IJIAET International Journal of Innovative Analyses and Emerging Technology

| e-ISSN: xxxx-xxxx | www.openaccessjournals.eu | Volume: 1 Issue: 1

PUPILS OF STUDENTS OPERATIONAL-DEVELOPING FUNCTIONS OF MATHEMATICAL KNOWLEDGE WHEN LEARNING ALGEBRA IN 7-9 CLASSES

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ABSTRACT:
This article examines the mastery by students of the operational and developmental functions of mathematical knowledge when teaching algebra in grades 7-9.

Key words: pedagogy, teaching, knowledge, mathematics, algebra

Today, the pedagogical process is, as it were, a connecting link in the activities of a teacher and a student, not properly oriented towards their personality. Informational and illustrative teaching methods prevailing in the educational process turn the student into an object of influence. With this method of teaching, the student's personality develops one-sidedly, that is, only memory and perception work, while when activating the activity of the personality in general and the personality of the student in particular, creative and practical activity plays the main role, in the process of which all aspects of the personality are activated.

In the formation of creative and practical activity, mathematics has ample opportunities that are not used to a sufficient extent by many teachers. When teaching by the explanatory-illustrative method, students assimilate only other people's thoughts. This does not contribute to the development of creative activity, cognitive independence, since the student is presented with the final result of mental activity.

Sources of information, the process of its formation, the process of finding a result, its emotional and motivating sides remain unknown to students. Information is learned passively.

Cognitive activity is the organization of the reflection of objective reality on the basis of subject-practical and communicative activities of students. Knowledge is the result of this activity. Knowledge is the result of the cognitive activity of students. Based on this, the structure of the academic subject, the structure of the educational material, section, paragraph, topic should be developed.

Does traditional teaching of mathematics provide students with real, vital creativity? For example, what is the impact on the student of the activity of simplifying rational expressions or finding a formula when performing transformations of other mathematical expressions? Undoubtedly, the transformation of expressions composed by someone, to some extent develops the desire for search, but this is not real creativity.

The modern level of development of technology, industrial and social relations makes increased demands on the educational process: students already at school must master not only the informational, but also the functional side of scientific knowledge. Bringing the functional side of scientific knowledge to the consciousness of students was left to chance.

Theoretical features of students 'mastering of operational and developmental functions of mathematical knowledge in teaching algebra in grades 7-9 - issues of social and methodological necessity and psychological and pedagogical features of students' mastering of operational and developmental functions of mathematical knowledge in the course of 7-9 grades of algebra are revealed.

Learning (and not only its components such as perception and representation, but also the emotional sphere) as a special form of activity, genetically and functionally related to real objective activity. For the systematic provision of these issues, it is necessary to clearly define the operational and functional capabilities of academic subjects, including the role of each of them in the formation of the personality, the development of the abilities and inclinations of students.

As you know, educational activity is subdivided into practical and theoretical. Naturally, this subdivision is conditional, for the theoretical and practical principles to one degree or another are present in any kind of educational activity. Thinking always directs and directs the practical activity of the individual. Based on this real situation, a plan for further action is drawn up. Drawing up a plan (scheme) of action is already a transition to theory, the implementation of what was conceived is practice. Consequently, in activity there is always a transition from practice to theory and vice versa.

In order for students to effectively master the operational and developmental functions of mathematical knowledge in the process of teaching algebra in grades 7-9, we conditionally divided the system of classes into the following three groups: contemplative-practical, creative-teaching and applied.

Based on this, the operational and developmental functions of algebraic knowledge, respectively, are divided into contemplative-practical, creative-teaching and applied functions. Contemplative and practical functions are performed by all algebraic operations that form only the algorithmic activity of students and do not contribute to the manifestation of truly creative independence.

The creative teaching functions of mathematical knowledge contribute to the formation of truly creative activity of students on the basis of abstraction, generalization and concretization when the teacher uses research, heuristic and problem teaching methods. Applied functions include those functions of mathematical knowledge that are of an applied-practical nature.

In the course of the research, the main personality-waving functions of students' mathematical knowledge, which are formed when teaching algebra in grades 7-9, were identified. We include the following to them:

1.Ability to move from practical life situations through analysis, synthesis, abstraction, generalization to numerical algebraic expressions.

2.Mastering analytical and synthetic methods of reasoning and rational thinking.

3.Ability to apply mathematical knowledge in related subjects, in real life situations. This, in turn, made it possible to highlight the main personal qualities of students, the formation of which is possible in the process of teaching algebra in grades 7-9.

To increase the effectiveness of students 'mastering of the operational and developmental functions of mathematical knowledge when teaching algebra in grades 7-9, it is necessary to structure the students' knowledge according to the stages of the cognitive process, sensory and mental. It is known that sensory cognition is achieved with the help of the senses, is associated with living contemplation and sensations.

Theoretical analysis made it possible to highlight the contemplative and practical foundations of mathematical knowledge:

1 Natural objects, objects, practical (agricultural, technical, economic, social, household, etc.) situations.

2 Various subject, technical models.

3 Materialized real objects, mathematical models (planimetric and stereometric drawings, drawings, posters, models of geometric shapes).

Currently, physiologists and psychologists have proven that the thinking organs of the brain consist of two parts. In one part, mental operations are carried out using images of real things, and in the other part, mental operations are performed in the form of abstract concepts. The cognitive process will only be effective when it is built (in a really) rational combination of these two components of human mental activity. Proceeding from this, the psychological and pedagogical features of students' mastering of the operational and developmental functions of mathematical knowledge are revealed.

To determine the ways of eliminating the “facelessness”, detachment from the personality of students of pedagogy and methods of teaching mathematics, the essence of the concept of knowledge has been comprehensively studied. The theoretical and practical results of the study led to the need to distinguish between explicit and implicit (or personal, i.e., covering skills, habits, intuitive images, creative thinking operations, mental states and other forms of personal experience) knowledge. With regard to human speech activity, knowledge is divided into articulated and non-articulated. What is knowledge? This is what is presented in the form of text, with the help of symbols, drawing, etc. This is all the end result of human cognitive activity in the form of social experience.

But knowledge is also subdivided into general social and special, depending on the field of activity chosen by the individual. If we proceed from the subject of mathematics (before the definition of F. Engels) mathematicians are engaged in the study of spatial forms and quantitative relations of the objective world, then mathematical texts of various kinds are only articulated components of mathematical knowledge. Other personal components that are not articulated, such as the ability to model, generalize, abstract, etc., are recreated by didactic means, methods of organizing the educational process. Taking these provisions into account, the topics of the entire course of algebra in grades 7-9 are presented in the form of a general structural diagram of mathematical concepts and theories.

For each basic mathematical concept, a structural diagram of the mastery of mathematical concepts by class was built. The further transition from basic mathematical concepts to derived concepts is carried out at the level of self-consciousness using mathematical logical operations.

Considering that the information material is the initial material for extracting knowledge from it, then, in order to obtain genuine knowledge, it is necessary to master the methods of obtaining this knowledge from practice, from real life, which involves the processes of living contemplation, generalization, abstraction, the creation of various models, implementation inside model thinking and interpretation of the results. Awareness of humanistic values is at the heart of active working methods. This means that the center of the educational process is the personality of the university student. A necessary condition is to provide him with freedom of choice, the possibility of self-realization and self-esteem increase. The learning process helps a person to realize the importance of his own point of view, responsibility for the decision.

This means that full-fledged mathematical knowledge is not only mastered mathematical concepts, conscious teaching materials, solved various problems, but also mastered (to be able to do it yourself) methods of extracting spatial forms and quantitative relations from the objective world, the ability to analyze and study their properties and characteristics, i.e. the ability to create various kinds of mathematical models, perform various model operations within and practically apply them. All this is achieved on the basis of three developed types of activities. In turn, each species is divided into two forms:

I. a) contemplative and practical lessons, built on the basis of practical activity through pre-organized (carefully designed) practical work; all mental activity of students is directed to an independent conclusion, brought to a new mathematical concept. In the course of the lesson, new mathematical knowledge, new concepts, individual properties are emphasized, taken in essence from real life, although expressed abstractly; students are given tasks and a number of questions related to this knowledge, concepts and properties, which help to better understand their mathematical expression (abstraction);

b) contemplative and practical lessons based on knowledge gained in other subjects; interrelated concepts are analyzed in advance, starting from already mastered forms and concepts come to new mathematical concepts, equations and formulas.

II. a) creative training sessions organized on the basis of practical activities; here problem situations are created, prospecting, research, heuristic interviews are conducted (method of questions and answers);

b) tasks from practice, mathematical puzzles, giving a feeling of a lack of existing knowledge so that the student feels the need for active independent thinking, creativity, so that such a need pushes him to an attentive attitude to the environment, to an active mental activity.

III. Applied problems had a varied content and included computational and measurement operations. The main goal of the practical lessons was the application of theoretical knowledge in practice, a deeper understanding of the educational material, as well as the development of the relevant skills and abilities:

a) practical exercises were distinguished by vitality and liveliness. The compilation of tasks by the students themselves, taken from the industrial sphere and agriculture, expanded the production and technical horizons, increased interest in solving problems, and contributed to the social formation of the individual. As a rule, this is the kind of activity that students encounter in life: land surveying, breaking maps, calculating the dose of mineral fertilizers, obtaining various mixtures, a measure of measurement; calculation of yield per hectare; economic calculation in a brigade or family contract; minor repairs, consumption of electrical energy; force and elements driving machines and mechanisms, etc. The students mastered these skills in the process of practical training. And this, in turn, was a factor determining the interest in vocational guidance, developing efficiency, the ability to work in a team.

b) applied classes on mathematical objects in terms of their structure, venue, didactic support (sets of models or a mathematical field were used), reflected the specifics of certain blocks of mathematical knowledge. Such forms of classes, to a greater extent ensured the activity of students, made it possible to realize the following educational goals: conscious assimilation of the material of a new topic; development of students' creative abilities; formation of the ability to apply the acquired knowledge in practice; the ability to apply mental mathematical operations on any objects; the ability to use creative-mental operations analysis, synthesis, abstraction, generalization, concretization, etc. in practice. The study of each topic at the beginning of the chapter was carried out on the basis of an activity-conceptual structural diagram, after which some students themselves made such structural diagrams.

Mastering the operations of creative thinking when teaching according to the developed methodological system, students get the opportunity not only to develop their thinking, but also to delve deeper into the content of the studied objects in the processes of reality.

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