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DIDACTIC BASES OF DEVELOPMENT OF LOGICAL THINKING IN SCHOOLCHILDREN

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МАКТАБ ЎҚУВЧИЛАРИДА МАНТИҚИЙ ТАФАККУР УСУЛЛАРИНИ РИВОЖЛАНТИРИШНИНГ ДИДАКТИК АСОСЛАРИ

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Аннотация. Мақолада математика фанини ўқитиш орқали мактаб ўқувчиларида мантиқий тафаккурни ривожлантириш имкониятлари кенг эканлиги кўрсатилган ҳамда бу йўналишда олиб борилган тадқиқотлар ва уларнинг хулосалари келтирилган**.**

Калит сўзлар: мантиқий тафаккур,тадқиқот, операциялар, анализ-синтез, психологик шартлар, амалиёт, кузатув, тажриба-синов, табиий жараён.

ДИДАКТИЧЕСКИЕ ОСНОВЫ РАЗВИТИЯ ПРИЕМОВ ЛОГИЧЕСКОГО МЫШЛЕНИЯ У ШКОЛЬНИКОВ

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Аннотация.В статье показано, что возможности по развитию логического мышления школьников посредством преподавания математики а также изложены результаты исследования, проведенные в этом направлении, и их выводы.

Ключевые слова: логическое мышление, исследование, операции, анализ-синтез, психологические условия, практика, наблюдение, эксперимент, естественный процесс.

DIDACTIC BASES OF DEVELOPMENT OF LOGICAL THINKING IN SCHOOLCHILDREN

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Annotation. The article shows that the possibilities of developing logical thinking of students by the means of teaching mathematics, and also presents the research conducted in this direction, and their conclusions.

Key words: logical thinking, research, operations, analysis-synthesis, psychological conditions, practice, observation, experiment, natural process.

One of the goals of instruction in state educational standards is to teach math in elementary school through children's ways of thinking.

Without independent thinking, a child cannot develop intellectually. That is why the problem of the development of logical thinking among students is especially relevant today.

The ideas of the formation of logical thinking operations were set forth by psychologists A.N. Leontiev [15], L. It was developed under the leadership of Rubinstein [22]. They came to the conclusion that the processes of learning and the development of thinking are interconnected, changes in the quality of analysis and synthesis of activity and its composition, as well as the need for the formation of logical operations among students.

Not Available Menchinskaya [17], A.V. Usova [25], G.I. Shukina [30], E.N. The Kabanova-Meller study [9] says that logical operations are universal and have the potential to move from one type of activity to another. Scientist N.A. A study by Podgoretskaya [20] showed that in older people who are not trained in certain methods of logic, logical behavior occurs spontaneously and behaves with various flaws.

N.P. Baldina [2] devoted her dissertation to the topic of mastering logical methods of reasoning, as a result of which it was concluded that logical methods are preferable in the process of acquiring knowledge about these methods. TS Thesis Kudrina [12] is devoted to the formation and development of logical thinking, through which the psychological conditions for the formation and development of complex logical operations are explained, justified, rejected and rejected.

The scientist proved that logical operations at different age stages are manifested in the form of difficulties. For younger schoolchildren - an explanation, in adolescence - at a young age - means refusal. Each subsequent step includes the previous one. N.F. The question of the formation of thalamic methods of thinking has been comprehensively studied [23].

They singled out the formation of logical operations, both direct and indirect, in psychology and pedagogy. Direct orientation is an explanation of the essence of the method being implemented, familiarity with its algorithm and functions.

An indirect goal is, first of all, the ability to master specific scientific knowledge and skills, to master specific rules. Skills must adapt logical thinking and logical operations to a specific learning environment.

Researcher B.F. In his dissertation, Kurbelo [13] came to the conclusion that the coordinated formation of specific methods of action and logical thinking is more effective than individual education. Amankul Kurbelo argues that the implementation of logical methods requires two steps: the choice of meaningful content and logical relationships.

Many researchers, both psychologists and psychologists, support the view that the analysis and synthesis of mainstream thinking are based on (S.L. Rubinstein, A.N. Leontyev, V.V. Davydov, A.A. Lyublinskaya, D.N. .). Epiphany, N.A. Menchinskaya and others). Without them, it is impossible to form thinking. "... Insufficient analysis and synthesis directly affect the performance of more complex mental operations" [17]. Pospelov N.N. and Pospelov I.N. main features of logical operations, such as analysis and synthesis.

"Analysis is a practical study of the elements or features (sides) of an object, since it is a practical study of the specific elements of the object under study, separating the individual elements of each object or its parts separately. or the unification of the mind. "[21] A.A. Lublin studied the features of logical operations, such as analysis and synthesis. The analysis consists in dividing the whole into parts, revealing its main aspects and revealing the connections and connections between these parts of the object under study.

The author describes the thought process as three interrelated logical operations: synthesis - analysis - synthesis. One or the other issue can be solved when all three parts are coordinated. Otherwise, there will be a flaw in the thinking process, and the task set will be addressed incorrectly. Analysis and synthesis are accompanied by visual imagery, mental abstraction and phenomena, and the use of subject matter and reality [16].

N.N. Pospelov and I.N. Pospelov investigates the development of students' analytic-synthesis thinking in solving geometric problems:

1) Analysis of the conditions - first of all, the understanding of the issue and the questions put forward;

2) The analysis of geometric shapes - the first point, the right drawings based on the results of mental activity, with the main features of geometric shapes;

3) Data and target size analysis - "determination of the correlation between known and unknown quantities";

4) An analysis of a problem-solving plan is an examination of the correctness and improvement of the plan to be drawn up, with conflicting points in the context of the issue;

5) Solution analysis - Verification of the problem is grounding it by comparing it with the individual parts of the terms and conditions of the problem;

6) Analysis of results - implies verification of results with terms of issue and drawings [21].

Some authors also argue that practical efforts such as analysis, synthesis, layout, layout, graph, and diagram construction are essential for the development of logical operations such as analysis and synthesis [21, 7]. Some didacticists believe that only the same subject, phenomenon and events can be compared [18]. Others support the idea that any (two or more) objects of any real reality and scientific understanding can be compared. Davidov [5], N.M. Zvereva [6], L.A. Ivanova [8], N.N. Pospelov, N.I. Pospelov [21]. Comparison operations are carried out on identical and different marks (complete comparisons), and comparisons are made on one (partial)

sign. There are various didactic recommendations for studying this operation. Below are some of them. Students' activities take place in a particular context of the subject, with the teacher gradually forming logical operation in the abstract material. During the course of a specific subject, the teacher introduces an algorithm for comparison methods when students perform their own tasks according to that algorithm. Parallel study of algorithm of known material and methods of comparison. Formation of such methodical methods of operation is most common in the pedagogical literature, since any discipline is clearly organized by programs.

L.A. Biryukov proposes three stages of comparison methods:

1. What are "Characters", "Symbols of Identity", "Different Marks"?
(Development of skills for identifying different signs of objects and events,
finding similarities and distinctive characters).
2. Propedeutics of comparison methods.
3. Acquaintance with the structure of comparison methods (approximate actions).

L.A. Biryukov [26, p. 26] proposed a comparison method as follows:

The structure of the logical method of comparison

1.	Separation of comparison objects;
2.	Purpose of comparison;
3.	Theoretical information on objects of comparison;
4.	There are different similarities and differences;
5.	Distinguish the main similarities and distinguishing features of the goal;
6.	Summary of comparison results.

Analysis of pedagogical literature, a review of algorithms for the formation of one and the same basic element by methods: the ability to analyze comparative operations has shown that you cannot learn. In fact, thanks to logical operations, it has become possible to compare the similarities and differences between important (or less important, often seemingly insignificant) features.

Researcher A.A. Pridekso is invited to perform the following operations for comparison:

1) the actualization of other signs and signs of the compared objects is carried out through feelings, memories, ideas;
2) highlight the main features of the comparison;
3) Compare and contrast elements;
4) conclusions about comparable objects [1].

Member of Parliament Abstraction Kabanova-Meller - conscious difference between important and non-essential and the difference between individual (dividing) species; It is believed that such an abstraction is important for the formation of concepts regarding the separation of important characters [9]. The scientist proposed a method of forming the opposite abstract method, which includes two stages: teaching methods and methods for their transition.

The purpose of the first stage is to view the list of events.

The purpose of the second stage is to teach students one of the ways to solve complex problems. The author illustrated this with the example of a geometric problem [9].

More detailed recommendations on the formation of an abstract operation are given by L.A. In his studies, this process was divided into three stages and was studied by studying the basic physical concepts proposed by Biryukov.

The first stage: formulated concepts: important features.

Formulated skills: the meaning of the attributes.

Step Two: Concepts: Signs That Are Not Important. Formulated skills: separation of insignificant characters; contrasting important characters with insignificant.
The third stage: formulated concepts: methods of abstraction; The structure of abstraction methods. Formulated skills: implementation of abstract methods in full; include abstractions in the system of previously studied methods.
Biryukov L.A. wrote: "... abstraction methods have their own structure, like any other method, that is, in a series of actions performed in strict sequence" [26]. The scientist proposed the following algorithm.
1) Observation (research) of the object and the allocation of as many objects as possible;
2) Observation (study) of the features of the intended purpose and comparison of important groups;
3) Separation of important groups of functions that must be abandoned in accordance with goals;
4) Comparison of the results obtained after modeling an ideal object with non-essential symbols selected from the actual object or event selected by non-essential symbols;
5) Definition of an ideal object that is not important from the actual object or event and vice versa [26].
An important aspect of his methodology is teaching students the elements of formal logic (important and non-essential, random and private) at the first stage of training. Undoubtedly, this justifies the effectiveness of this method, since it is impossible to form a complete abstract operation without the learner's knowledge at the above stage. An analysis of the structure of an abstraction operation reveals the following steps:
1) analysis of the studied objects (with highlighting the entire set of features of the object);
2) Comparison (distinguishing common and common features of objects);
3) to distinguish between significant features and the deviation of insignificant characters based on the comparison made.
Thus, from the above, we can conclude that abstraction methods depend on the successful implementation of direct analysis, synthesis and comparison. On the other hand, the main function of abstraction is to highlight important and insignificant features of objects, which allows for a deeper comparison.
An analysis of the methods of generalizing the methods allows us to come to the conclusion that it is important to find insignificant variations of character, while retaining important features.
A generalization can be represented by both inductive and deductive methods of forming concepts. The inductive method of distinguishing characters leads to the distinction of important features that define the concept. The deductive way of teaching generalization methods is given by the main characters who are ready for this object. Then the parameters of the object are listed. It is proposed to formulate a definition of the concept and highlight common features. Thus, any generalization process is included in the abstraction, since it is impossible to combine the subject without separation of the necessary characters.
Based on the foregoing, it can be concluded that generalization as a logical operation acts as a function of responding to the separation of important and common symbols. Generalization is inextricably linked to thought-provoking operations, such as analysis, synthesis, comparison, and abstraction. The knowledge acquired by students must be systematized in a certain way. Students will be able to gradually move from single knowledge to generalized knowledge, and then systematize and classify them.
In this regard, V.V. Davydov declares: “One of the central tasks of education is to give children knowledge in a classification scheme that reflects the conformity of concepts in a certain field” [56; 86]. N.N. Pospelov N.I. Pospelov suggested that the teacher follow the plan in order to formulate and improve the classification of operations:
1) familiarity with the elements of formal logic;
2) explain and master the nature of classification operations;

3) demonstration and analysis of ready (right and wrong) classifications of various objects;
4) Development and application of classification recommendations (rules, algorithms);
5) Various exercises for the classification of objects [21].
G. Pippig, D. Lompscher proposed the following algorithms as a guiding basis for performing classification operations;
1) The choice of common features of all disciplines that you consider with a certain degree of severity;
2) Combining the subject (s) with this sign in one class;
3) Validation of existing classes;
a) Verification that classes have the same elements (that is, whether all disciplines belong to the same class);
b) do all SPS unite many early sciences [168; 10] to verify such aspects.
A.A. Pryadexo defines the classification as follows:
1) updating of various features related to the objects of classification;
2) reference to the grounds for classification;
3) validation of the proposed classification structure;
4) Dividing the set of objects into groups (classes).
The classification procedure is a relatively benign comparison and therefore a more complex operation. Subjects are grouped into classes, types, categories to determine the similarity between main and secondary characters. For the present study, we determined the stages of development of logic in adolescents by using mathematical methods, and analyzed the peculiarities.
Comparative analysis, analysis and synthesis, abstraction, classification, and generalization are required for complex development at an early age.
Researcher A.A. The algorithms of the thought operations developed by Pryadexo were distinguished at the level of logical thinking.
In the first phase, the students were instructed to coordinate a particular operation using specific methodological methods, with the help of the teacher's perception, memory, and imagination. In primary school, operations such as benchmarking are formed.

Therefore, at this stage, students - juniors should be able to identify the main criteria for comparison. We also include the ability of students to create a holistic picture of the subject without finalizing the object, considering the importance of the synthesis activity in adolescence.
In the second stage of development of logical thinking of young adolescents, we describe their ability to substantiate the classification, compare objects, analyze criteria, and identify the basics of generalization. Learners must be aware of thought-provoking operations, such as comparison to the end.
In the third stage, students complete abstraction, classification, analysis and synthesis. N.N. Pospelov and N.I. In keeping with Pospelov's conclusions, students should be aware of induction and deduction so that they can generalize, that is, to carry out analysis and synthesis activities, to summarize the general features and relationships of objects at this stage.
The fourth stage is high, and students must know how to perform all the abovementioned operations.
In recent years, a number of researchers have analyzed the problems of synthesis, synthesis and its derivatives: Palamarchuk [19], SV. Lazarevsky [14], N.A. Garuli [4], S Kakaev [10], SI. Kalandarov [11], V.I. Tatochenko [24], T.F. Kholmuradov [28], LS Khadartseva [27], I.A. It is reflected in the dissertation work of Khrestina [29].
They offer the structure of separate logical operations, algorithms and methods of their formation, a system of didactic tasks is proposed; certain recommendations (ways,

methods, generalized schemes, graphs) on the formation of separate logical operations are proposed.

However, the problem of the transition from logical operations to logical thinking as a holistic process is still relevant today. There are no effective didactic conditions for intermediate stages of this process, with different aspects of school development for young adolescents.

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