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## MODERN TEACHING METHODS IN PRIMARY SCHOOL MATHEMATICS LESSONS

**Abstract:** The training method can play a determining and auxiliary role, serving as a means of implementing another method. Each of the methods provides for a special type of teaching activity of the teacher and cognitive activity of students, and also leads to a specific result - the assimilation of the corresponding type of content.

**Key words:** methodology, pedagogy, innovation, mathematics, primary grade, school.

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### Introduction

Currently, a new understanding of the main goal of education has developed in society. The teacher, first of all, should take care of the formation of the child's ability for self-development, which will ensure the integration of the individual into the national and world culture. In connection with these changes in the "Main directions of the reform of the general education and vocational schools", great importance is attached to the improvement of teaching methods.

When teaching children in the primary grades of school, it is very important to convey to the consciousness of students all the necessary educational material. This requires modern teaching methods. With their help, you can arouse students' interest and help children acquire the necessary knowledge, skills and abilities. This helps to generate a positive attitude towards the learning process not only among those who study with interest, but also among children who have no desire to learn.

Teaching methods are ways of interaction between a teacher and students, which are aimed at solving various learning problems. At the same time, the purpose of the teaching method is not to simply transfer knowledge, but to arouse the student's interest in solving a specific problem and awaken his need for obtaining new knowledge.[1]

The methodology of teaching mathematics as a separate pedagogical science arose in the works of teachers. Even Jan Amos Comenius (1592-1670) in his work "Great Didactics", highlighting the general didactic requirements and rules, paid much attention to the study of arithmetic. Johann Heinrich Pestalozzi (1746-1827), a Swiss theorist and practitioner of pedagogy, the founder of didactics of primary education, in his writings, along with general pedagogical problems, developed the question of the methodology for the primary teaching of arithmetic to children. K. D. Ushinsky (1824 -1870) in his "Guide to Teaching in the" Native Word "in several pages deep in content considers the methodology of elementary learning to count [2, p.342].

Learning goals play a leading role among these components of the methodology. The change in learning objectives affected not only the content of education, but also entailed noticeable changes in other components of the methodology, and, above all, in teaching methods. This was concretely manifested in the fact that new textbooks were created for the school, new methods were developed, and a new system of teaching aids was being created.[3]

By teaching methods in didactics, it is customary to understand the ways of joint activity of the teacher and students, with the help of which the teacher

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transfers, and the student assimilates knowledge, skills and develops skills.

The choice of teaching methods is determined by a number of factors: the tasks of the school at the present stage of development, the academic subject, the content of the studied material, the age and level of development of students, as well as the level of readiness to master the educational material. The choice of teaching methods is influenced by the preparation of students for mastering a certain profession, as well as solving problems, social adaptation.

Teaching methods are ways of joint activities of the teacher and students, aimed at solving learning problems.

The teaching method should be distinguished from the medium. The method is closely related to activity and does not exist outside of activity. Textbooks, books, reference books, manuals, technical means, dictionaries, visual aids are used as teaching aids. They can be used for a variety of purposes. Being included in any activity, they make it possible to fulfill the purpose of the activity. The use of various means in the learning process changes the very method of activity. [4]

The verbal method - its basis is the word, and the teacher's task is to convey information to students through words. Oral reception is the leading one in the training system, as it allows you to transfer a large amount of information in a minimum period of time.

Oral teaching method includes: story, lecture, explanation, conversation, discussion, as well as independent work with the textbook. Unlike story and lecture (monologue methods), conversation and discussion (active methods) involve the inclusion of students in the discussion of the material, which develops their interest in the cognitive process.

### A practical method.

This technique presupposes active practical activity of students. Practical teaching methods can be presented in the form of:

- exercises (performance by students of mental or practical actions, the purpose of which is to perfectly master a certain skill);
- laboratory and practical work, during which students study any phenomena using equipment or training machines;
- didactic games - modeling of the studied processes or phenomena.

**Visual method** - implies the use in the learning process of visual aids or other means that reflect the essence of the studied objects, processes or phenomena.

Visual techniques can be divided into two groups:

- illustrations (figures, tables, maps);

-demonstrations (includes watching films and conducting experiments).

The heuristic or partial search teaching method implies that the teacher asks a question, and the students search for an answer to it. Thus, students do not receive "ready-made" knowledge, but actively participate in the search for a solution, thereby developing their thinking abilities.

Heuristic teaching methods include various competitions, research, essays. Heuristic forms of classes are a heuristic lesson, Olympiads, intellectual games, creative defense, interactive forms of learning.

### Problematic method.

Problematic learning is understood as a form of resolution of the posed problem situations. The problem should activate the thinking processes of students and encourage them to actively search for a solution. In addition to the assimilation of knowledge, the method of problem learning allows students to master the methods of obtaining them:

- search practice;
- skills of analysis;
- independent research activities;
- the arrangement of the information received.

### Research method.

The essence of this method lies in the fact that the teacher does not communicate knowledge to the students, they must obtain it themselves in the process of active research of the problem posed. The teacher forms the problem, and the students independently realize it, put forward a hypothesis, make a plan to test it, and draw conclusions. As a result, the knowledge obtained in the course of the search is distinguished by its depth, the educational process is intensive, and the students show interest in the problem posed.

### Explanatory and illustrative method.

This method is one of the most economical teaching methods, and its effectiveness has been tested by centuries of practice. The essence of the method is that the teacher presents information using combined means: oral and printed words, visual and practical materials.

Students perceive information and perform actions necessary for its assimilation - they listen, watch, read, compare with previously studied material and remember.

The teacher's word is the most accessible and widespread teaching tool. Having learned to use the word, the teacher makes even the most abstract concepts and ideas understandable to children. With the help of the word, he can evoke in the minds of children vivid pictures of the past, the beautiful future of humanity, the structure of the universe. The word activates the imagination, memory, feelings of students. In the first stage of learning, until the

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children have learned to use the book, the word is almost the only one a tool for understanding the world.

Teacher's story. This is a lively, imaginative, emotional presentation of events, containing mostly factual material. A teacher who has a good command of the skill of storytelling ensures the assimilation of knowledge by students in a certain system, develops their thinking, shows students how to skillfully use the word.

Depending on the characteristics of the subject, the nature of the story may vary. The most common are story-telling - a statement of events, a story about the life and work of writers, historical figures and story-description - a description of the structure of plants, the design of various devices and apparatus, the composition of substances, etc. [5, p.40]

Conversation. During the conversation, the teacher, relying on the students' knowledge and practical experience and using the questions, leads the students to understand and assimilate new knowledge. In the course of the conversation, a wide scope opens up for independent statements and reasoning of students. The conversation allows the teacher not only to reveal the quality of preparation and the depth of mastering the educational material, but also to study the abilities of each student.

Students literally come to life when the teacher moves into frontal conversation. Strong students react quickly to questions, their example captivates the average and weak, and after a few minutes a general working enthusiasm reigns in the class. And what a satisfaction the students experience when, after such active work, the teacher praises them according to their merits!

Conversation is used by the teacher to establish a connection between the previous material and the new, to communicate new knowledge, as well as to consolidate and test them. [5]

### Observation method.

At the present time, when learning is based on a close connection with life, the boundaries of the use of the observation method in the educational process are significantly expanding. Without observing the diverse phenomena of nature, human labor, social life, observations directed and organized by the teacher, it is impossible to imagine the successful implementation of the tasks of connecting learning with life.

The need for widespread use of the observation method follows from taking into account the process of children's cognition of the phenomena of the surrounding reality. Based on observations, students' ideas are formed and deeper, their knowledge becomes more reliable.

### Characteristics of teaching methods

The classification of teaching methods does not fit into a clearly defined framework. In domestic and world practice, a lot of efforts have already been made

to draw it up. The method is a multidimensional and universal category, therefore different authors use different grounds in order to draw up their own classification. They provide arguments in favor of a particular classification model. E. Ya. Golant and E.I. Perovsky propose to classify methods according to the nature of the perception of information and the source of its transmission. That is, there is passive perception when students watch and listen - lecture, story, explanation, demonstration, and so on. And active perception is the use of visual aids, books, working with them, as well as the laboratory method. [6]

The classification of teaching methods according to various sources of information transfer, as well as the acquisition of knowledge was proposed by N.M. Verzilin, I.T. Ogorodnikov and others. The following methods fit into the framework of this classification: [7]

- verbal - working with a book, the teacher's word;
- practical - experiment, observation, exercise, that is, studying the reality that surrounds each of us.

The classification of teaching methods proposed by B.P. Esipov and M.A. Danilov, based on didactic problems. That is, the sequence of acquiring knowledge by students in a particular lesson is of great importance. First comes the acquisition of knowledge, then the formation of skills and abilities, then the application of this acquired knowledge, followed by creative activity, then consolidation, testing of skills, knowledge and skills. [8]

There is also a classification of teaching methods by the nature (type) of cognitive activity. It was suggested by I. Ya. Lerner and M.N. Skatkin.

They said that the level of independent activity is reflected in the nature of the cognitive activity of students. This classification is characterized by the following methods: [9]

- reproductive (boundaries of creativity and skill);
- explanatory and illustrative, it is also called informational and reproductive;
- partial search;
- problematic presentation of knowledge;
- research.

German didact L. Klinberg also proposed his own classification of teaching methods in combination with forms of cooperation: [6]

- the first group - these are monological methods - demonstration, story, lecture.
- the second group - forms of cooperation - group, individual, frontal and collective.
- the third group - dialogical methods - conversation.

Conversation is a teaching method in which the teacher, by posing a carefully thought-out system of questions, leads students to understand new material or checks their assimilation of what has already been learned.

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Depending on the specific tasks, the content of the educational material, the level of creative cognitive activity of students, the place of the conversation in the didactic process, various types of conversations are distinguished. Heuristic conversation is widespread (from the word "eureka" - I find, I open). In the course of a heuristic conversation, the teacher, relying on the students' knowledge and practical experience, leads them to the understanding and assimilation of new knowledge, the formation of rules and conclusions.

A communicating conversation is used to communicate new knowledge. If the conversation precedes the study of new material, it is called introductory or introductory. The purpose of such a conversation is to induce in students a state of readiness to learn new things. Reinforcement conversation is applied after learning new material. It is based on working with the material learned earlier, but requiring opposition and integration within the framework of any sections. Thinking is based here on the transition to a broader generalization through a comparison of many facts and generalizations.

Active teaching methods are methods that encourage students to actively think and practice in the process of mastering the educational material. Active learning involves the use of such a system of methods, which is mainly aimed not at the teacher's presentation of ready-made knowledge, their memorization and reproduction, but at the independent mastery of knowledge and skills by students in the process of active thinking and practical activity. The use of active methods in mathematics lessons helps to form not just knowledge-reproduction, but the skills and needs to apply this knowledge to analyze, assess the situation and make the right decision.

Active teaching methods are built: [7]

- mainly on a dialogue, involving a free exchange of views on ways to resolve a particular problem;
- on the practical orientation, game action and the creative nature of training;
- interactivity, various communications,
- on the use of the knowledge and experience of students, the group form of organizing their work,
- an activity-based approach to learning. For each stage of the lesson, their own active methods are used, which make it possible to effectively solve the specific tasks of the stage: [5]

Stage 1 - primary mastery of knowledge. This can be a problem lecture, heuristic conversation, educational discussion, etc.

Stage 2 - knowledge control (consolidation). Methods such as collective thinking, testing, etc. can be used.

Stage 3 - the formation of skills and abilities based on knowledge and the development of creative

abilities; it is possible to use simulated learning, game and non-game methods.

A variety of creative design assignments can be used in math lessons. Such tasks in the best way activate the creative development of students in the lesson, contribute to the provision of the necessary conditions for enhancing the cognitive activity of each student, provide everyone with an opportunity for self-development and self-expression. The classification of teaching methods proposed by Yu.K. Babansky, compiled on the basis of the organization and implementation of educational and cognitive activities, methods of its stimulation, motivation, as well as methods of self-control and control. This classification is represented by the following groups of methods: [6]

- the first - the methods of organization, as well as the implementation of educational and cognitive activities. These include verbal (lecture, story, conversation, seminar), visual (demonstration, illustration), practical (laboratory experiments, exercises) [6]. This group also includes problem-search and reproductive methods, methods of work under the guidance of a teacher and independently.

In mathematics lessons, clarity plays an important role. Visibility provides a strong memorization. Thus, visual methods are applied at all stages of the pedagogical process. Their role is to provide a comprehensive, imaginative perception, to serve as a support for thinking.

The principle of clarity says: everything that is possible must be explained and shown to the child on objects, pictures, visual samples. This is due to the fact that the leading forms of thinking at this age are visual-effective and visual-figurative. The conceptual form of thinking at school age is manifested only in the simplest forms (visual-schematic thinking). Therefore, visual explanations are always more accessible. In elementary school, various types of visualization are used: [6]

- natural (real objects),
- picture and picture-dynamic (photos, drawings, paintings, filmstrips, etc.),
- volumetric visibility (models, dummies),
- audiovisual (films, video films),
- graphic (diagrams, drawings), experimental (elementary experiments).

Requirements for visibility: must really reflect the surrounding reality, correspond to the level of development of children, be highly artistic in content and design.

Each math lesson uses exercises. Exercise means repetition (multiple) performance of mental and practical actions in order to master it or improve its quality. Exercises are used in the study of all subjects and at various stages of the educational process. The nature and methodology of the exercises depend on the characteristics of the subject, the specific material, the question being studied and the age of the students.

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Exercises by their nature are divided into oral, written, graphic and educational-labor. When completing each of them, students do mental and practical work.

According to the degree of independence of students when performing exercises, there are:

- exercises for reproducing the known for the purpose of consolidation - reproducing exercises;
- exercises for applying knowledge in new conditions - training exercises.

If, when performing actions, the student silently or aloud speaks, comments on the upcoming operations, such exercises are called commented. Commenting on actions helps the teacher to detect typical mistakes, to make adjustments to the actions of students.

- the second group of this classification - methods of stimulating and motivating students' activities.

- the third group - methods of self-control and control over educational and cognitive activity in order to increase its effectiveness.

Thus, there are several dozen classifications of teaching methods that have their own disadvantages and their advantages. But it is important to understand that the educational process is a dynamic structure. Therefore, the choice of teaching methods depends on many factors [8].

The question of methods is the question of how to teach in order to achieve high educational and upbringing results in learning.

It is necessary to consider what methods it is advisable to use at different stages of work on the program material in order to achieve success in solving the main problems of teaching mathematics.

Preparatory work should provide the necessary conditions for the successful assimilation of the material by all students in the class. The system of exercises at this stage should contribute to the creation or expansion of the experience of children, which will form the basis for familiarization with new material, reproduction of the material, which will have to rely on when discovering new [9].

For example, familiarization with arithmetic operations is based on operations on sets: joining sets that do not have common elements, deleting part of a set, etc. Therefore, before getting acquainted with the actions, using the method of conversation, it is necessary to offer students exercises on operating with sets: [10]

Put in 5 circles and 2 more circles. Slide in 2 circles. How many circles have there been? Remove 3 circles. How many circles are there now?

Another example. Before introducing the addend permutation technique, it is necessary to repeat the displacement property of addition. For this purpose, students are offered exercises in which they must apply the displacement property of addition. In this case, it is advisable to use the conversation method:

Writing on the board:  $5 + 2 = 2 + 5$

Solve the first example. How much did it turn out? Compare the first example with the second: how are they similar? What is the difference? Who can say by calculating from the second example. Why did it turn out also 7?

In many cases, the preparatory exercises are performed by students independently, that is, in this case, the method of independent work can be used. For example, before getting acquainted with the solution of an equation of the form  $x \cdot 3 = 21$ , you can offer students to independently perform the exercise - find the result of the second example, using the first: [11]

$$8 \cdot 6 = 48 \quad 7 \cdot 9 = 63 \quad 6 \cdot 4 = 24$$

$$48 : 8 = 63 : 9 = 24 : 6 =$$

Explaining the implementation of this exercise, the students form a rule: if the product is divided by one of the factors, then another factor is obtained. Based on this knowledge, it is easy for the teacher to lead the children to the solution of equations of the named type [12].

There is another very important side in preparing a student for the assimilation of new material - this is the formation of his ability to perform mental operations: the ability to perform analysis, synthesis, compare objects, highlight the essential common (generalize), distracting from the insignificant. The work on the formation of these mental operations should begin from the first days of schooling for children and be organically linked with the study of the material. Particular attention should be paid to training, to compare objects, since it is necessary to perform analysis and synthesis, and the operation itself is the basis of generalization.

Thus, the methods of mathematical development of schoolchildren. And on the basis of the material under study, we can say that not one method taken separately does not have such a strong educational character as their combination. Traditional classification of teaching methods, originating in ancient philosophical and pedagogical systems and refined for current conditions. The source of knowledge is taken as a common feature of the methods distinguished in it - practice, clarity, word.

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