compliance of the results with the source data.

When solving problems, the emotional perception of the problem being solved, which has an active effect on the activity of the creative imagination, is important. Imagination, arising in response to the aspiration and motivation of students, is realized in their creative activity.

Of great importance is the effective organized management of students' creative activities. B. P. Korotyaev [77] talks about the teacher's control of the schoolchildren's creative activity and the possibility of correcting it. B.C. Shubian conditionally divided the management of creative activity into non-rigid, semi-rigid and rigid.

In the case of non-rigid management, it is enough to organize the initial “collision” of students with a new one: to report a fact, to come across it, to pose a question, to provoke an emotional mood. Then the student goes on the “steps of the emergence of the creative process” (from realizing the novelty of the facts encountered, through reformulating the questions given by the teacher as creative for himself, to unconscious brain work).

With tight control, the teacher controls all or most of the "steps" of the creative situation, and in the case of semi-rigid control, some of them [195, p. 49].

In studies conducted by P.Ya. Galperin,

V.V. Davydov, E.N. Kabanova-Meller, A.I. Leontyev, M.A. Menchinskaya, N.F. Talyzina, and others consider various theoretical models of teaching and managing students' mental activity. In them, one can single out the general that underlies the development of creative activity in solving mathematical problems, namely: the systematic inclusion of students in solving creative problems; development of students' ideas about the main stages of the process of solving creative problems and the conscious implementation of these stages; creating motivation for this type of activity.

Thus, the path to enhancing creative activity is based on the inclusion of students in solving creative problems.

The process of solving creative problems is accompanied by the manifestation of certain features of creative activity:

- a) independent transfer of knowledge and skills to a new situation;
- b) a vision of a new problem in a familiar situation;
- c) independent combination of known methods of activity in a new situation;
- d) a vision of possible solutions to this problem;
- e) the construction of a fundamentally new method of solution, in contrast to the known;
- e) a combination of known solutions.

Every solution to a new problem, as you know, is built on the basis of already solved problems. Solution transfer involves analytical-synthetic activity. The transfer is based on a generalization, which is the result of an analysis that reveals significant relationships. To identify the willingness of students to carry out the transfer, you can offer tasks that require the transfer of knowledge between sections, paragraphs of the same topic, as well as between the subjects studied.

Such a feature of creative activity as a vision of a new problem in a familiar situation includes the ability to ask questions about the essence of the conditions of the situation, the situation itself, the ability to see new sides of a familiar object.

To determine the ability to exhibit this trait, you can offer tasks:

- in which it is necessary to determine the difference in similar situations;
- in which a requirement is formulated to address a question to a teacher;

to the various application of a certain concept. Independent combination of well-known methods of activity in a new situation is manifested in the ability to identify elements of the object, correlation and establishment of relationships between elements. The means used to identify the presence of this trait among students may be tasks to establish the relationship between the elements, the image of the object, the identification of essential elements.

To consider the organization of students' creative activity in solving such problems, we will dwell on the main stages of the creative process, since they underlie any creative activity.

The first stage of creative activity is the stage of awareness, development, problem statement. Intellectual creative activity takes place only where a problem arises. Clear formulation of the problem is an important initial stage in the creative process.

The second stage is the stage of a fundamental solution to the problem, during which the "key" to solving the problem must be found. The basis of the second stage is human knowledge, so the students' creative activity is inextricably linked with knowledge and the ideas that they have.

The third stage is the implementation of a fundamental solution to a problem in which a fundamental solution takes a concrete form. This is based on knowledge, techniques and methods of action.

Students' creative activity can be carried out through creative initiative and independence in search of ways to solve problems, a special system of exercises, entertaining, unusual, non-standard situations, searching for unknown relationships between the objects in question, etc.

Thus, the implementation of the development of students' creative activities in mathematics takes place when solving creative problems. The lesson in which the teacher intends to form students' experience in creative activity is a lesson in which the student creates something new for himself, his own educational product.

Also, when organizing creative activities, we took into account the features of various organizational forms of training that have a positive impact on the development of students' creative abilities in the course of assignments:

- with an individual form of organization of training, the teacher has the opportunity to adapt the degree of complexity, difficulty of tasks, provides assistance to students taking into account the level of development of their creative abilities [126];

- in the group form of work, students have the opportunity to work on the task together, in mutual dependence, according to an agreed plan or work order [96]; the use of group forms of work removes psychological barriers, is optimal for using methods of activating thinking [81];

- in the collective form of organization of training, students are considered as a holistic team in which common goals, tasks and active interaction between all students provides a sufficiently high level of their cohesion and mutual understanding in the process of creative activity [5].

The combination of organizational forms of activity at various stages of the assignment is presented in table. 2 (Appendix 1, p. 174-175).

The choice of a combination of forms when performing tasks is determined depending on the objectives of the task and the level of complexity of the proposed task.

Thus, the combination of organizational forms of training in the process of implementing students' creative activity regulates the joint activities of the teacher and students, determines the ratio of the individual and the collective in the educational process, the degree of student activity in creative activity and the ways in which the teacher guides it.

The current state of the problem of the development of creative abilities suffers from an abundance of terminology, ambiguous interpretations of the basic concepts, and the absence of a clear strategy in organizing the creative activities of students.

The development of creative abilities is the result of focused training of students in creative activities.

We consider the development of students' creative abilities from the perspective of students' personal acquisitions in the process of solving creative problems that involve the ability to find a solution, apply knowledge in new conditions, create something subjectively (sometimes objectively) new using algorithmic and heuristic methods of creativity.

The relevance of the problem of developing creative abilities of students is due to the need for scientifically-based solutions to practical problems in connection with the modernization of the existing education system, increased requirements for the abilities of a graduate of an educational institution, insufficiently developed problems in theory and pedagogical practice.

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