JOURNAL OF SCIENTIFIC RESEARCH, MODERN VIEWS AND INNOVATIONS
Volume 1, March, 2025
https://spaceknowladge.com

PEDAGOGICAL EXPERIENCE OF IMPROVING THE LEVEL OF MATHEMATICS IN PRIMARY SCHOOL STUDENTS USING DIGITAL TECHNOLOGIES - METHODOLOGY OF ORGANIZING AND CONDUCTING TESTS

Khulkar Komiljonovna Nasriddinova [1]
[1] *Independent researcher*

ARTICLE INFO

ARTICLE HISTORY:

Received:19.03.2025
Revised: 20.03.2025
Accepted:21.03.2025

KEYWORDS:

Pedagogical experiment, testing methodology, observation, questionnaires and surveys, specific goal-oriented tests, developing new methodologies.

ABSTRACT:

The article discusses the pedagogical experience of increasing the level of mathematics knowledge among primary schoolchildren using digital technologies - methods of organizing and conducting tests.

INTRODUCTION. Pedagogical experiment - a methodology for organizing and conducting testing work - is a type of scientific and research activity carried out in order to study, develop and evaluate the knowledge and skills of students in the educational process, and is designed to test new teaching methods and technologies by teachers and apply them in practice.

The main stages of the methodology for organizing and conducting testing work are as follows:

Determining the goals and objectives of the experiment: Before organizing testing work, the main goal of the test, its contribution to the educational process, as well as the results and indicators that are intended to be achieved when conducting the test should be determined. Pedagogical experiment and testing work may be aimed at assessing the effectiveness of new methodologies or curricula.

Preparation of methodological and methodological materials for testing work: A special curriculum, tests, assignments, methodological manuals, materials for lectures and seminars are prepared for testing work. The methods used during the testing process (for example, experiments, observations, questionnaires) and evaluation criteria are developed.

Selecting and preparing the experimental group: Groups are selected for conducting the test work. These groups are usually created with special conditions to evaluate the effectiveness of the materials being tested. The groups are selected in a balanced or random manner.

Conducting the test work: The test process should be controlled. In this process, new methods or technologies for teaching students are tested in practice. The changes in students during the process, their academic performance, are observed and evaluated.

Analyzing the results of the test: The data obtained from the test are analyzed. Comparisons are made with the previous indicators of the students and the test group. Based on the results obtained, a conclusion is drawn about the effectiveness of the new method or program.

Summarizing the results and preparing conclusions: The results of the test work are analyzed and summarized. Based on the experience gained from the test, conclusions are drawn about what changes need to be made in the educational process.

Testing Methodology:

Experimental Method: One of the main methods of conducting pedagogical experiments, this method helps to obtain accurate information about how a new method or technology affects the educational process.

Observation: Analyzing the effectiveness of testing methods by observing students' activities during the learning process.

Questionnaires and surveys: Evaluating pedagogical methods and testing processes by collecting feedback from students and teachers.

Specific goal-oriented tests: Preparing special tasks for testing students' learning techniques or theoretical knowledge.

By choosing and implementing the right methodology for testing, you can increase the effectiveness of teaching and guide students in the learning process.

Determining the goals and objectives of experimental research is the first and most important stage in organizing pedagogical experiments and testing, when the main directions, goals and expected results of the experiment should be clearly defined. The goals and objectives of the experiment ensure the successful and effective conduct of the experiment.

The main goal of experimental research is to study and test an innovation (a new method, technology or curriculum) in the pedagogical process and determine how it affects the educational process. This goal can usually take the following forms:

Improving the educational process: Implementing new teaching methods, technologies, or didactic materials into practice and studying their impact.

Improving educational effectiveness through experimentation: Developing students' knowledge, skills, and competencies by testing effective teaching methods.

Developing new methodologies: Creating and testing new pedagogical methodologies in the educational process and studying what results they produce.

The objectives of experimental research are to identify specific, measurable, and clearly workable areas for experimentation in the educational process. They help to successfully conduct the experiment and achieve its goals. The following objectives define the general main areas of experimental research:

Determining the object and subject of the experiment: Determining which part or method of the educational process needs to be tested (for example, a new curriculum or methodology).

Creating test conditions: Preparing the necessary educational materials, tools and methods for conducting the test process.

Selecting a test group: Selecting groups or classes for conducting the experiment and conducting test work in them. In this case, the groups are selected according to their needs and characteristics.

Selecting methods and tools: Selecting the methods used to conduct the experiment (for example, experiments, observations, tests) and evaluating their effectiveness.

Determining the criteria for evaluating the results: Determining the criteria for evaluating the test results and determining the criteria on which students will be evaluated (for example, test results, practical skills, participation).

Analyzing the test process and drawing conclusions: Analyzing the results of the experiment, drawing conclusions on improving existing pedagogical processes and summarizing them.

Factors that should be considered when formulating the goals and objectives of the experimental research[1]:

Characteristics of the educational process: Taking into account the educational and educational status of the class or group in which the experiment is being conducted, their needs and capabilities.

Practical application of experimental results: Determining how the results obtained can be applied in practice to make the learning process more effective.

Personal characteristics of students: The individual characteristics of each student, their level of education, and their level of preparation can affect the test results.

Determining the goals and objectives of experimental research is the main condition for the successful conduct of pedagogical experiments and testing. Setting clear goals and objectives at this stage allows you to increase the effectiveness of the testing process and

improve the learning process. Only a scientifically based, clear and carefully planned approach is needed when conducting experiments.

The logical sequence of conducting pedagogical experimental research is as follows:

1. Preparation of the person conducting the experimental research;
2. Determining the purpose of the experimental research;
3. Putting forward research hypotheses;
4. Conducting experimental research in stages;
5. Making necessary adjustments to the methods and forms of research;
6. Determine the steps for conducting experimental and test work in stages;
7. Describe the results of experimental and test work;
8. Describe the results of experimental and test work quantitatively;
9. Analyze and interpret the results of experimental and test work qualitatively.

The main goal of pedagogical experimental work is to determine the level of relevance of an object, process or phenomenon based on the results obtained. In other words, it is to study the dynamics of change of an object, process or phenomenon.

The famous psychologist R. Gottsdanker once said, “The goal of any experimental study is to make sure that the results based on a limited amount of data remain outside the experiment.”

As another scientist B. Ananev noted, based on the characteristics of the study, we used the following methods:

1. Organizational (comparison, generalization).
2. Empirical:

a) observational methods (observation and self-observation);

b) teaching experiment method;

c) psychoanalytic methods (standardized and designed tests, questionnaires, interviews and conversations);

g) practical methods (description, work evaluation);

d) modeling method (mathematical, etc.);

e) biographical methods (analysis of pedagogical processes and evidence).

3. Quantitative (mathematical-statistical) and qualitative analysis methods.
4. Method of interpretation of the results obtained.

In the process of experimental work, attention was paid to the formation of the following skills and qualifications in mathematics teachers that contribute to the effective conduct of the educational process:

1) determining the purpose of the lesson;

2) determining the tasks to be performed within the framework of the goal;

3) developing the content of the lesson;

4) determining the form, methods and means that serve to fully cover the content of the

lesson;

5) establishing control over the level of assimilation of the essence of the topic or educational material by the students.

As noted, in order to increase the effectiveness of teaching mathematics at Mirzo Ulugbek district school No. 286 of Tashkent city, Kibray district school No. 3 of Tashkent region, and Kibray district school No. 11 of Tashkent region, it is important for subject teachers to be able to use new pedagogical technologies and constantly improve their skills.

According to the preliminary results of the pilot study, the following conclusions were made:

Students of Mirzo Ulugbek district school No. 286 of Tashkent city, Kibray district school No. 3 of Tashkent region, and Kibray district school No. 11 of Tashkent region have insufficient knowledge and imagination in mathematics;

they have shortcomings in understanding the essence of mathematics;

they are not engaged in design and engineering activities.

Experimental work on improving the teaching of mathematics based on digital technologies was carried out in the control groups using traditional methods, and in the experimental groups using experimental materials and methods[2].

The stage of experimental testing of a special methodology aimed at improving the teaching efficiency of mathematics in the Mirzo Ulugbek district of Tashkent city, the 3rd general education school of the Kibray district of Tashkent region and the 11th general education school of the Kibray district of Tashkent region consists of the following:

1) The stage of analyzing the results obtained. The final results are compared according to the indicators obtained from the experimental and control groups, and processed using mathematical and statistical methods.

2) Based on the final results achieved at the end of the experimental work process, scientific and methodological recommendations will be developed that will allow increasing the effectiveness of students' mastery of physics using digital technologies.

The experimental work consisted of three stages, namely the emphasizing

(2022-2023), formative (2023-2024) and final

(2024-2025) stages, and was conducted among primary school students of Mirzo Ulugbek district of Tashkent city, General education school No. 286 of the Qibray district of Tashkent region, and General education school No. 3 of the Qibray district of Tashkent region.

The main goal of the first stage (2022-2023) was to critically study literature, dissertations, abstracts, articles in scientific, scientific and methodological journals and scientific collections related to the research problem. Foreign literature in this field, materials from international conferences, symposia in the field were studied and compared with the state of the field in our republic. As a result of this research, the state of use of

digital technologies in teaching mathematics was studied and analyzed. The selected problem was to develop criteria for determining the level of formation of knowledge and ideas of primary school students through the use of digital technologies in teaching mathematics in Mirzo Ulugbek district of Tashkent city, 3rd general education school of Kibray district of Tashkent region and 11th general education school of Kibray district of Tashkent region. For this purpose, the activities of primary school students in the field of mathematics were studied. The process of teaching mathematics in general secondary schools was constantly monitored. The level of development of primary school students' initial and final knowledge and ideas in the subject was checked.

As is known, the correct diagnosis in each case determines the effectiveness of subsequent work. Therefore, special importance was attached to determining the initial state of the level of formation of knowledge, imagination and skills in mathematics among students. Questionnaires were conducted with students. According to the results of the analysis of the responses, it was found that the majority of students (70-80%) do not have sufficient knowledge and imagination regarding the use of digital technologies in teaching mathematics.

In the second stage of the pilot study (2023-2024), methodological recommendations were developed for teaching mathematics based on the new content in Mirzo Ulugbek district of Tashkent city, 3rd general education school of Kibray district of Tashkent region, and 11th general education school of Kibray district of Tashkent region. Based on them, initial pedagogical experimental and test work was carried out and the content of the subject and its teaching methodology were enriched. The initial state of knowledge and ideas about the use of digital technologies in teaching mathematics to students was determined and opportunities for their development were sought. For this purpose, advanced pedagogical experiences were studied and generalized. At the beginning of the experiment, groups of students with similar levels of mastery participated[3].

It was envisaged to use a 5-point assessment criterion to determine the knowledge of students, namely

Excellent (5 marks): understands and can express basic knowledge about mathematics, can independently observe, think creatively, draw conclusions, can solve problems and perform independent work.

Good (4 marks): understands and can express basic knowledge about mathematics, can independently observe, can solve problems and perform independent work, cannot independently observe.

Satisfactory (3 marks): understands and can express basic knowledge of mathematics, can draw conclusions, cannot perform tasks and independent work, cannot conduct independent observation.

Unsatisfactory (2 marks): does not understand and cannot express basic knowledge of mathematics, cannot draw conclusions, cannot perform tasks and independent work, cannot conduct independent observation.

A four-level criterion (excellent, good, satisfactory, unsatisfactory) was used to determine the formation of students' knowledge and ideas about the use of digital technologies in

teaching. Out of 600 students, 300 were involved in the experimental group and 300 in the control group for pedagogical experimental work.

Based on the results of the initial survey, it was concluded that it is necessary to increase the level of formation of knowledge and ideas about the use of digital technologies in teaching mathematics.

The main goal of the third, formative stage (2024-2025) is to conduct pedagogical experimental and test work based on the methodological and didactic requirements developed in the experimental and control groups, analyze and generalize the results.

The final stage of pedagogical experimental and test work was conducted in 2024-2025 among primary school students of Mirzo Ulugbek district of Tashkent city, 3rd general school of Kibray district of Tashkent region and 11th general school of Kibray district of Tashkent region.

The following tasks were set for the implementation of the final stage of experimental and test work:

observing lessons on mathematics and analyzing them from the point of view of developing students' knowledge and imagination in the use of digital technologies in these lessons;

analyzing work and assignments on the use of digital technologies;

conducting a questionnaire and interviewing students.

In order to form the groups participating in the experiment and determine the level of formation of mathematical concepts in them, an experimental test was conducted and evaluated based on the above criteria.

In order to determine the level of formation of the use of digital technologies among students in the selected experimental and control groups at this stage of the research, each student was given the task of using mathematics mobile applications and their responses were analyzed.

The classes were conducted in the control groups in a traditional way, and in the experimental groups, by observing the students in mathematics lessons and studying the use of digital technologies in these classes.

References:

1. Безрукова, В. С. Основы духовной культуры (энциклопедический словарь педагога) 2000 г. [Электронный ресурс] //_URL: http://didacts.ru/dictionary/1010/word/diversifikacij a-sistemy-obrazovanij a_(дата обращения 4.01.2016).

2. Белкин, А.С. Диагноз в педагогике/ А. С. Белкин // Нар. образование. - 1970. - № 9. - С. 37-41.

3. А.В.Белошистая. Методика обучения математике в начальной школе: курс лекций / А. В. Белошистая. - М. : ВЛАДОС, 2005.