



FORMATION OF MATHEMATICAL CONCEPTS OF CHILDREN WITH HEARING DEFECT USING INNOVATIVE TECHNOLOGIES

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<p>Received: February 20th 2023 Accepted: March 20th 2023 Published: April 26th 2023</p>	<p>This article presents ideas about innovative education and the content of the formation of mathematical concepts. The views of scientists on the formation of mathematical concepts of children with hearing impairment using innovative technologies are also presented.</p>
<p>Keywords: innovation, technology, disability, mathematical concept, numeracy, hearing impairment, element</p>	

Modern educational development has given rise to a new direction of innovative pedagogy. Innovative - (English) - introduction (dissemination) of innovation.

The term innovative pedagogy and researches specific to it appeared in Western Europe and the USA (60s). Innovative activity was studied in the works of O. N. Gonobolin, V. A. Slastinin, N. V. Kuzmina, A. I. Shervanov and others.

The socio-psychological aspect of innovation was developed by the American innovator E. Rodgers. He showed the classification of the participants of the innovation process, their attitude to the innovation, and others.

A.I. Grigorin understands innovation as purposeful changes that introduce new, relatively stable (elements) elements into a specific social unit - organization, population, society, group.

There are two views on this process (Grigorin, Sazonov, Stepanov, etc.).

At first glance, some new idea introduced into life is illuminated.

In the second approach, the interaction of separately introduced innovations is their primary, competition and, as a result, replacement of one by another.

Pedagogical literature shows the scheme of the innovation process and its stages are as follows:

1. It is called the birth of a new idea or the emergence of innovation (discovery stage).
2. Inventing - the stage of creating something new;
3. The stage of practical application of the created innovations;
4. The stage of spreading the news, its wide application;
5. The stage of innovation dominance in a particular field.

In pedagogical innovation, the concept of "new" is considered central, and in pedagogical science, it arouses interest in special, conditional, local and subjective innovation.

The concepts of novelty and innovation are different in scientific areas. Innovation is a tool, a new method, methodology, technology, etc.

"Innovation" is an educational process that develops according to certain stages.

R. N. Yusufbekova considers pedagogical innovation as a previously unknown and unrecorded situation, result, changing pedagogical reality leading to developing theory and practice in teaching and education.

The innovative processes according to R. N. Yusufbekova are as follows:

The first block is a new separation block in pedagogy.

The second block is the block of new perception, change and evaluation.

The third block is the block of new use and its introduction.

The first block includes the classification of new, pedagogical innovation in pedagogy, conditions and criteria for new creation, readiness for its assimilation and use, term and innovation, stages of new creation.

The second block is pedagogical communities, evaluation of the new and its assimilation, innovation in pedagogy, innovation environment, readiness of the pedagogical communities to perceive and evaluate the new.

The third block consists of laws and types of new implementation, use and wide implementation.

M.I. Potashnik shows the following structure of the innovation process:

-- activity structure - motive-goal-task-content-form-methods - set of methodical components.

-- subjective structure - international, regional, district, city, etc. of innovative activity subjects.

-- content structure - the emergence, development and assimilation of innovations in educational and educational activities.

-- organizational structure - diagnostic, predictive, purely organizational, practical, generalizing, implementing.

The innovation process consists of a system that includes structural structures and laws.

In the literature on pedagogy, 4 main laws of the innovation process are distinguished:

- The law that the environment of pedagogical innovation is not in a bad condition;
- Law of final implementation;
- Law of improvement;
- Law of periodic repetition and return of pedagogical innovation;

In the law of innocence, ideas about the pedagogical process and events are violated, pedagogical awareness is violated, and pedagogical innovation is evaluated.

Finally, the law of realization is the vitality of innovation, sooner or later, spontaneously or consciously.

In the law of improvement, pedagogical innovation has a tendency to standardize thinking and practical action.

According to the law of periodicity and return of pedagogical innovation, innovation is renewed in new conditions.

The following approaches are the basis of the innovative processes of the Higher School (Slastinin, Levina, etc.):

1. Approach from the aspect of cultural studies (priority development of human knowledge);
2. Approach from the aspect of personal activity (new technologies in education);
3. Multi-conversational (dialogic) approach, humanization of professional training;
4. Individual-creative (teacher and student interaction) approach.

In developing counting skills, students learn to use the method of counting by adding objects or units. Second decimal numbers are taught in subject-practice education classes at the school for the deaf, and in work classes at the school for hearing-impaired children. Pupils learn to count materials and tools, to count, to determine the quantity of things made and to be made. The content view of numbers is formed by saying the page numbers, reading examples and problems in the textbook, saying the names of dates, apartment numbers, house numbers, one's own serial number, and the serial number of his friends in the rhythm class. Knowledge of verbal numbering is mainly strengthened in counting. In order to know numbering in writing, students learn that units should be written to the right and tens to the left in 2-digit numbers.

The analysis of the textbook "Methodology of teaching mathematics in primary grades" authored by Levenberg et al. showed that in order to master the order and sequence of numbers, students need to understand their quantitative and order relationships. When considering quantitative relationships in adjacent numbers, the method of comparing pairs of numbers is used: 10 and 11, 11 and 12, etc. Quantitative relations of the second decimal numbers are treated in a similar way to the first decimal numbers. Expressions familiar to children are also used: equal numbers, the largest number, the smallest number, which number is larger (smaller).

When learning second decimal numbers, students first encounter the situation of dividing numbers into units of units. This knowledge helps in mastering the written numbering and calculation methods of two-digit numbers. Together with the review of the numbering, work is carried out on the previously covered materials.

1. In 10, acquired knowledge is developed and strengthened (numbering, composition, comparison, etc.).

2. The skills of adding and subtracting numbers within 10 are strengthened; for this purpose, various exercises are introduced, in which great attention is paid to the fact that some component or result is equal to 0 in the operation of subtraction and addition.

3. In addition and subtraction, knowledge about the interdependence of components and the result is strengthened.

Calculation methods are performed in a certain sequence

1. Work without going through ten: a) $12+1, 13-1, 1+12$; b) $10+3, 3+10$; c) $13-3$; d) $13-2, 14-3$.

2. Work past ten.

Qualifications and skills are first mastered when working with didactic material. They also learn to add and subtract beyond ten. This is one of the most complicated methods of calculation. This requires knowledge that is different from the skills acquired by students.

As stated in the study guide "Obucheniye matematike v podgotovitelnix 4-klassakh shkol glukhix detey" authored by V.B. Sukhova, students with hearing impairment should listen and memorize the following cases of tabular addition:

$9+2$ $9+3$ $9+4$ $9+5$ $9+6$ $9+7$ $9+8$

$8+3$ $8+4$ $8+5$ $8+6$ $8+7$ $8+8$ $9+9$

$7+4$ $7+5$ $7+6$ $7+7$

$6+5$ $6+6$

They also learn about the relationships between the components and results of addition and subtraction. Use mathematical terms such as "addition", "subtraction", "first adder", "second adder", "sum", "subtractor", "subtractor", "subtraction" in their speech. learn to use.

They hang a table with the names of the following numbers:

26	+	3	=	29	28	-	5	=	23
first joiner		second addendum		total	decreasing		separable		difference

Children with hearing loss have a clear understanding that there are certain differences between a tenth (of sticks, a circle, etc.) and a one. They learn to number whole numbers. They also acquire the skill of numbering in written form. Knowledge of the arrangement of numbers in the series of natural numbers is strengthened. Knowledge of verbal numbering is also strengthened in terms of counting quantities related to units of measurement.

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