

RESEARCH METHODS USED IN THE METHODOLOGY OF TEACHING MATHEMATICS

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Abstract. *This article discusses the research methods used in the methodology of teaching mathematics in general secondary schools and their effectiveness in the educational activities of students.*

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Information about research and observation methods. Work on pedagogical education it is impossible to develop pedagogy without studying and generalizing experiments and in-depth research of the pedagogical process. Current education is armed with a general method of scientific knowledge of pedagogy, but, like any other discipline, pedagogical science has private research methods. Scientific research methods are methods of obtaining scientific information for the purpose of establishing legal links, relationships, connections and drawing up scientific theories.

Includes observation, experience, acquaintance with school documents, study, conducting interviews and surveys, methods of scientific pedagogical research. Recently, the use of mathematical and cybernetic techniques, as well as modeling techniques, has been noted.

Observation method-the perception of the pedagogical process in a direct goal-oriented way, with the appropriate recording of the results of observation under normal conditions. The observation method is used to study how the work in one area or another of educational work is going. This method makes it possible to collect factual material about the activities of the teacher and students in non-forced natural conditions.

At the time of observation, the researcher does not interfere with the usual course of the educational process. Observation proceeds at long or close intervals based on a specific target-driven plan. The course of observation, facts, what is happening, equipment are recorded in the observation diary.

Observation can be contiguous or selective. In contiguous observation, a more broadly derived phenomenon (e.g., the cognitive abilities of younger students in mathematics classes), in selective observation, small-to-small-scale phenomena (e.g., independent work of students in mathematics classes) are observed. Writing a decision or keeping a diary is the simplest method of recording observation. But the most reliable method of recording observations is the use of technical means, video, photo and film studio, telescreen.

One of the observation techniques used is the study and generalization of advanced pedagogical experience. The obligatory main condition for the successful use of this method is that the description of the experience of teachers must be suitable for the task of the established study (in our country, a great deal of work is being carried out on the study of advanced pedagogical experience. The generalization of this experience is reflected in the process of applying information technology in collections of materials of scientific and practical conferences and pedagogical readings, in monographs and journal articles).

2. Experience and study of school documents.

The experiment is also an observation, conducted in a specially organized, research-supervised and systematically modified environment. Pedagogical experience is used in the research of the effectiveness of one or another method of teaching and training, instruction – manuals. Before conducting the experiment, it is necessary that the researcher clearly articulates the issues that need to be researched, that such issues are addressed should be relevant to the subject of pedagogy in school practice. Before conducting the experiment, the researcher will familiarize himself with the theory and history of the issue, which is the subject of study, as well as with practical work experience in this area. The role of scientific hypothesis in research is of great importance. The organization of the entire experiment is directed to the examination of the scientific hypothesis. It allows the marking of material collection paths, not letting the researcher get confused in the factual material.

Analysis of the results of the experiment is carried out by a comparison method. To do this, two or several groups are formed, which should be as uniform as possible in terms of the level of training and other indicators in the composition of students who enter the groups. In the same classes, work is carried out on experimental material specially developed by the researcher. For comparison, control classes are chosen, these classes should be strong in the composition of students, approximately equal to experimental classes in their level of knowledge, these classes do not apply methods, tools, etc., which are used in mathematics experimental classes.

Other methods of obtaining objective data on experimental results are also used:

1. In pilot classes, the initial conditions are some time more favorable than in the control class; if good results are obtained in such conditions in experimental classes, it is considered self-justifying that an experiment will solve the issue;

2. Readers' two classes with approximately the same composition are obtained; a new solution to the problem under study is enslaved in one of these classes, and then applied in the other subject materials in the second one class; if a new method in such application, the method gives a good result, this method, the method will be justified.

Before starting the experiment, at its intermediate stages and at the end, the knowledge of all students of the class is checked. Based on the analysis of the data obtained, the method under study, the method, etc.k. conclusions are drawn about the effectiveness. A conclusion is made based on the analysis of qualitative and quantitative results from the classes in which the experiment is carried out. Various methods for determining quantitative magnitudes (in terms of acquisition, compare correct and incorrect answers vah.k.) are available. In later times, various computational techniques and cybernetic tools from variational statistical techniques are used for this purpose. Experimental verification of some important rules is carried out through mass experimentation.

One of the common methods of pedagogical research consists in studying the work and documentation of students. The work of students allows them to determine the level of training in certain sections of the program, monitor their growth and development over a certain period of training. For example, Special Written and graphic works are carried out for this purpose, as a result of which, as a result of verification, the knowledge and qualifications that children receive in mathematics should be clearly visible; keeping such special work done at certain intervals shows how students progress and to what extent they shift. It is important to analyze the mistakes that students make in their written work. Such analysis makes it possible to determine the complex

difficulties faced by students of the entire class, as well as the individual characteristics of students in their mastery of mathematics.

Educational documents (curriculum, program, documents of methodological work, reports, etc.k.) the study reflects the process and state of development of educational work.

The study of student notebooks is relevant for scientific research work. Looking at and analyzing the team of students for a long time will help to reveal the system of teacher work, the features of the work of students.

3. Interview and survey method.

In pedagogical research, the method of conversation is also used. The use of this method makes it possible to obtain materials that complement and determine the data obtained from observation, to carry out assignments. The basis of the success of this method is the establishment of communication with children, the opportunity to freely communicate with them

For a conversation, it is very important to set its purpose, substantiate the program development, direction and methodology. The interview method implies the introduction of direct and indirect questions that allow you to check the reliability of answers to directly asked questions. The method of conversation can also be aimed at teachers, parents, in this case there is no need for the mentioned caution, therefore, in this case, the attitude of the researcher towards the interlocutor can be clear. A method of inquiry is used in cases where it is required to determine opinions regarding an issue, to collect some facts. If the answers are taken verbally, then these answers are written to the fullest of the decision. When many answer a question to itself, on top of that, when everyone answers independently, written questionnaire becomes valuable.

When using the questionnaire, it is necessary to follow the following two requirements:

- 1) the questionnaire should have few questions;
- 2) questions should be structured in such a way that everyone understands them the same, they require clear (non-abstract) answers.

Theoretical methods occupy a leading place in scientific and pedagogical research. Before each study, it is necessary to select the object of study, determine in which facts the object is related based on theoretical analysis, and select its leaders from them to verify. Drawing up the hypothesis of a clear identification of the goals and objectives of the study, accordingly, it is necessary to develop a methodology for conducting research, to choose methods for explaining and analyzing the facts obtained in the course of the study, and to express conclusions. To carry out all this work, it is necessary to study and analyze literary sources that highlight the theory and practice of the issue under study, both before and at the present time. Theoretical methods are applied to each study of the methodology of mathematics, along with other methods. When solving any scientific problems, it is necessary to study all the literature on the issue being done before and conduct a theoretical study. Without it, the goal will not be directed, the test will sometimes be carried out by mistake, while not always leading to the full involvement of the issue posed. At the same time, consistency in science is not ensured without studying literature and without theoretical analysis. Other techniques are also used in research on *Matemati kametodika*. Usually using all of these techniques together ensures that these different results are reliable. In modern didactics, there is a different approach to the classification of teaching methods. The most expedient of our opinion is the classification, which includes various methods. From the above definition, teaching methods appear to consist of the joint activities of the teacher and students. Consequently, the organization of such activities implies promotion and control, accordingly, teaching methods are also divided

into three large groups: methods for organizing educational activities; methods for stimulating educational activities; methods for controlling the effectiveness of educational activities.

REFERENCES

1. Zhumayev M.E. etc. Method of teaching mathematics-T.: "Science", 2003.
2. Zhumayev M.E., "Praktikum from the methodology of teaching mathematics-Tashkent.: Teacher, 2004.
3. Azizhodzhaeva N.H "pedagogical technology and pedagogical resource" - Tashkent.: TDPU, 2003, p.174.