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# The Use of Modern Technologies in the Development of Mathematical Knowledge of Preschoolers

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***Abstract.*** *the article discusses the use of modern technologies in the development of mathematical knowledge of preschoolers, the importance of a problematic situation in the learning process, and suggests types of entertaining games for the development of thinking and mathematical knowledge of preschool children.*

***Keywords:*** *preschooler, concept, knowledge, development, mathematical knowledge, technology, games, problem situations.*

Problem-based learning is of great importance in the formation of mathematical concepts in a child.

Problem-based learning is a didactic system that involves the involvement of a teacher (educator) in solving issues of a problematic nature. Psychologists believe that thinking in a problematic situation begins with a question. Therefore, a problematic situation forms the basis of problem-based learning, creates conditions for solving the problem.

The situation is a call for the need to systematize concepts through scientific debate. A problematic process is a conscious difficulty that requires finding your own solution. When a given question causes difficulties and requires new knowledge and mental activity from the teacher (educator) when answering, a problematic situation is created. In a problematic situation, the teacher's (educator's) attention is fully focused on solving issues. This tendency becomes an obvious goal when solving a problem. Problem-based learning can be useful only if the child has deeply and firmly mastered basic knowledge, concepts, and verbal methods of problem solving.

The significance of the problematic situation in the learning process lies in the fact that children become “pathfinders” and discoverers here. In this case, the problem situation is first created and analyzed, a convenient method of solving the problem is determined, the problem is solved and the conclusion is investigated. In the process of using problem-based learning, you can use a problematic presentation of the topic, heuristic dialogue and a set of research techniques. The essence of the problematic statement is that the teacher (educator) he asks the question himself and points out the ways of a verbal solution. On the other hand, the essence of the heuristic style is expressed in the fact that the teacher (educator) thinks through a system of questions in advance, directing children to a specific study. The research style causes children to be very interested in the world around them, they try to think, reason, study surrounding events, use the acquired knowledge in practice and in solving the issue. In the research style, a teacher (educator) can pose a problem, put forward hypotheses, determine the main idea, make observations, compare and generalize, analyze, break the whole into components and draw conclusions.

L.S. Vygotsky identified four forms of connection between imagination (hypothesis) and reality. These forms of communication are of great importance for the development of mathematical concepts in a child. The form of the first link. In this form, the hypothetical activity of children is

expressed. The essence of this form is really expressed in fantasy based on the mathematical concepts obtained. The creative activity of the hypothesis depends on the richness and diversity of the child's previous experience. Because fantasy is based on the material that experience has given. The richer the experience, the more material there is for hypotheses. The form of the second link. The second form of connection between hypothesis and reality is the hypothesis of experience. (The finished product of fantasy and real events are mainly related to the experience of others), since hypotheses in this case serve as involuntary, but directed through the experience of others, as if they acted on the instructions of others, only on this basis it would be possible to obtain a result of correspondence with real reality. There will be a third form of binding. The emotional (emotional-emotional) reality of the hypothesis is the laws. The essence of the law is that any fantasy structure has the opposite effect on our emotional arousals, if this fantasy structure does not correspond to reality, then the sensory arousal caused by it will be a sense of reality experienced in practical reality, of interest to the child. The importance of sensory (emotional) assimilation in creative hypothetical activity is undoubtedly great. That's why intuition drives creativity in a person in the same way as thought.

This is the Fourth Law between hypothetical activity and reality. Making a pedagogical conclusion about the patterns formulated by L. Vygotsky, we can say the following: it is necessary to expand the cognitive experience of the child in every possible way; the more the child knows, the more he learns, sees, hears, the more effective his hypothetical activity. The process of solving the problem serves as a means of expanding the child's experience, since the child can hypothetically and visualize what is not in his direct experience. Let's consider in detail the process of solving the issue. The term "problem solving" is used in psychological and pedagogical literature in different meanings.

In different texts, the solution of the problem is understood in different ways: the result obtained when achieving the goal of the task; a sequence of logically interrelated actions leading to the same result; at the same time, the sequence is as economical and predictable as possible without any guiding reasoning (logical incomplete solution):

It is a process in which a person accepts a problem until they achieve a result. In this case, the result is the goal of the task (the solution process). Thus, in the methodological literature, solving a problem is understood as an activity in which all activities related to this issue move from accepting this issue to another issue or to another type of work altogether. Only with a full understanding of the term "problem solving" does it make sense to divide the work on the problem into four known stages. Let's briefly describe these steps.

For the development of mathematical concepts in a child, it is important to know his personality traits. To do this, the teacher (educator) must have important information about the child, that is, information about his readiness for creative activity. Knowledge about the changes taking place in the course of activities and about the final results of activities is of great importance. Therefore, we can conditionally distinguish three forms of information that serve the development of mathematical concepts: initial, current and final. The importance of information lies in the fact that it makes it possible to correctly determine the purpose of the upcoming type of work or the child's readiness to perform specific tasks. In pedagogy, the following types of primary information are distinguished: personality traits; mental abilities, relevance, interest; level of knowledge and cognition. This information is important to determine the child's willingness to creatively understand the problem. Therefore, when organizing such activities, it is necessary to know:

a) the level of knowledge, i.e., according to what concepts the creative activity of the child is carried out;

b) how is creative performance formed;

c) the specific difficulties faced by children;

d) The personal characteristics of the child.

With the rapid development of information technologies, distance learning technologies are penetrating the education system - learning via the Internet. This, in turn, opens up wide possibilities

for the use of modern psychological and pedagogical techniques. Due to the fact that currently the use of educational games and distance learning technologies occupies a special place in the education system, including in the educational process of the Ministry of Education, it is advisable to study these issues more widely.

Educational games occupy an important place in modern psychological and pedagogical learning technologies. As a method, they became widespread in the 70s of the XX century. Currently, there are different types of educational games depending on the application area. Educational games perform three main tasks:

- mediocre: the formation of certain skills and abilities;
- Gnostic: the formation of knowledge and the development of students' thinking;
- Socio-psychological: development of communication skills. Each task corresponds to a certain type of game: an instrumental task can be expressed in game exercises, gnostic - didactic, and socio-psychological – in story-role-playing games.

Its technology for improving the effectiveness of educational games:

- matching the game with educational goals;
- the influence of imitation role-playing on the practical pedagogical (psychological) situation;
- special psychological training of the participants of the game, corresponding to the content of the game;
- the possibility of using creative elements in the game;
- the educator (psychologist) must be prepared for such requirements as participation not only as a leader, but also as a “corrector" and adviser in the gameplay.

A voluntary learning game can consist of several stages: 1) creation of a game environment-at this stage, the content and main task of the game are determined, psychological training of its participants is carried out;

1) Organization of the gameplay -at this stage, the rules and conditions of the game are explained to the participants and the roles are distributed between them.
2) holding a game - it solves the set goal;
3) Summing up - at this stage, both the participants themselves and special experts (psychologist, teacher) analyze the course and results of the game. It is important to note that educational games use not only a simple style of play.

It is important to note that educational games use not only a simple style of play. During the game, group, individual work, joint discussion, testing and questioning, and the creation of role-playing situations can be used. In other words, it becomes possible to combine and use various methods - questionnaires, sociometry, brainstorming and other techniques in a limited number. At the same time, the style of play has some specifics in pedagogy. In the learning process, the game as an auxiliary element is partially used as an addition to the theoretical material and cannot act as the main style. Depending on the style and nature of educational games, they can be divided into the following types:

- Simulation games are used to simulate calculation professions, orientation of children to the profession. For example, in the game” Impod " simulated conditional sewing and production activities, as well as practical skills of modeling and sewing products.
- Meaningful role-playing games (based on a specific life, business or other situation. At the same time, the game resembles a theater production, where each participant performs a certain role (plays). In this case, the game is a creative game with content - a form of intellectual activity, therefore, the preparation of participants and the development of a game scenario are of great importance in this case.

- Innovative games (their difference from other types of games is that they have a movable structure and play in several educational “spaces”, for example, using computer programs. Innovative games are aimed at obtaining high-quality knowledge using modern pedagogical and information technologies. If the types of games given above as an example differed in their style, then the principle of highlighting the latter is the purposeful development of the game, which consists in the formation of skills for managing a specific situation.

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