Methods of teaching algebraic material in elementary grades

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ABSTRACT

The article revials with the issues of methodology for teaching algebraic material in elementary grades.

Introduction

"Mathematics is in our blood. But over the past 20 years, the level of knowledge in this science has decreased. Because we did not pay enough attention to teachers, did not give them a decent salary, did not set a specific goal for them. The consequences of this are now being felt in many areas," the president said. "Today, our goal in the development of this area is to create a competitive environment in mathematics."

President of the Republic of Uzbekistan Shavkat Mirziyoyev

Algebraic material is one of the components of the initial course of mathematics, but does not stand out as an independent section. It was first introduced into science in 1969-1970. and the school subject became known as "Mathematics". The study of the elements of algebra in the initial course of mathematics has close ties with the study of arithmetic issues, because the algebraic part of the program is of particular importance in the mathematical development of the younger student, as well as for the further concept of the mathematics course in high school.

Literature analysis

When writing this article, we analyzed andused the research works of famous mathematicians-methodologists of the world: M. I. Moro, G. V. Beltyukov, A. M. Pyshkalo, M. A. Bantov and Uzbekistan: M. E. ZhumaevA, Z.G. Tadzhieva and others, made to date on the methodology of teaching mathematics in primary school. We reviewed and studied such scientific works as "Methods of teaching mathematics in primary grades", "Mathematics in grades 1-4", "History of mathematics at school" and whether we expressedour opinions on the basis of this.

Research methods:

In primary school, students get acquainted with basic algebraic concepts such as: "equality", "inequality", "expression", **"variable", "equation".** Familiarization of students with these algebraic concepts creates conditions for the generalization of many arithmetic concepts.

Along with the basic concepts, the following main tasks can be distinguished in the study of the initial course of mathematics:

1. To form students' ability to read, write and compare numerical expressions;
2. Acquaint students with the rules for performing the order of actions and develop the ability to calculate values;

3. To form students' ability to read, write down letter expressions;
4. Introduce students to the simplest equations;
5. Teach how to solve the simplest problems using equations.

The concepts of equality, inequality and equations are revealed in the relationship. Work on them is carried out from the first grade, organically combined with the study of arithmetic material.

Students get numerical equals and inequalities as a result of comparing given numbers or arithmetic expressions. Therefore, the signs ">", "<", "=" do not connect any two numbers, not any two expressions, but only those between which there are these relations. Two equal numbers or two expressions that have equal values, connected by the sign " = ", form an equality. If one number is greater (less) than the other, or one expression has a value greater (less) than another expression, then, connected by the corresponding sign, they form an inequality.

In the methodology of working on numerical expressions, three stages are distinguished: the first is to form concepts about the simplest expressions (+,-,*,/); the second is about expressions containing two or more arithmetic operations of the same stage; the third is about expressions containing two or more arithmetic operations of different stages. With the simplest expressions - "sum and difference" - students get acquainted in the first grade, with "work and private" - in the second grade.

Performing operations on sets, children, first of all, learn the specific meaning of addition and subtraction, therefore, in records of the form 3 + 2, 7-1, the signs of actions are recognized by them as a short designation of the words "add", "subtract" (add 2 to 3).

In the future, the concepts of actions deepen: students learn that by adding (subtracting) several units, we increase (decrease) the number by the same number of units (reading: 3 increase by 2), then children learn the name of the action signs "plus" (reading: 3 plus 2), "minus".

The ability to read and write expressions, to find their meanings with the help of an appropriate arithmetic operation is developed with the help of repeated exercises.

The ability to compose and find the meaning of an expression is used by children in solving arithmetic problems, at the same time, there is a further mastery of the concept of "expression", the specific meaning of expressions in the records of problem solving is assimilated.

The rules of the order of execution of actions in complex expressions are studied in the 3rd grade, but practically some of them are used by children in the first and second grades.

The first is the rule about the order of actions in expressions without parentheses, when either only addition and subtraction, or multiplication and division (3 cl) are performed over numbers. Based on calculations and analysis of specially selected expressions of students of the fourth grade, it is concluded that if parentheses do not affect the order of actions in expressions with brackets, then they can be omitted. In the future, using the learned properties of actions and the rules of procedure, studentsare trained in converting expressions with parentheses into expressions identical to them without parentheses. For example, it is proposed to write these expressions without parentheses so that their values do not change:

$$(45 + 30)\text{-}20 \quad (10 + 4)\bullet 2$$

So, the first of the given expressions, children replace the expressions: 45 + 30-20, 45-20 + 30, explaining the order of performing actionsin them. Thus, students make sure that the meaning of the expression does not change when the order of actions is changed only if the actions are applied.

Study of letter expressions.

For the first time, students get acquainted with the variable in grade 3 when studying the topic "Expression and its meaning". In the process of learning, children should learn to read and write expressions with one and two variables of the form: a + 2, a + b, c-13, c-d, 3 • b, 16: c, and so on, learn to find the meanings of these expressions with given values of letters.

In grade 3, children are introduced to expressions that contain a variable and then two variables. The term "variable" is not introduced.

The letter symbolwill be a means of generalization only when the student has many times observed certainconnections, dependencies, relations, properties, etc., on numerical examples, formed the corresponding conclusions, rules or properties and used them when performing various exercises.

Thus, the use of alphabetic symbolism is a wayto increase the level of generalization of knowledge acquired by primary school students, and prepares them for the study of the system ofalgebra in the following classes

The concept of an equation occupies a special place in a number of algebraic concepts studied in primary school. It is closely related to the concept of expression, variable, equality.

Equality with an unknown number is called *an equation.*

For example: *34 + x. = 45.*

To solve the equation is to find a value of an unknown number at which the equality will be true. This number is called the *root of the equation*.

The solution of the equations is carried out directly:

1. Method of selection.
2. A way to use the relationship of the components of the action.

Method of selection. From the given values or from an arbitrary set of numbers, a suitable value of an unknown number is selected. In this case, the selected number should, when substituted into an expression, turn it into a correct equality. For example: from the numbers 3, 5, 6, 7, 10, select *the value of x., at which the equality x. + 3 = 10 will be true.*

When solving by the selection method, students form a conscious idea of what it means to solve an equation (find a number that, when substituted into this equation, the correct equality is obtained).

How to use the relationship of activity components. The rules of the relationship of the components of actions are used when solving the equation:

$$1)\ 5+ X. = 12$$

We have an unknown second term. Recall the rule, in order to find an unknown term, it is necessary to subtract the known term from the sum (value of the sum).

$$So,\ X. = 12 – 5$$

$$X. = 7.$$

Conclusion

Thus, the introduction of algebraic material in the initial course of mathematics allows students to prepare for the study of the basic concepts of modern mathematics (variable, equation, equality, inequality, etc.) contribute to the generalization of arithmetic knowledge, the formation of students' functional thinking. The study of algebraic material is conducted in close connection with arithmetic material. The introduction of elements of algebra is of great importance for improving the system of mathematical education at the 1st stage of general secondary education, expanding the concepts of mathematical tools used by younger schoolchildren in solving problems.

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