

**MINISTRY OF EDUCATION OF REPUBLIC OF BELARUS**  
**BELARUSIAN NATIONAL TECHNICAL UNIVERSITY**  
**Department «Psychology»**

**Electronic educational and methodical complex**  
**on the academic discipline**

**METHODOLOGY OF SCIENTIFIC AND PEDAGOGICAL RESEARCH**

**for the specialty**  
**7-06-0111-01 "Scientific and pedagogical activity"**

Compiler: Puyman S.A.

**MINSK BNTU 2024**

## CONTENT

Explanatory note	4
<b>1. THEORETICAL SECTION</b>	<b>6</b>
1.1. Content of lectures	6
Lecture 1. Methodological foundations of pedagogical research	6
Lecture 2. Methodological and ethical principles of research activity	10
Lecture 3. Logic and structure of pedagogical research	23
Lecture 4. The main components of pedagogical research	29
Lecture 5. Definition of pedagogical research variables	38
Lecture 6. Methods of pedagogical research	43
Lecture 7. Types and types of research activity of a teacher	52
<b>2. PRACTICAL SECTION</b>	<b>63</b>
Seminar lesson 1. Methodological and ethical principles of research Activity	63
Seminar session 2. The main components of pedagogical research	65
Seminar lesson 3. Preparation of the program and methodology of pedagogical research	68
Seminar lesson 4. Designing a scientific apparatus	69
Seminar lesson 5. Determining the variables of pedagogical research	70
Seminar lesson 6. Methods of pedagogical research	70
Seminar lesson 7. Designing questionnaires	73
Seminar lesson 8. Types and types of research activities	73
Seminar lesson 9. Evaluation criteria and design of research results	75
Seminar session 10. Pedagogical culture and skills of the researcher	76
<b>3. KNOWLEDGE CONTROL SECTION</b>	<b>77</b>
3.1. Exam questions	77
3.2. The main types and forms of independent work of students in the discipline "Methodology of scientific and pedagogical research"	78
3.3. Methods of independent work of students with educational and scientific texts	79
3.4. Subject of abstracts	80
3.5. Tests	81
<b>4. AUXILIARY SECTION</b>	<b>88</b>
4.1. Fragment of the educational and thematic plan for the specialty 7-06-0111-01 "Scientific and pedagogical activity"	88
4.2. The content of the discipline "Methodology of scientific and pedagogical research"	89
4.3. The list of educational publications and information and analytical materials recommended for the study of the discipline	94
4.4. Glossary	95

## **EXPLANATORY NOTE**

The educational and methodological complex for the academic discipline "Methodology of scientific and pedagogical research" was developed for the specialty 7-06-0111-01 "Scientific and pedagogical activity".

The purpose of studying the discipline is to form undergraduates methodological and scientific culture, knowledge system, skills and abilities in the field of organization and conduct of scientific research.

The main objectives of the discipline are:

- to form a concept of the essence of the methodology of pedagogical science.
- formation of practical skills and abilities in the application of scientific methods, as well as the development of a program for the methodology of scientific research.
- to systematize the students' knowledge about the types of research activities of the teacher.
- education of moral qualities, instilling ethical norms in the process of scientific research.

The academic discipline is based on the knowledge gained during the study of such disciplines as: "Pedagogy and psychology of higher education", "Design and examination of the quality of the educational environment", etc.

The theoretical section of the educational and methodological complex contains materials for the theoretical study of the discipline and is a course with an in-depth study of issues related to the organization and methodology of scientific and pedagogical research, processing, analysis and presentation of the data obtained, as well as evaluation of the results of scientific activity. Materials for the theoretical study of each of the topics of the curriculum include a list of issues under consideration, basic concepts, the content of educational material on each of them, as well as a list of publications and information and analytical materials that are sources of additional information for in-depth study of each of the topics.

The practical section includes materials for practical work. Materials for practical work include goals, basic concepts and issues to be studied.

The knowledge control section contains materials for conducting current certification in the discipline and means of organizing students' independent learning activities. This section presents questions for the test, as well as criteria for assessing students' knowledge.

The auxiliary section contains a list of educational publications and information and analytical materials recommended for the study of the discipline.

Teaching methods – explanation, thematic discussions, analysis of educational situations, independent work, business games, etc.

When presenting the educational material, audio-visual, multimedia, printed teaching tools, abstracts on pedagogical research, samples of questionnaires for pedagogical diagnostics, electronic databases of legal information, electronic educational resources are used.

As a result of studying the discipline, the student must:

To know:

- theoretical foundations of the organization of research activities;
- applied problems of pedagogical research;
- methods of pedagogical research;
- types of research activities of the teacher;

be able to:

- analyze the problems that arise in the process of teaching and educating students, identify contradictions;
- to adequately assess the relevance of pedagogical research;
- variables (dependent, independent, additional, spontaneous);
- formulate the scientific apparatus of research;
- develop a research program;
- develop questionnaires, protocols of pedagogical observations;
- analyze the trends of modern science, identify promising areas of scientific research;
- use experimental and theoretical research methods in professional activities;
- to conduct an expert assessment of the results of research work.

own:

- modern methods of scientific research in the subject area;
- skills of analysis, synthesis, comparison, generalization and systematization of research results presented in the subject literature,
- skills of searching, receiving, processing and presenting information using information and communication technologies;
- methods of expert evaluation of research methods;
- modern technologies for the formation of resource and information bases for solving research problems,
- tools for conducting individual stages of pedagogical experiment.
- skills to improve and develop their scientific potential.

Mastering this discipline provides the formation of the following competencies:

CC-1 To apply methods of cognition in research activities, generate and implement innovative ideas

According to the curriculum for full-time higher education, only 96 hours are allocated for the study of the discipline, of which 34 hours are classroom hours.

The distribution of classroom hours by courses, semesters and types of classes is given in Table 1.

Table 1.

Full-time form of higher education					
Course	Semester	Lectures, h.	Laboratory classes, h.	Practical classes, h.	Form of current certification
1	1	14		20	exam

## THEORETICAL SECTION CONTENT OF LECTURES

### **Lecture 1 Methodological foundations of pedagogical research**

*Lecture questions:*

- 1.1. The general concept of the methodology of pedagogy.
- 1.2. Functions of the methodology of pedagogy.
- 1.3. Levels of methodological knowledge.

**Basic concepts:** methodology; levels of methodological knowledge; basic methodological approaches in pedagogy; structure and logic of scientific and pedagogical research.

#### **1.1. General concept of the methodology of pedagogy**

Methodological problems of pedagogy have always been among the most urgent, acute issues of the development of pedagogical science. The study of pedagogical phenomena from the standpoint of dialectics, i.e. the science of the most general laws of the development of nature, society and thinking, allows us to identify their qualitative originality, connections with other social phenomena and processes. In accordance with the principles of this theory, the training, upbringing and personal development of students are studied in close connection with the specific conditions of social life and professional activity. All pedagogical phenomena are studied in their constant change and development, the identification of contradictions and ways to resolve them.

**The methodology of pedagogical science** is the teaching about the ways and methods of cognition of the laws of education and transformation on this basis of educational activity.

It is important to further clarify what should be understood by methodology, what is its essence, logical structure and levels, what functions it performs.

The term “**methodology**” is of Greek origin and means “the doctrine of method” or “theory of method”.

In modern scientific literature, methodology is most often understood as the doctrine of the principles of construction, forms and methods of scientific and cognitive activity. The methodology of science characterizes the components of scientific research - its object, subject, research tasks, a set of research methods, tools and methods necessary for their solution, and also forms an idea of the sequence of the researcher's movement in the process of solving a scientific problem.

However, with the development of science, its formation as a real productive force, the nature of the relationship between scientific activity and practical activity becomes clearer, which is increasingly based on the conclusions of science. This is reflected in the idea of methodology as a teaching about the method of scientific knowledge aimed at transforming the world.

It is impossible not to take into account the fact that with the development of social sciences, private theories of activity appear. For example, one of such

theories is pedagogical theory, which includes a number of particular theories of education, training, development, management of the education system, etc.

Most often, the methodology of pedagogy is interpreted as a theory of methods of pedagogical research, as well as a theory for creating educational and educational concepts. According to R. Barrow, there is a philosophy of pedagogy, which develops the methodology of research. It includes the development of pedagogical theory, logic and the meaning of pedagogical activity. From these positions, the methodology of pedagogy means the philosophy of education, upbringing and development, as well as research methods that allow you to create a theory of pedagogical processes and phenomena. Based on this premise, the Czech teacher-researcher Yana Skalkova argues that the methodology of pedagogy is a system of knowledge about the basics and structure of pedagogical theory. However, such an interpretation of the methodology of pedagogy cannot be complete. To reveal the essence of the concept under consideration, it is important to pay attention to the fact that the **methodology of pedagogy, along with the above, performs other functions:**

- firstly, it determines the ways of obtaining scientific knowledge that reflect the constantly changing pedagogical reality (M.A. Danilov);
- secondly, it directs and determines the main way by which a specific research goal is achieved (P.V. Koppin);
- thirdly, it provides comprehensive information about the process or phenomenon being studied (M.N. Skatkin);
- fourthly, it helps to introduce new information into the foundation of the theory of pedagogy (F.F. Korolev);
- fifth, provides clarification, enrichment, systematization of terms and concepts in pedagogical science (V.E. Gmurman);
- sixth, it creates an information system based on objective facts and a logical and analytical tool of scientific cognition (M.N. Skatkin).

These features of the concept of “**methodology**”, defining its functions in science, allow us to conclude that the methodology of pedagogy is a conceptual presentation of the purpose, content, methods of scientific and pedagogical research that provide the most objective, accurate, systematized information about pedagogical processes and phenomena.

**Consequently, the following can be distinguished as the main features of the methodology in any pedagogical research::**

- firstly, the definition of the research goal taking into account the level of development of science, the needs of practice, social relevance and the real capabilities of the research team or scientist;
- secondly, the study of all processes in the study from the standpoint of their internal and external conditionality, development and self-development. With this approach, for example, education is an objectively developing phenomenon caused by the development of society, educational institutions, families and the age formation of the student's psyche;

- thirdly, consideration of educational and educational problems from the perspective of all human sciences: sociology, psychology, anthropology, physiology, genetics, etc. This follows from the fact that pedagogy is a science that combines all modern human knowledge and uses all scientific information about a person in the interests of creating optimal pedagogical systems;

- fourth, orientation to a systematic approach in research (structure, interrelation of elements and phenomena, their subordination, dynamics of development, trends, essence and features, factors and conditions);

- fifth, the identification and resolution of contradictions in the process of education and upbringing, in the development of a team or personality;

- and, finally, sixth, the development of links between theory and practice, ideas and their implementation, the orientation of teachers to new scientific concepts, new pedagogical thinking while simultaneously excluding the old, obsolete, overcoming stagnation and conservatism in pedagogy.

From what has been said, it is already clear that the broadest (philosophical) definition of methodology does not suit us. In the lecture we will talk about pedagogical research, and from this point of view, we will consider methodology in a narrow sense, as a methodology of scientific knowledge in the specified subject area.

At the same time, we should not omit broader definitions from the field of view, because today we need a methodology that would orient pedagogical research on educational and educational practice, on its study and transformation. However, this should be done thoughtfully, based on a deep analysis of the state of pedagogical science and practice, as well as the main provisions of the methodology of science. A simple “imposition” of certain definitions on the field of pedagogy cannot give the necessary results.

Summarizing the above, we give the classical definition of the methodology of pedagogy. According to one of the leading Russian experts in this field, V. V. Kraevsky: “the methodology of pedagogy is a system of knowledge about the structure of pedagogical theory, about the principles of approach and methods of obtaining knowledge reflecting pedagogical reality, as well as a system of activities to obtain such knowledge and substantiate programs, logic, methods and evaluation of the quality of research work.”

In this definition, V.V. Kraevsky, along with the system of knowledge about the structure of pedagogical theory, principles and methods of obtaining knowledge, identifies the system of activity of the researcher to obtain them. Consequently, the subject of pedagogy methodology acts as a correlation between pedagogical reality and its reflection in pedagogical science.

Currently, the problem of improving the quality of pedagogical research is particularly acute. The focus of the methodology on helping the teacher-researcher, on the formation of his special competencies in the field of research work is being strengthened. Thus, the methodology acquires a normative orientation, and its important task becomes methodological support of research work.

The methodology of pedagogy as a branch of scientific knowledge appears in two aspects: as a system of knowledge and as a system of research activity. At the same time, two types of activity are meant – methodological research and methodological support. To provide research methodologically means to use the available methodological knowledge to justify the research program and assess its quality when it is being conducted or has already been completed.

### **1.2. Functions of the methodology of pedagogy.**

There are two functions of the methodology of pedagogy – **descriptive**, i.e. descriptive, involving the formation of a theoretical description of the object, and **prescriptive** – normative, creating guidelines for the work of a teacher-researcher.

The presence of these functions determines the division of the foundations of the methodology of pedagogy into two groups – theoretical and normative.

**The theoretical foundations that perform descriptive functions include the following:**

- definition of methodology;
- general characteristics of the methodology of science, its levels;
- methodology as a system of knowledge and a system of activity, sources of methodological support for research activities in the field of pedagogy;
- object and subject of methodological analysis in the field of pedagogy.

**The normative foundations** cover the following range of issues:

- scientific cognition in pedagogy among other forms of spiritual development of the world, which include spontaneous empirical cognition and artistic and figurative representation of reality;
- determination of the affiliation of work in the field of pedagogy to science: the nature of goal-setting, the allocation of a special object of research, the use of special means of cognition, unambiguity of concepts;
- typology of pedagogical research;
- characteristics of research by which a scientist can compare and evaluate his scientific work in the field of pedagogy: problem, topic, relevance, object of research, its subject, purpose, objectives, hypothesis, protected provisions, novelty, significance for science and practice;
- logic of pedagogical research, etc.

These grounds outline the objective field of methodological research. Their results can serve as a source of replenishment of the content of the methodology of pedagogy itself and methodological reflection of the teacher-researcher.

### **1.3. Levels of methodological knowledge**

E.G. Yudin distinguishes four levels in the structure of methodological knowledge: philosophical, general scientific, specifically scientific and technological.

The content of the first, highest philosophical level of methodology consists of the general principles of cognition and the categorical structure of science as a whole. Methodological functions are performed by the entire system of philosophical knowledge.



The second level – general scientific methodology – represents theoretical concepts applied to all or most scientific disciplines.

The third level is a specific scientific methodology, i.e. a set of methods, research principles and procedures used in a particular special scientific discipline. The methodology of a particular science includes both problems specific to scientific knowledge in this field, and issues put forward at higher levels of methodology, such as, for example, problems of a systematic approach or modeling in pedagogical research.

The fourth level – technological methodology – consists of the methodology and technique of research, i.e. a set of procedures that ensure the receipt of reliable empirical material and its primary processing, after which it can be included in the array of scientific knowledge. At this level, methodological knowledge has a clearly defined normative character.

All levels of pedagogy methodology form a complex system within which there is a certain subordination between them. At the same time, the philosophical level acts as the substantive basis of any methodological knowledge, defining ideological approaches to the process of cognition and transformation of reality.

### **Questions for self-control**

1. Formulate the definition of the concept of "methodology".
2. What functions does the methodology of pedagogical research perform?
3. Formulate the most general methodological requirements for a specific pedagogical research.
4. Reveal the structure and logic of pedagogical research.
5. Which of the methodological characteristics of the study reflects the intent of the study and the intended scientific result?

### **Literature:**

1. Belyaev, A.V. Methodological foundations of pedagogical research: textbook. manual / A.V. Belyaev, M.V. Gulakova, G.I. Kharchenko. – Kirov: Interregional Center of Innovative Technologies in Education, 2017.- 190 p.
2. Zagvyazinsky, V.I. Methodology of pedagogical research: textbook. manual / V.I. Zagvyazinsky. – Moscow : Yurayt, 2017.- 117 p.
3. Starikova, L.D. Methodology of pedagogical research: textbook for academic bachelor's degree / L. D. Starikova, S.A. Starikov. — 2nd ed., ispr. and add. — Moscow : Yurayt Publishing House, 2019. - 287 p. — (Universities of Russia).

## **Lecture 2 Methodological and ethical principles of research activity**

### *Lecture questions*

- 2.1. General scientific principles of pedagogical research
- 2.2. Concrete scientific principles of pedagogical research.
- 2.3. Methodological requirements for conducting pedagogical research.

## 2.4. Ethical principles and norms of research activity in pedagogy.

### **Basic concepts**

Principles and requirements of scientific research; general scientific and specifically scientific principles of pedagogical research; subjective conditions and objective factors affecting the effectiveness of pedagogical research; ethical principles of research activity: collectivism, universalism, selflessness, organized skepticism.

### **2.1. General scientific principles of pedagogical research**

The principles of research activity play a particularly important role in methodological knowledge. They combine theory and practice into a single stream, give practice scientifically based guidelines.

The principle should have a deep and detailed scientific justification (express a way to achieve socially significant goals based on objective laws) and be generalized (be applicable to the study of all situations in this area). The principle is always binding.

The fundamental principle of any scientific research is the methodological **principle of objectivity**. It is expressed in a comprehensive account of the factors generating a particular phenomenon, the conditions in which they develop, research approaches and means to obtain true knowledge about the object, assumes the exclusion of subjectivity, one-sidedness and bias in the selection and evaluation of facts.

The art of the researcher is to find ways and means of penetrating into the essence of the phenomenon, into its inner world, without introducing anything external, subjective. For example, in the history of science for a long time there was an opinion that objective reality, including the inner world of a person, is unknowable and that, at best, this reality can be known, captured only by self-observation, self-contemplation (this method is called introspection). Naturally, this method did not correspond to the principle of objectivity of consideration of the studied phenomena.

The principle of objectivity, however, does not exclude subjectivity, involvement in the process of researching the personality of the researcher himself with his creative individuality and inner world.

The principle of objectivity dictates the requirement of evidence, the validity of the initial assumptions, the logic of the study and its conclusions. In this regard, it is of particular importance to establish and take into account all facts related to the studied phenomena and their correct interpretation. The reliability of facts is a necessary, though still insufficient condition for the reliability of conclusions.

The requirement of evidence also implies an alternative nature of scientific research. In a general sense, this is a requirement to identify and evaluate all possible solutions, to identify all points of view on the issue under study. Usually, in a specific study, a preliminary analysis allows you to identify the most significant solutions for these conditions. The condition of alternative scientific search is realized if, when analyzing views or ways to solve a problem, not only points of view that coincide with the accepted position or similar points of view are

given, but also mismatched, opposite ones, if not only obvious, but also hidden, non-obvious solutions are checked. Often the alternative is expressed in the identification and consideration of possible issues that arise when solving a particular problem.

When determining the logic of the study, it is necessary to analyze the possibility of other logical options, to oppose alternative solutions to the tested option.

Another methodological principle is the principle of essential analysis. Compliance with this principle is associated with the correlation of the general, special and singular phenomena in the studied phenomena, penetration into their internal structure, disclosure of the laws of their existence and functioning, conditions and factors of their development, the possibilities of their purposeful change. This principle presupposes the movement of research thought from description to explanation, and from it to forecasting the development of pedagogical phenomena and processes.

For pedagogical research, it is important to observe the genetic principle, the essence of which is to consider the fact or phenomenon being studied on the basis of an analysis of the conditions of its origin, subsequent development, and identification of moments when one level of functioning changes to another (qualitatively different).

The principle of the unity of logical and historical is also connected with the genetic approach, which requires in each study to combine the study of the history of the object (genetic aspect) and theory (structure, functions, connections of the object in its current state), as well as the prospects for its development. Historical analysis is possible only from the standpoint of a certain scientific concept, based on ideas about the structure and functions of certain elements and relationships, and theoretical analysis is untenable without studying the genesis (origin, formation) of an object. Therefore, the difference between historical-pedagogical and theoretical-pedagogical research is only in the emphasis on one or another aspect of a unified research approach.

The logic of cognition of an object, phenomenon reproduces the logic of its development, that is, its history. The history of personality development, for example, is a kind of key to understanding a particular person, making practical decisions on her upbringing and training. In the history of personality development, its essence is manifested, since a person is only a person in so far as he has his own history, life path, biography.

The principle under consideration implies the requirement of continuity, taking into account accumulated experience, traditions, and scientific achievements of the past. The "new", which has not grown on this fertile soil, turns out to be very stunted and unviable, despite its external attractiveness. This "new" turns out to be either groundless projecting, or disguised, tinted with the old.

One of the general scientific principles is also the principle of conceptual unity of research, because if a researcher does not defend, does not consistently pursue a certain concept, developing it himself or joining one of the existing ones,

he fails to realize unity and logical consistency of approaches and assessments, he inevitably slips into the position of eclecticism. The principle of conceptuality is internally contradictory, it represents the unity of the definite, accepted as true, and the indefinite, changeable. This is what distinguishes it from bias. The accepted starting points are checked, developed, corrected during the search, and, if necessary, discarded (there is a change or modernization of the concept).

The variety of sides, elements, relationships, internal and external factors of the functioning and development of the socio-pedagogical process determines the need for its systematic study.

The principle of consistency involves considering the object of study as a system, identifying a certain set of its elements, establishing, classifying and ordering the connections between these elements, isolating the system-forming ones from the set of connections, that is, ensuring the connection of different elements into the system.

The system approach reveals the structure (expressing relative vitality) and organization (quantitative characteristics and orientation) of the system; the basic principles of its management.

In the process of implementing a systematic approach, it must be borne in mind that the object of pedagogical research and the system are not the same (several systems can be distinguished in the object, depending on the purpose of the study); when selecting the system, the phenomenon under study is artificially separated from the environment, that is, abstracted from it; selecting the system of the object of research, its elements are established and the elements of its environment, the system-forming relationships between the elements of the system, the essential relationship of the system itself to the environment. Each element of the system in complex processes can be an independent system, and its quality is determined not only by the quality of individual elements, but also by the relationship of elements with the environment.

The systematic approach orients the researcher and the practitioner to the need to approach the phenomena of life as systems that have a certain structure and their own laws of functioning. The subject, functional and historical aspects of the system approach require the implementation in unity of such research principles as historicism, concreteness, consideration of comprehensive connections and development.

The system approach is based on the position that the specificity of a complex object (system) is not limited to the features of its constituent elements, but is primarily related to the nature of the interaction between the elements. Therefore, the task of knowing the nature and mechanism of these connections and relationships, in particular the relationship between a person and society, people within a certain community, comes to the fore.

In the process of system analysis, not only the causes of phenomena are clarified, but also the impact of the result on the causes that gave rise to it.

The essence of the system approach is expressed in the following provisions that help to establish the properties of system objects and improve them.

1. The integrity of the system in relation to the external environment, its study in unity with the environment. Education issues are studied in close connection with social and economic development, the needs of society.

2. The dismemberment of the whole, leading to the allocation of elements. The properties of elements depend on their belonging to a certain system, and the properties of a system are not reduced to the properties of its elements or their sum.

3. All elements of the system are in complex connections and interactions, among which it is necessary to single out the most essential, defining for this system, as they say, the system-forming connection.

Pedagogical research is always complex, multidimensional by virtue of its interdisciplinarity, involving various specialists in it – psychologists, sociologists, doctors, teachers, each of whom can have his own position, highlight his own aspect. At the same time, it is important, firstly, to consistently maintain the accepted aspect, secondly, to take into account the possibility of other aspects, and thirdly, to really evaluate the results obtained as aspect, understanding the need for their correlation and synthesis with the data of the analysis of the studied processes in other aspects. If these conditions are met, aspectality does not turn into one-sidedness, but acts as a condition for a complete, multidimensional, holistic study of the subject. It is the synthesis of aspect knowledge that leads to concrete knowledge.

The holistic approach to the study of the pedagogical process implies, therefore, the requirement of combining an aspect analysis from a certain angle with a multidimensional, multidimensional interpretation of its results.

These methodological principles determine the general guidelines of theoretical and empirical scientific research, and the corresponding activity of the performer. It is also natural that there is a certain amount of conditionality in the allocation and substantive characterization of methodological principles: they repeat and complement each other in some ways, thereby preventing the occurrence of erroneous attitudes in the organization of scientific research.

## **2.2. Concrete scientific principles of pedagogical research**

The methodology of research also has specific scientific forms: they manifest themselves in orientation to the system of knowledge created by scientific schools, which have their own explanatory principles and specific ways of organizing scientific research.

Let's highlight some principles related to the specifics of pedagogical research.

Pedagogical research should consistently embody the principle of combining what is and what is due (V. V. Kraevsky). This principle consists in the obligatory correlation of the plan of the due and the plan of the essential, explanatory and prognostic elements in each study, which does not exclude the possibility of studies in which one of the parties or functions acts as a leader. Any of the existing pedagogical phenomena can be correctly understood and evaluated only in comparison with the norm or ideal, and any pedagogical perspective cannot be

justified and understood without correlation with the existing one, without taking into account the state of modern theory and real practice.

The unity of what exists and what is due allows avoiding both hypertrophied or speculative constructions, divorced from practice and its real possibilities, and narrowly empirical constructions, devoid of creative depth and perspective.

The basis, means and decisive condition for the development of personality is activity, which necessitates the implementation of an activity-based approach in pedagogical research.

The activity approach is expressed in the desire of researchers to use the provisions of the theory of activity in the methodology and interpretation of the content of their works.

The essence of the activity approach lies in the fact that the real process of human interaction with the surrounding world is being investigated, which provides the solution of certain vital tasks. In this case, a person acts as an active principle, as a subject of interaction, performing a certain sequence of various kinds of actions, including mental ones. All the functional capabilities of the psyche are included and subordinated to the solution of the tasks of the activity being carried out.

In relation to the problems of learning, the activity approach means the identification and description of those methods of action in the activity that should lead to the disclosure of the content of the concept in the studied educational material and the full assimilation of relevant knowledge. At the same time, the assimilation of knowledge leads to the consolidation of known actions, the mastery of new actions that mediate the formation of general abilities and ways of behavior of the student. Knowledge is not just transmitted, it is acquired by students in the course of their own activities (for example, educational). In the process of performing such activities, skills related to the implementation of meaningful analysis and design of products of activity are of great importance.

The activity approach requires the transfer of the student to the position of the subject of cognition, work and communication. This, in turn, requires the implementation of a dialogical approach, which follows from the fact that the essence of a person is much richer, more versatile than his activity. The dialogical approach is based on the belief in the positive potential of a person, in unlimited creative possibilities of constant development and self-improvement, which develop only in relationships built on the principle of dialogue with other people.

A person lives, studies in a specific socio-cultural environment, belongs to a certain ethnic group. In this regard, the culturological approach is transformed into an ethnopedagogic one. In such a transformation, the unity of the international (general pedagogical), national and individual is manifested.

One of the reviving ones is the anthropological approach, which was first developed by K.D. Ushinsky. "If pedagogy wants to educate a person in all respects, then it must first know him in all respects, too," — this position is an unchangeable truth of pedagogy.

In modern conditions, when information becomes the main resource of scientific, technical and socio-economic development, significantly affects the accelerated development of science, technology and various sectors of the economy, plays a significant role in the processes of upbringing and education, cultural communication between people, as well as in other social areas, it is justified to highlight the principle of the information approach. The process of education and training is primarily a special, culturally fixed way of operating with information.

Pedagogical research (with the exception of purely theoretical) is usually inscribed, woven into the real process of teaching and upbringing. Such pedagogical research should satisfy the requirement of unity of research and practical educational work. This requires a very careful and balanced approach to innovations in order to minimize the degree of possible risk, not to harm the pupils. Disagreeing with those who generally believe that it is impossible to take risks in working with students (no research is possible without risk), we believe that the principle of "Do no harm!" in pedagogy, as well as in medicine, should be guiding in all work.

The **principle of unity of theory and practice** plays an important role in the successful implementation of pedagogical research. Practice is the criterion of the truth of a theoretical position. A theory that does not rely on practice turns out to be speculative, fruitless. Theory is designed to illuminate the path of practice. Practice, not guided by scientific theory, suffers from spontaneity, lack of proper purposefulness, ineffective. Therefore, when organizing pedagogical research, it is important to proceed not only from the achievements of pedagogical theory, but also from the development of practice. Without a deep and comprehensive scientific analysis of practical activities, it is impossible to outline effective ways to improve the educational process in educational institutions. Any pedagogical research is not an end in itself. It should reflect best practices, be tested by it and contribute to the successful solution of educational and educational tasks.

**One of the methodological principles is a creative, concrete historical approach to the problem under study.** Experience convinces that it is impossible to deeply explore this or that problem of training future specialists, going only the beaten paths, following the developed patterns, without showing creativity. If a researcher really wants to help pave the way for a rapidly developing pedagogical practice, he must solve emerging problems in a new way.

In the course of research, one should look for one's own reasoned explanation of new facts, phenomena, supplement and clarify existing views, and not be afraid to show scientific courage. However, this courage should be combined with scientific validity and foresight, since pedagogical research is connected with living people, and every communication with a person should enrich him spiritually. Creativity is inextricably linked with a concrete historical approach to the evaluation of pedagogical phenomena: what is progressive at a certain historical stage may be reactionary in other conditions. In other words, it is

impossible to evaluate pedagogical theories of the past from the standpoint of modernity.

The success of pedagogical research largely depends on the implementation of the principle of comprehensive study of pedagogical processes and phenomena. Any pedagogical phenomenon is connected by many threads with other phenomena and its isolated, one-sided consideration inevitably leads to a distorted, erroneous conclusion. For example, the educational process is a complex and dynamic phenomenon, inextricably linked with many factors. Therefore, it should be studied as a certain phenomenon, relatively isolated from the external environment and at the same time closely related to it. This approach makes it possible to model the phenomena under study and to investigate them in a state of development and in different conditions. It allows for a multi-level and multifaceted study of the pedagogical process, during which not one, but a number of models are built that reflect this phenomenon at different levels and “slices”. At the same time, it is possible to synthesize these models in a new holistic, generalizing model and, ultimately, in a holistic theory that develops the essence of the problem under study.

The methodological principle of comprehensiveness implies an integrated approach to the study of pedagogical processes and phenomena. One of the most important requirements of an integrated approach is to establish all the relationships of the phenomenon under study, to take into account all external influences that influence it, to eliminate all random factors that distort the picture of the problem under study. His other essential requirement is the use of various methods in their various combinations in the course of research. Experience proves that it is impossible to successfully carry out research on a particular issue with the help of a single “universal” method.

The requirement of an integrated approach to research in the field of pedagogy is to rely on the achievements of other sciences, primarily such as sociology, philosophy, cultural studies, etc.

A very fruitful approach to the study of pedagogical phenomena from the standpoint of cybernetics, when the process of learning, education and development is considered as a special kind of management of cognitive activity of students, the formation of their professional and ethical qualities. Here the specificity of direct and feedback connections in the pedagogical process is manifested, the conditions for the successful functioning of educational information are studied, the means to increase the effectiveness of the management of the training of future specialists are studied.

On the basis of universal principles, more specific fundamental requirements have developed, which are certainly taken into account by researchers in the field of pedagogy: the principle of determinism; unity of external influences and internal conditions of development, activity of the individual; personal-social-activity approach, etc. What is the essence of these principles?

The principle of determinism obliges the researcher to take into account the influence of various factors, causes on the development of psychological and



pedagogical phenomena. In the study of personality, it is necessary to take into account three subsystems of the determination of his behavior: the past, the present and the future, objectively reflected by him.

The past in a person settles in her life path, biography, as well as in her personal qualities, moral and psychological appearance. The influence of the past, the history of personality development on its behavior is indirect. The direct influence on behavior, actions is exerted by consciousness, motives of activity of the individual. Along with activity and communication, the internal conditions of personality development constitute a real system of determination of its improvement. Along with the internal, subjective conditions of personality development, its activities, communication, external conditions also have a determining influence on it.

The impact on the development of the personality of the goals of its activities, which are largely directed to the future, is exceptionally great. In this sense, we can talk about the future as a subsystem of determining the development of personality. At the same time, a conscious goal as a law determines the way and nature of a person's activity and therefore has a significant impact on its development.

All three subsystems (past, present and future) they are deterministic, interconnected, mutually dependent on each other.

The principle of unity of external influences and internal conditions. In accordance with this principle, the cognition of the inner content of a person occurs as a result of evaluating the external data of her behavior, deeds and deeds.

The connection of internal conditions with external conditions is mediated by the history of personality development. On this occasion S.L. Rubinstein wrote: "Since the internal conditions through which external influences on the personality are refracted at any given moment, in turn, were formed depending on previous external interactions, the provision on the refraction of external influences through internal conditions means at the same time that the psychological effect of each external (including pedagogical) influence on the personality is due to the history of its development".

With the social development of a person, his inner nature and the specific weight of internal conditions of development in relation to external ones become more and more complex. The ratio of internal and external in the development of personality changes both historically and at various stages of a person's life path: the more he is developed, the more the progress of his personality is associated with the actualization of internal factors.

The principle of active personality activity focuses the researcher's attention on the fact that not only the environment forms a personality, but also the personality is an active object of cognition and transformation of the surrounding world. This principle involves considering all changes in the personality through the prism of its activities. The influence of activity on the personality is enormous. There is no man outside of activity, but the essence of man is not exhausted by it and cannot be reduced to it and fully identified with it. Pedagogical influences on a

person should take into account the nature of their activities, and often the most effective impact is to change, correct a particular human activity.

The principle of development dictates the consideration of pedagogical phenomena in constant change, movement, in the constant resolution of contradictions under the influence of a system of internal and external determinants. The principle of development in pedagogy is usually considered in two aspects: the historical development of the personality from its origin to the present state – phylogeny; and the development of the personality of a particular person - ontogenesis. In addition, it is possible and necessary to consider the development of various components of personality – orientation, character, and other personal qualities. Naturally, the effectiveness of pedagogical influences depends crucially on how fully and accurately the development of the future specialist is taken into account, which is affected, how accurately the development of the pedagogical system is taken into account.

The concrete implementation of all these principles is carried out in accordance with the principle of the personal-social-activity approach. This principle orients the researcher to a holistic study of personality in the unity of the main social factors of its development – the social environment, upbringing, personality activity, its internal activity.

The principles act as a direct methodology of scientific pedagogical research, predetermining their methodology, initial theoretical concepts, hypotheses.

### **2.3. Methodological requirements for conducting pedagogical research**

Based on the principles considered, we will formulate methodological requirements for conducting pedagogical research:

- a) to investigate processes and phenomena as they really are, with all the positives and negatives, successes and difficulties, without embellishment and without denigration; to conduct not a description of phenomena, but their critical analysis;
- b) prompt response to new developments in the theory and practice of psychology and pedagogy;
- c) strengthening the practical orientation, weight and quality of recommendations;
- d) the reliability of the scientific forecast, the vision of the prospects for the development of the process under study, the phenomenon;
- e) strict logic of thought, purity of psychological or pedagogical experiment.

Summarizing these requirements, it is possible to determine the methodological requirements for the results of pedagogical research, which are conditioned by them. These include objectivity, reliability, reliability and evidence. We will focus on this in more detail in the lecture, which will be devoted to the problem of developing pedagogical research.

The implementation of the above-mentioned methodological principles is carried out in conjunction with the cultural approach. At the same time, culture is

understood as a specific way of human activity. The development of culture by a person presupposes the development of ways of creative activity by it.

The considered methodological principles (approaches) make it possible to identify the actual problems of pedagogy, make it possible to analyze the totality of the most significant educational problems holistically and in dialectical unity and to obtain objective knowledge.

#### **2.4. Ethical principles and norms of research activity in pedagogy**

Ethics as a set of moral and moral attitudes has its own specifics in the scientific community. It's about:

- - internal (in the community of scientists) ethical norms,
- - external ethical norms expressing the social responsibility of scientists for their actions and their consequences.

Ethical principles of scientific activity are determined by a set of moral and ethical norms and values that are inherent in this type of creative activity. The content of the ethics of scientific activity has developed in the course of the historical development of science and is constantly being refined and improved. In the process of clarifying and improving the moral norms of scientific activity, the scientific community itself takes part, first of all, in accordance with the emerging objective conditions, as well as reacting to the emergence of new ethical problems in science under the influence of various social transformations.

Scientific ethics is a set of norms of behavior and rules established by the scientific community.

Aristotle was the first thinker who thought about the ethics of scientific activity: "Plato is my friend, but the truth is dearer."

The main content of the norms of scientific activity is the reflection of universal moral rules, such as, for example: "don't steal", "don't lie", etc. The question is that in the ethics of scientific activity, these universal rules have a pronounced specificity: "do not steal other people's thoughts" - do not plagiarize; "do not lie" - do not distort the results of the experiment, etc.;

In 1942, R. Merton described the ethical rules of scientific activity as a set of four basic values:

- 1. The first value is universalism. The essence of this value lies in the fact that the truth of scientific statements and evidence should be evaluated equally regardless of who presents these statements and evidence (by status, gender, age, race, etc.). A mature scientist has no privileges over a young one when it comes to proving the truth. This value stems from the belief that natural phenomena studied by science are the same everywhere.

- 2. The second value is community. The meaning of this value lies in the fact that scientific knowledge is the essence of the public domain. There should be no monopoly rights to knowledge. When a scientist publishes the results of his research, he, firstly, asserts his primacy and priority in the discovery, and secondly, opens the way for other scientists to develop the theory he developed further.

- \* 3. The third value is selflessness. For every scientist, the primary meaning of his research is the search for truth. Personal gain is always secondary.

Remuneration for research results, public recognition - there is only a possible consequence of the discoveries made.

\* 4. The fourth is critical skepticism: each researcher is responsible for assessing the goodness of what his colleagues have done and for making the assessment itself public. At the same time, a researcher who relied in his work on incorrect data borrowed from the works of his colleagues is not exempt from liability, since he himself has not checked the accuracy of the data used. It follows from this requirement that in science one cannot blindly trust the authority of predecessors, no matter how high it may be. In scientific activity, both respect for what the predecessors did and a critical attitude to their results are equally necessary. Moreover, the researcher must not only courageously and persistently defend his scientific beliefs, using all the means of logical and empirical argumentation available to him, but also have the courage to abandon these beliefs, as soon as their fallacy is discovered.

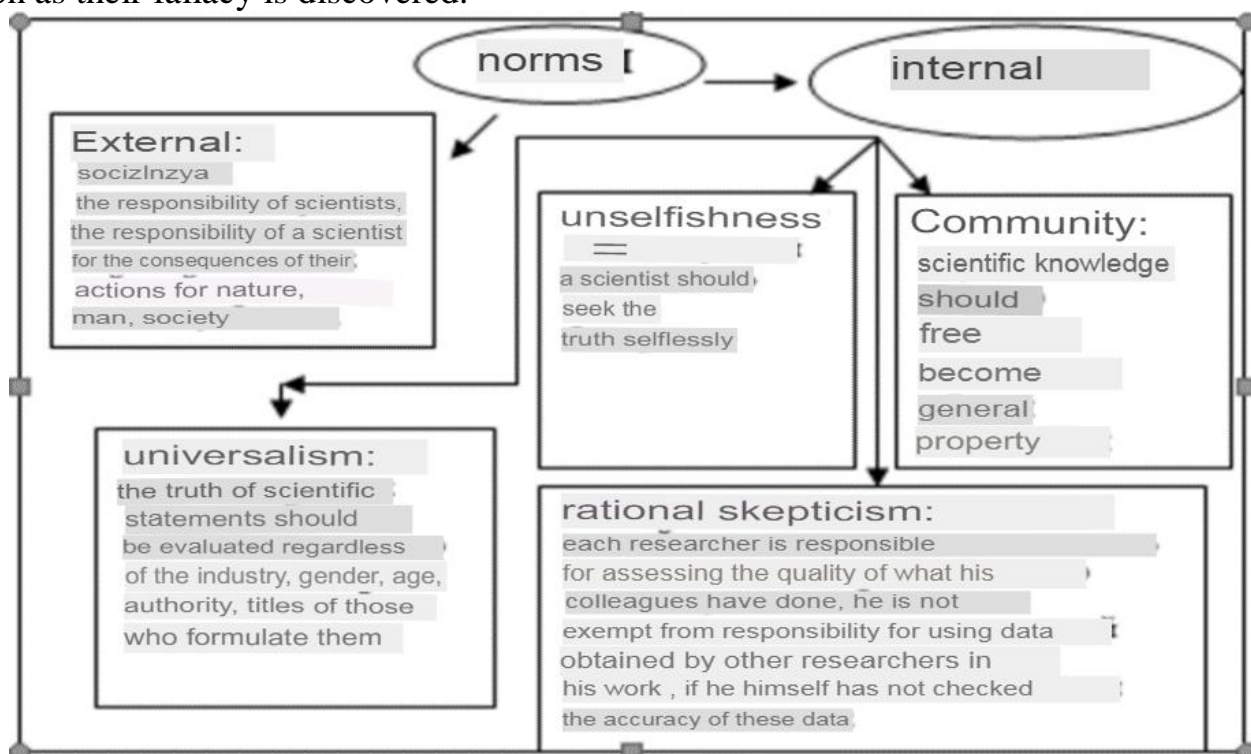


Fig. 1. Norms of scientific research

There are 2 groups of ethical standards in research activities.

**a) Rules governing everyday scientific activity:**

- - strict compliance with the rules for obtaining and selecting data applicable in a particular scientific discipline;
- - reliable organization of primary data protection and storage; clear and complete documentation of all important results;
- - the rule of "systematic skepticism": openness to doubts, even about your own results and the results of your team's work;
- - comprehension of implicit, axiomatic assumptions; vigilant attitude to attempts to wishful thinking caused by personal interest or even ethical reasons; cautious attitude to the likelihood of misinterpretation as a result of methodically

limited possibility of establishing the object of research (overgeneralization, excessive generalization).

***b) Norms governing relations between colleagues and cooperation:***

- - the obligation not to interfere with the scientific work of competitors, by, for example, delaying reviews or transferring to a third party scientific results obtained under the condition of confidentiality;
- - active promotion of scientific growth of young scientists;
- - openness to criticism and doubts expressed by other scientists and colleagues;
- - attentive, objective and unbiased assessment of the work of colleagues; unbiased attitude.

***(c) Rules governing the publication of results:***

- - mandatory publication of the results of work carried out at the expense of state funding (the principle of accessibility of the results of fundamental research);
- - appropriate presentation of unconfirmed hypotheses and recognition of errors (the principle of scientific culture that allows the possibility of errors in science);
- - honest recognition of merit and due assessment of the contribution of predecessors, competitors and colleagues (the principle of recognition of merit).

As can be seen from these rules and norms, scientific ethics is based on scientific honesty. It determines the ethical values that should guide researchers.

Thus, in science, as in any field of human activity, the relationship between those who are engaged in it and the actions of each of them are subject to a certain system of ethical norms that determine what is permissible, what is encouraged, and what is considered impermissible and unacceptable for a scientist in various situations. These norms arise and develop in the course of the development of science itself, being the result of a kind of "historical selection", which preserves only what is necessary for science and society at each stage of history.

**Questions for self-control**

1. Name and describe the general scientific and specifically scientific principles of pedagogical research.
2. What ethical principles are important to observe in professional activity?
3. What is research ethics?
4. What ethical standards exist in science?
5. What principles should a scientist observe in his activities?

**Literature**

1. Belyaev, A.V. Methodological foundations of pedagogical research: textbook. manual / A.V. Belyaev, M.V. Gulakova, G.I. Kharchenko. – Kirov: Interregional Center of Innovative Technologies in Education, 2017.- 190 p.
2. Zagvyazinsky, V.I. Methodology of pedagogical research: textbook. manual / V.I. Zagvyazinsky. – Moscow : Yurayt, 2017.- 117 p.
3. Code of Ethics of Scientific publications [Electronic resource]. – Access mode: [http://psyjournals.ru/info/code\\_of\\_ethics.shtml](http://psyjournals.ru/info/code_of_ethics.shtml) . - Date of access: 30.03.2023).

4. Starikova, L.D. Methodology of pedagogical research : textbook for academic bachelor's degree / L. D. Starikova, S.A. Starikov. — 2nd ed., ispr. and add. — Moscow : Yurayt Publishing House, 2019. - 287 p. — (Universities of Russia).

### **Lecture 3. Logic and structure of pedagogical research**

#### *Lecture questions*

- 3.1. The concept of research logic
- 3.2. Pedagogical research and its types
- 3.3. Stages of research logic design
- 3.4. Efficiency and effectiveness of pedagogical research.

#### **Basic concepts:**

The logic of scientific research; pedagogical research and its types; the problem, goals and objectives of pedagogical research; hypothesis; methods and methodology of research.

#### **3.1. The concept of research logic**

Among the elements of the methodology, the logic of research plays an important role. She barks to the researcher the apparatus of evidence, persuasion of opponents, confirmation or denial of conclusions, facts, arguments. The main difference between a scientific work and any other literary work is the logical presentation.

Logic is the science of patterns and forms of thinking, patterns of knowledge of the truth. Logic can also be defined as the science of rational methods of reasoning, which cover both the analysis of the rules for deducing conclusions from premises (deduction), and the study of the degree of confirmation of probable or plausible conclusions (hypotheses, generalizations, assumptions, etc.). Otherwise, the logic of scientific research is a special way of presenting evidence and refutations, which from true judgments - premises lead to true judgments - consequences.

The role of logic in scientific research is determined by the fact that it allows, on the basis of objective laws, principles and methods, to display frequently occurring connections and relationships that exist in the real world. Logic is a theoretical tool that, through concepts, judgments, conclusions, controls the correctness and validity of scientific reasoning, searches for and proves the truth. The logic of science is understood as a set of rules in the logical organization of scientific knowledge applied in a particular scientific theory.

Thus, the logic of science, using the apparatus of modern symbolic (i.e. mathematical) logic, studies the structure of scientific theories and their components, such as definitions, classifications, concepts, laws, etc.

It establishes logical connections between various structural components of scientific knowledge, examines the issues of consistency and completeness of theory, considers ways to test and form scientific hypotheses, analyzes the logical aspects of such methods of cognition as generalization, abstraction, idealization, etc. That is, it is a fairly developed and relatively independent branch of science,

although its main achievements are included in the range of methodological problems that are considered in many textbooks. The main goal of the methodology of science is to study the means, methods and techniques of research, with the help of which new knowledge of science is acquired.

### 3.2. Pedagogical research and its types

**Pedagogical research** is the process and result of scientific activity aimed at obtaining new knowledge about the laws, structure, principles, content and technologies of education and training.

According to the orientation, there are:

- *fundamental research*, which results in generalizing concepts, the development of models for the development of pedagogical systems on a predictive basis;
- applied research that solves individual theoretical and practical problems related to the study of individual aspects of the holistic pedagogical process (the content of education, the development of technology of the pedagogical process, etc.);
- developments aimed at substantiating scientific and practical recommendations on education and training, forms and methods of organizing educational activities of teachers and students, management of educational institutions and other educational systems; creation of curricula, textbooks, manuals, etc.

Any pedagogical research involves the definition of generally accepted methodological characteristics. These include: problem, topic, object and subject of research, purpose, objectives, hypothesis and protected provisions. Any research has a certain logic, which includes a sequence of tasks and ways to solve them.

### 3.3. Stages of research logic design

There are three stages of designing the logic of research: staged, research and design. The first stage is from choosing a topic to defining goals, objectives and developing a hypothesis. It can be carried out according to a logical scheme common to all studies (problem – topic – object – subject – scientific facts – leading idea and idea – hypothesis – goals and objectives).

The logic of the second stage of the study – from the choice of methods to the formulation of conclusions can be given in general form: selection of methods – hypothesis testing – construction of preliminary conclusions – their experimental verification and refinement – construction of final conclusions.

The logic of the third stage of the study includes the implementation of the results obtained in practice and the literary design of the work.

Let's focus on the steps of the first stage of the study.

Research work begins with the choice of the object area of research, it is determined by the relevance, novelty, prospects of the scientific problem, as well as the inclinations, interests of the researcher.

Then the **problem and the topic** of the study are determined. The topic should contain the problem.

The problem should not be understood as a practical problem, it is something unknown in science. At the heart of any problem is always a contradiction between knowledge and ignorance, between new facts and old theory, etc. You can approach a scientific problem from the requests of practice or science itself. The criterion for choosing a problem is its relevance, i.e. the need for further development of science, or for solving an important issue of pedagogical practice.

The relevance of the topic is proved in the following areas: 1) it turns out whether there is a need for this research in most people; 2) whether there is such a need in society; 3) it turns out how this issue is solved by mass practice; 4) it turns out that it is developed in science.

Any research is based on the leading idea, i.e. what is most essential in the study. The leading idea determines the design of the study.

The idea is intended to identify the **subject of research and the object of research**. As is known, connections, relationships, sides, properties of a real object that are included in the object of cognition can act as an object of cognition. This is something that exists independently of the subject of cognition.

In pedagogy, such objects of cognition can be some phenomena, processes that exist independently of the subject of cognition: the process of teaching an academic discipline, the process of formation of an educational technology, etc.

Is it possible to call a school or some other educational institution or an institution of additional education an object of research? Not all elements of this sphere are subject to study in this work, it is a very broad sphere, therefore it is not correct to call it an object of research, it is rather the basis of scientific research.

The subject of the study is the most significant relationships, sides, properties of the object studied for a specific purpose. In the same object, different subjects of research can be distinguished. I.e., the subject of research is even more specific in its content than the object. The main purpose of the subject is to highlight the side of the object, the knowledge of which leads to the improvement of the object as a whole.

Thus, the subject of the study is formed on an objective basis by the researcher himself. This can be done only based on the initial theoretical position, the concept. And this requires a theoretical analysis of the research problem, the definition of the theoretical foundations of the work, its objectives.

The goal is an educated guess about the overall final or intermediate search results.

An important stage in the study is the concretization of the overall goal in the system of research tasks. A task is a step, a link, a stage of achieving a goal.

No more than 5-6 tasks are allocated in the study. However, there must be three groups of tasks: historical and diagnostic - it is connected with the study of the history and current state of the research problem, the definition or clarification of concepts, general scientific and psychological and pedagogical foundations of research.



Theoretical and modeling it is associated with the disclosure of the structure, the essence of the studied, factors, methods of its transformation.

Practical-transformative is associated with the development and use of methods, means of rational organization of the pedagogical process, its intended transformation and with the development of practical recommendations.

Thus, the goal tree determines the search route, specifies which sequence of tasks needs to be built in order to solve the problem.

There are scientific and non-scientific (procedural) tasks. Procedural tasks are auxiliary in nature, contribute to solving scientific problems. The formulation of scientific tasks begins with the words – to identify, justify, develop, etc. The formulation of the second is from the words: analyze, study, systematize, etc.

The next stage in the development of the idea is the development of a hypothesis, it acts as the main presumptive solution to the problem.

The hypothesis is carefully thought out simultaneously with the formulation of the purpose and objectives of the study. Therefore, the problem can be presented in the form of a number of contradictions and issues, the removal of which can contribute to their resolution.

In the process of analyzing the literature and the experience of school practice, the researcher has his own thoughts, opinions about the issues that need to be investigated first, preliminary ideas about the connections between the facts being studied are formed.

A hypothesis is an unproven thesis, a possible, assumed answer to the question that the researcher has set for himself, and consists of supposed connections between the facts being studied.

Building a hypothesis, therefore, is a creative phase in research work, the result of thinking, it is one of the most difficult stages.

The hypothesis in the study is necessary for three reasons:

- 1) it is a compass that gives the direction of activity;
- 2) a well-formulated hypothesis prevents the vagueness of the study;
- 3) she directs the researcher's thoughts and organizes the collection of the necessary material.

It is desirable to formulate the hypothesis according to the scheme: if ..., then ..., since ..., this allows you to implement the descriptive, explanatory and predictive function of the hypothesis.

Two types of hypotheses are possible. Descriptive, they describe the causes and possible consequences. Explanatory they explain possible consequences and characterize the conditions under which these consequences will arise.

An important part of the study is **the conceptual and terminological apparatus**, a clear definition of the essence of each term. For pedagogical research, functional definitions are the most valuable, including the processes and operations necessary to identify them. The work on the conceptual dictionary in pedagogy is of particular importance, because it is closely related to the everyday, common language. To clarify the concepts at the theoretical level, an analysis of the essential properties and relationships fixed in the concepts is carried out. The

connections of the studied concepts with others, the measure and accuracy with which they express the essence of pedagogical processes and phenomena are revealed. At the empirical level, concepts are compared with certain facts of reality, the correspondence of objects to the concepts of pedagogical theory is established.

Any research has a certain logic, which includes a sequence of tasks and ways to solve them.

There are three stages of designing the logic of research: staged, research and design. The first stage is from choosing a topic to defining goals, objectives and developing a hypothesis. It can be carried out according to a logical scheme common to all studies (problem – topic – object – subject – scientific facts – leading idea and idea – hypothesis – goals and objectives).

The logic of the second stage of the study – from the choice of methods to the formulation of conclusions can be given in general form: selection of methods – hypothesis testing – construction of preliminary conclusions – their experimental verification and refinement – construction of final conclusions.

The logic of the third stage of the study includes the implementation of the results obtained in practice and the literary design of the work.

In the research program, along with the methodological part, the procedural part can also be distinguished. It includes drawing up a research plan, describing the methods and techniques of data collection, the method of their analysis, conducting an experiment, analyzing, interpreting and summarizing its results (choosing research methods, conducting an experiment in order to establish the initial state of the subject of research; organizing and conducting a transformative experiment; analyzing, interpreting and processing research results and developing practical recommendations).

In addition to theoretical concepts, research methods are also considered at this level.

Pedagogical methods and methods of other sciences are distinguished: ascertaining and transforming, empirical and theoretical, qualitative and quantitative, etc.

At the final stage, the results of the study are finally formulated, taking into account its goals and objectives, possible prospects are outlined, new questions arising from the conducted research.

### **3.4. Effectiveness and efficiency of pedagogical research**

**Scientific efficiency** is understood as new knowledge about society and thinking, which made it possible to identify new facts, connections, patterns, laws.

**Economic efficiency** is determined by the possibility of saving human, material or financial resources.

**Social efficiency** is determined by improving the working and living conditions of the population, improving education and healthcare, and environmental protection. The effectiveness of pedagogical research can be considered in economic and social terms.

The most important characteristic of pedagogical research is its result – a set of new ideas, theoretical and practical conclusions obtained in accordance with its goals and objectives. The result of the research should be substantiated, proved, presented in such a way as to be used in scientific and practical pedagogical activity, disclosed with the content of the intrinsically related value side.

The criterion of novelty of pedagogical research reflects the content side of the result. This side of the results obtained, their place and relations with the available knowledge are characterized by the following indicators:

- **the level of novelty** – the new result clarifies the known, concretizes individual theoretical or practical provisions. At the same time, the changes affect particular issues, individual provisions that are not of fundamental importance for understanding the essence of the phenomenon, the process;

- **the level of addition** – the new result does not change the picture, but only expands the known theoretical provisions, practical recommendations, makes additions to the problem under study. The increment of knowledge is essential, opens up new aspects, facets of the problem;

- **the level of transformation is characterized** by fundamentally new approaches in pedagogical theory and practice.

The relevance criterion characterizes the potential value of the research results, the degree of discrepancy between the demand for scientific ideas, practical recommendations and the available means to meet them, indicates the need for timely study and solution of the problem for the further development of pedagogical theory and practice.

According to the degree and breadth of influence on the theory, several levels of pedagogical research can be distinguished. The general pedagogical level of the theoretical significance of the study has an impact on all areas of pedagogy and goes beyond its individual disciplines. The disciplinary level of theoretical significance characterizes research, the results of which contribute to the development of individual pedagogical disciplines, reveal the basic concepts and criteria, the basic provisions on which this field of pedagogy is based. The disciplinary level is, for example, works in which the issues of the content of education, methods and forms of organization of training, its principles, etc. are developed. General and particular methodological levels of theoretical significance have studies, the results of which change the existing theoretical ideas on a number of problems within one area of pedagogy, as well as on individual private issues. The theoretical significance of pedagogical research is closely related to its novelty, conceptuality, evidence of the conclusions obtained, the prospects of the results for the development of applied topics.

The practical significance is characterized by the influence of the results obtained on the educational process, teaching methods, organization of various activities, social and economic efficiency of the results. The significance of the study depends on the number and composition of users interested in the results of the study; the scale of implementation of the results; the expected socio-economic effect; the readiness of the results for implementation.

There are several levels of practical significance of pedagogical research, depending on the scope of application of the results obtained. The private-methodological level of practical significance is research, the results of which are important within the course, discipline, teaching methods. The disciplinary level of practical significance is research, the results of which are important for pedagogy and its branches as a whole.

Thus, the following logic of pedagogical research is viewed. First, contradictions are identified, the resolution of which justifies the relevance of the study and serves as the basis for the formulation of the research problem. Then the object and the object are highlighted, the goal is formulated, in which its result is embodied. The hypothesis formulates the predicted process of transferring the identified patterns to the object of research, i.e. its predicted main conclusion. The higher the degree of correspondence of the subject of study to the object, the more precisely the revealed patterns reflect the nature of the studied sphere of pedagogical reality.

### **Questions for self-control**

1. What is the logic of research?
2. What is the logic of scientific research?
3. What stages does the research logic include?
4. What kind of scientific research is based on the application of logical methods of cognition of the object?
5. Name and describe the main criteria for evaluating the results of scientific research

### **Literature**

1. Fundamentals of scientific research: a textbook for undergraduate studies / Edited by O. V. Plebanek. — St. Petersburg: Publishing House of the University at the IPA EurAsEC, 2023. — 236 p. (
2. Specialized module "Logic and methodology of science": educational and methodological complex / V. V. Ivchik, M. V. Kondratova – Gor'ki: BGSMA, 2018. – 238 p.
3. Ushakov, E. V. Philosophy and methodology of science: textbook and workshop for universities / E. V. Ushakov. — Moscow : Yurayt Publishing House, 2020. — 392 p.

## **Lecture 4. The main components of pedagogical research**

### *Lecture questions*

- 4.1. The main components of pedagogical research
- 4.2. Criteria for the success of the research search and monitoring of the process and results of research in the conditions of an educational institution.
- 4.3. Scientific, theoretical and practical significance of the research.

### **Basic concepts**

The main components of pedagogical research; the object and subject of research; criteria for evaluating the success of the research search; scientific, theoretical and practical significance of the research.

#### **4.1. The main components of pedagogical research**

In the previous lecture, a brief description of the main components of pedagogical research was given, taking into account their logical sequence. Let's take a closer look at the essence and content of each component using specific examples.

Scientific research traditionally begins with the justification of the relevance of the topic. Substantiation of the relevance of the study involves getting an answer to the questions: "Why does this problem need to be studied now? Why is it necessary to develop this topic?".

It is necessary to distinguish the relevance of the scientific direction as a whole (for example, the formation of students' learning skills or ways of implementing the educational function of learning), on the one hand, and the relevance of the topic itself within this direction, on the other. The relevance of the direction, as a rule, does not need a complex system of evidence. Another thing is the justification of the relevance of the topic. It is necessary to show quite convincingly that it is among others, some of which have already been investigated, that it is the most urgent. At the same time, in works of a theoretical and applied nature that have a normative part (which include pedagogical research), it is important to distinguish between the practical and scientific relevance of the topic. Any problem can already be solved in science, but not brought to practice. In this case, it is relevant for practice, but not relevant for science and, therefore, it is necessary not to undertake another study duplicating the previous one, but to take measures to implement what is already available in science.

When justifying the relevance of the research topic, a methodological error is often made: the relevance of the chosen topic is not justified, but the direction of research as an entire field.

Substantiation of the relevance of the research topic assumes:

- 1) identification and designation of facts, circumstances, aggravating, actualizing the chosen topic and formulated problem;
- 2) designation of the company's tasks in connection with the identified and identified facts; tasks facing the researcher and the solution of which will contribute to the elimination of these undesirable facts;
- 3) the designation of what has already been done in this direction in science and what, which sides of the issue remain unresolved.

Against this background, the contradiction is formulated as a discrepancy between what is and what is due. The revealed contradiction can take place both in theory and in practice. In the methodological literature, the lexical formalization of the contradiction is proposed by the following turns of speech: "Without knowledge... it's impossible now... At the same time ... have not yet been

developed ...", or "Thus, there is a contradiction between the need for application... the approach, and the lack of methods for identifying ... ", etc. On the basis of the identified and formulated contradiction, the problem is formulated.

The problem of scientific psychological and pedagogical research is something unknown in science. The essence of the problem is the contradiction between established facts and their theoretical understanding, between different explanations, interpretations of facts. The scientific problem is not put forward arbitrarily, but is the result of a deep study of the state of practice and scientific literature, reflects the contradiction of the process of cognition at its historically defined stage, i.e. the situation. The source of the problem is usually bottlenecks, difficulties arising in practice. There is a need to overcome them, reflected in the identification of urgent practical tasks.

To move from a practical task to a scientific problem, it is necessary to perform the following procedures:

1) determine what scientific knowledge is needed to solve this practical problem;

2) to establish whether this knowledge is available in science, if there is knowledge and they only need to be selected and systematized, then there is no actual scientific problem. If there is no necessary knowledge, then there is a problem;

3) to highlight the problem, study what is known, including related issues;

4) summarize the results of the analysis and isolate the main contradiction, which must be formulated as a problem. In other words, to express what you already know in general; what you do not yet know in specifics: in terms of content, structure, mechanisms, etc. The concluded contradiction should be reflected in the topic, the wording of which fixes the stage of clarifying and limiting the scope of the problem.

The further development of the problem is associated with the definition of the object and subject of the study. The object of research is a set of properties and relationships that exists independently of the knower, but is reflected by him, serves as a specific search field. This is a certain process, a certain phenomenon, to which the attention of the researcher is drawn.

In pedagogical research, the objects usually become the processes of formation of personality qualities, the processes of education and upbringing, the activities of the subjects of the educational process, the process of formation of a new educational system, etc.

The subject of the study fixes that property or relation in the object, which in this case is subject to deep special study. The subject indicates the aspect of the object of research concerning which new knowledge will be obtained. The last statement is worth paying special attention to. The fact is that several objects can objectively coexist in the object of research at the same time. The task of the researcher is to identify one subject, the study of which will allow you to gain new knowledge about the solution of the problem. Therefore, the definition of the subject of research means: the establishment of the boundaries of the search; the

assumption of the most significant connections in terms of the problem posed; the assumption of the possibility of their temporary isolation and unification into one system. The subject in a concentrated form contains the directions of search, the most important tasks, the possibilities of their solution by appropriate means and methods.

The subject indicates the aspect of the object of research, concerning which new knowledge will be obtained, etc. So, for example, in the object, what is the mental education of students in the learning process, the following subject is highlighted: research and heuristic teaching methods as a means of mental education of students. In other words, defining the object of research, one should answer the question: "What is being considered?" The subject of research denotes an aspect of consideration, gives an idea of how the object is being studied, what new relationships, properties and functions of the object are being studied. The precise definition of the subject saves the researcher from trying to "embrace the immensity", to say about an object having an unlimited number of elements, properties, relations, everything, including new about an empirical object having an unlimited number of elements, properties and relations in principle.

The immediate characteristics of the research activity are the purpose and objectives of the research. The goal is a representation of the result. When setting a goal, the researcher asks himself the question: what result do I want to get? Outlining the logic of the research, the author formulates a number of particular research tasks, which together should give an idea of what needs to be done to achieve the goal.

It is usually recommended to begin the formulation of the goal with the words: develop (model, methodology, criteria, fundamentals, etc.); justify, identify, etc. It is considered not entirely justified to use the word "path" (justify paths ...), since it is uncertainty, vagueness. In fact, the purpose of the study is a prerequisite for creating a new concept to solve a particular problem.

After determining the object, subject and purpose of the study, a research hypothesis is constructed (formulated). When formulating a hypothesis, the researcher makes an assumption about how he intends to achieve his goal. Hence the question: "In what way, at the expense of which it is possible to get the desired result?".

A hypothesis is an assumption in which, based on a number of facts, a conclusion is made about the existence of an object, connection or cause of a phenomenon, and this conclusion cannot be considered fully proven. During the development process, the hypothesis is deployed into a system, or hierarchy of certain statements, in which each subsequent element follows from the previous one. For this reason, in order to put forward a hypothesis, you already need to know quite a lot about the object under study. Only then is it possible to put forward an assumption or some kind of theoretical idea that needs to be proved. The task of a researcher developing a hypothesis is primarily to show what is not obvious in an object, what he sees in it that others do not notice. Scientific truths are always paradoxical. The hypothesis, being a means of transition from the old

knowledge to the new, inevitably comes into conflict with the existing ideas. In any case, what is already obvious to everyone, which does not require proof, is not a hypothesis [2].

The structure of the hypothesis can be two-part and three-part. A hypothesis is two-part if it consists of a statement and three or four assumptions.

The three - part hypothesis includes:

- a) approval;
- b) assumption;
- c) scientific justification.

For example:

- a) the educational process will be such and such;
- b) if you do this and so;
- c) because there are the following pedagogical patterns.

When a scientific justification is not formulated, that is, the third component ("b"), the structure of the hypothesis becomes two-part, i.e. it consists of a statement and 3 or 4 assumptions. The hypothesis must meet the following methodological requirements:

- 1) the requirement of logical simplicity or logical consistency;
- 2) the probability requirement means that the basic assumption of the hypothesis must have a high degree of possibility of its implementation;
- 3) the requirement of breadth of application suggests that not only the phenomena for which it is intended to explain could be deduced from the hypothesis, but also a possibly wider class of other phenomena;
- 4) the requirement of conceptuality expresses the prognostic function of science: the hypothesis should reflect the corresponding concept or develop a new one;
- 5) the requirement of scientific novelty suggests that the hypothesis should reveal the continuity of previous knowledge with new;
- 6) the verification requirement means that any hypothesis can be verified.

The most convincing hypotheses are those that are tested experimentally, but a variant of logical operations (conclusions) is also possible. When the revealed consequences correspond to the facts, the hypothesis is recognized as solid. The formulated goal and hypothesis logically define the research objectives, which most often act as private goals in specific conditions of hypothesis testing.

A task is a link, a step, a stage in achieving a goal. Among the significant number of tasks to be solved, it is very important to highlight the main ones. It is recommended to allocate relatively few of them, no more than 5-6. However, three groups of tasks must be allocated. Most often, the first of the main groups of tasks - historical and diagnostic - is associated with the study of the history and current state of the problem, the definition or refinement of concepts; the second - theoretical modeling - with the disclosure of the structure, the essence of the studied, the factors of its transformation; the third is practically transformative - with the development and use of methods, techniques, means of rational



organization of the pedagogical process, its intended transformation and with the development of practical recommendations.

It is recommended to begin the formulation of research tasks with the words:

- explore,
- analyze,
- identify,
- define,
- develop,
- experimentally check,
- implement, etc.

Further in the introduction, the methodological foundations of the dissertation research are revealed. As a methodological basis, those philosophical concepts, theories and positions that formed the basis of the study, leading ideas, positions of materialistic dialectics, epistemology are usually designated. In addition to the methodological basis and methodological approaches in the scientific apparatus of the dissertation, it is necessary to indicate the theoretical basis (or foundations) of the research.

As the theoretical basis of the research, fundamental theories, concepts, ideas developed in the branch of science under study are indicated, for example, the concept of designing pedagogical systems, the concept of personality-oriented education, personality theory (in psychology), the concept of the biosocial nature and social essence of a person, the theory of creativity, the cultural concept of the content of education, etc.

The option of combining the theoretical and methodological foundations of the study into one heading is allowed. But such an option makes it difficult to determine whether the researcher is able to distinguish between the methodological basis and the theoretical basis. And they should be distinguished.

Indicating the methodological basis and theoretical foundations of the study, the researcher declares that he relies on them, that they are not accidentally presented in the study, their set is correct and closes the "field" of the problem of the object and subject of research. The theoretical and methodological base is the initial platform, its main provisions are already well-tested provisions that are not tested in this study (although, of course, they can be clarified and specified).

In some dissertations, as well as scientific works of students, such a methodological error is sometimes allowed when specifying the theoretical basis of the research: they write that the theoretical basis of the research was the works... and the names of scientists are listed. It is necessary to understand that it is not the works of scientists themselves that are the theoretical basis of research, but those concepts, ideas, theories that are put forward by the authors in these works, and, accordingly, it is necessary to indicate the names of these theories, concepts.

#### **4.2. Criteria for the success of the research search and monitoring of the process and results of research in the conditions of an educational institution.**

The researcher needs constant monitoring of the transformation process, objective information about the results of the work. The collection, processing and

analysis of information, which makes it possible to analyze, evaluate and correct further work, constitute the content of monitoring. The diagnostic system is the base for monitoring. For its implementation, a choice of criteria is necessary.

The main components of a comprehensive criterion for diagnosing the quality of education on the basis of the conducted research:

- **Educational criterion** (quality of training in leading subjects; number of students involved in creative and research activities; depth, systematicity and complexity of knowledge).

- **Sociological criterion** (real opportunities for free choice within the school; adaptation to the microenvironment; adaptation of graduates; prestige of the school in the eyes of parents; offenses and deviations; the level of development of classroom groups).

- **Criteria of individual and personal development** (breadth and stability of interests; characteristics of the level of thinking; degree of contact, responsiveness; expression of individual style of activity; development of cognitive processes, creativity).

- **The criterion of upbringing** (the formation of civil legal awareness; the degree of formation of moral ideals; the development of ecological culture; the development of tolerance; the absence of bad habits; facts of deviant behavior; cohesion of classroom groups).

- **Valeological criterion** (level of mental and physical health; morbidity; distribution of students by health groups; quantity and quality of services that promote health care).

- **Criterion of psychological comfort** (degree of optimism; level of anxiety; interpersonal relationships; working capacity).

#### **4.3. Scientific, theoretical and practical significance of the research.**

One of the necessary requirements for research work is a description of the value of scientific research from the point of view of theory and practice. The theoretical significance of the research should be understood as the disclosure of thematic material, the offer of new data about the subject and object of research.

Theoretical significance is very closely related to scientific novelty. In both cases, it is proved that the research is aimed at the development of science and the scientific field.

In scientific novelty, we say that a scientific problem has not been developed before us, or it has only appeared in the sphere of interests of researchers. In the theoretical part, we explain exactly how the results of our work will affect the progress of science.

Therefore, the functions of theoretical applicability include:

- Coverage of a scientific problem, immersion in the question in order to disclose

- Solving a scientific problem
- Methodological development of the problem
- Confirmation of a hypothesis or solution of a theory, etc.

In other words, it demonstrates the importance of the scientific work carried out from the point of view of the existing theory, supplementing it with new conclusions or rethinking existing ones. Clarity of presentation, compliance with the requirements and standards of citation design are important.

**The criterion of the theoretical significance of pedagogical research** shows the impact of the results on existing concepts, approaches, ideas, theoretical concepts, determines the contribution of research to the development of pedagogical science.

To describe the theoretical significance of the study, you do not need to invent anything new. The entire chapter of the introduction is designed to give a description of the main text and explain why it was written.

**An example of use in the work:** "The theoretical significance of the study is to determine the role of a supervisor in the process of professional training of a future specialist. Practical – the results of the conducted research can be applied by students in order to gain a deeper understanding of the future specialty."

The theoretical significance of the research allows the researcher to explain what his contribution to the existing knowledge is.

The theoretical significance of the study is as follows:

- coverage of the problem, formulation of the problem;
- show the problem from a previously unexplored side. To initiate new developments in this area;
- prove that the conclusions will be able to optimize the practical part;
- contribute to the development of theory, supplement existing knowledge;
- arouse interest, create an incentive to continue searching in this area.

Thus, successfully completed surveys serve as the basis for further work in this area.

#### **The criterion of the theoretical significance of the study**

The criterion establishes the influence of the research results on existing concepts, theories and postulates. It is necessary to note the previously missing provisions that were obtained by the researcher as a result of a scientific search. Then demonstrate their theoretical significance for the further development of science.

Based on this, the theoretical significance of the study can be assessed as:

- **very high**. Substantiation of new theoretical approaches, the theory is an integral, logically constructed structure. Due to the implementation of the results, new directions and prospects of this area are opening up;
- **high**. The results obtained are replenished and supplemented with existing concepts. A new theory has been developed;
- **satisfactory**. The results are being clarified, certain provisions are being specified. Provisions have been developed that have a narrower scope of application. Prospects for solving private issues within the same area or topic;
- **low**. The results obtained do not carry novelty, repeat existing ones, do not carry specifics. The scientific concept is poorly formulated, not logically justified. It has no prospects for development.

It is much easier to understand what the practical significance of the study is. After all, this is essentially the benefit that your work will bring to society.

Therefore, you need to understand for whom the results of your research will be useful.

The practical significance (value) of the results is a mandatory section of the introduction in the abstract and dissertation, which reflects the application of the research results in practice: the results of the practical use of the results obtained or recommendations for their use are given.

The practical significance of the results obtained is given in the introduction in the abstract and dissertation in a concise form. In two or three sentences, the use or recommendations for the practical use of the research results are described, indicating, if available, the form of use and the details of the documents confirming the use.

The results of practical use in the field of humanities include new methods, methods, techniques that are used or can be used in the relevant industry, indicating the degree of readiness for use or the scale of use.

The practical use of research results can be formalized by an implementation act, which specifies the specific results of the dissertation work used in the work of the organization that implements the practical results.

The practical use of the results can be confirmed by their inclusion in various programs, rules, development forecasts, regulatory documents, guidelines, regulations, instructions, methods, etc. The documents confirming the practical use can be acts of implementation, conclusions and certificates of authorities, business entities, as well as approved regulatory documents, recommendations, guidelines, which include the results of the dissertation research.

The practical use of the results can also be confirmed by their inclusion in the educational and methodological literature (textbooks, educational and methodological manuals, etc.), which is confirmed by certificates from educational and scientific institutions.

It also provides an assessment of the scientific, economic or social effectiveness of the practical use of the results of the dissertation research.

### **Questions for self-control**

1. What is the theoretical significance of the research?
2. What is the practical significance of the research?
3. How to formulate the practical significance of the study?
4. How to describe the theoretical significance of the study?
5. Give examples of what mistakes occur when writing the theoretical and practical significance of the study
6. How to check the uniqueness of the text?
7. How to increase uniqueness?
8. What is the difference between the scientific novelty of the research and the practical and theoretical significance of the work?

## Literature

Bayborodova, L. V. Methodology and methods of scientific research: Textbook / L.V. Bayborodova, A.P. Chernyavskaya. — M.: Yurayt. 2018. 222 p.

Drechinsky, V. A. Fundamentals of scientific research: Textbook for SPO / V.A. Drechinsky. — M.: Yurayt. 2019.- 274 p.

Zagvyazinsky, V.I. Methodology of pedagogical research : a textbook for universities / V. I. Zagvyazinsky. — 2nd ed., ispr. and add. — Moscow : Yurayt Publishing House, 2018. — 117 p.

## Lecture 5. Definition of pedagogical research variables

### *Lecture questions*

5.1. Definition of a variable

5.2. Classification of variables based on causal relationships and dependencies between the studied phenomena

5.3. Additional variables

### Basic concepts

Dependent; independent; independent indirect variables; design of dependent, independent, additional and spontaneous variables.

### 5.1. Definition of a variable

What is a variable? A variable (the English term variable) is something that can be measured, controlled. In other words, a variable (from the English root var) is something that varies, changes, and is not constant. This is the name of any real condition of the situation that can be changed. The researcher manipulates the variables, while the observer waits for the change that the experimenter makes at his discretion to occur.

The identification and determination of variables is an important task of the research of pedagogy problems. Variables are a variety of factors that are evaluated by certain values in the study area. It is important to determine from which side the researcher is interested in these objects. The identification of variables is based on the establishment of the defining characteristics of this object.

A variable is some quality (attribute) common to all objects, the specific manifestations of which may vary.

The values of a variable are those readings of a variable that can change under the influence of certain factors.

### 5.2. Classification of variables based on causal relationships and dependencies between the studied phenomena

Depending on the type and class of scales used to measure variables, *nominal*, *ordinal*, *interval* and *relative* variables are distinguished.

In scientific research of an empirical nature, the classification of variables based on causal relationships and dependencies between the studied phenomena is of particular importance. This classification is widely used because the principal

subject of their research is the analysis of the effectiveness of dependencies in the pedagogical process. Based on this criterion, three types of variables are distinguished in pedagogy: dependent; independent; independent indirect.

**Independent** is the variable that the experimenter changes.

**Dependent** - a factor that changes in response to the input of an independent variable.

Intermediate variables are factors that are not subject to strict control, but are certainly taken into account, in practice located between independent and dependent variables, mediating their influence on each other. For example: the physiological or psychological state of the subjects (stress, fatigue, interest in work, indifference, etc.).

**Dependent variables** are phenomena that are influenced by other phenomena, their study should determine the scope and types of this dependence, defined as independent or independent indirect variables.

**Independent variables** are phenomena that have a direct impact on the occurrence and manifestation of other phenomena, which are defined as dependent variables.

**Independent indirect variables** are internal and external phenomena, with the participation of which the influence of independent variables on dependent ones occurs.

In pedagogy, for example, in the theory of education, one can name characteristic types of variables that often take place in pedagogical research.

Characteristic dependent variables are:

- the results of the education process in the form of knowledge, skills, abilities, personal qualities and the like;
- the effects of educational actions in the form of changes in the behavior of pupils, personal qualities, attitudes and moral values;
- other changes that contribute to achieving the goal of education.

As independent variables, the following usually act:

- actions of subjects (educators and pupils) of the educational process;
- methods, forms and means of education;
- the system of education;
- the activities of various educational and educational systems;
- the activities of various service, public, friendly and other systems.

Independent variables are well controllable.

In studies of parenting problems, three groups of independent indirect variables most often occur:

- relatively constant components of the social environment;
- relatively long-term factors associated with the study of various pedagogical phenomena, for example: school, school's daily routine, its organizational structure, provision of cultural and educational property, concreteness and content of educational work planning, efficiency and quality of planning and organization of the educational process, the level of material and technical support, etc.;

– factors characterizing a specific study group, for example: age, gender, social origin, number, education, average learning outcomes.

It should be emphasized that independent indirect variables should be consciously taken into account by the researcher in order to exclude as much as possible their side or unintentional influence on the process of studying parenting problems.

In relation to the research problem "Educational functions of the collective" of the independent variable "collective", which affects all its members by performing certain educational functions relative to them. These functions are dependent variables. Independent variables are mediated living conditions and activities of team members or the surrounding social environment.

The logic of the experiment requires that such characteristics should not be overlooked, since they are able to significantly change the behavior of the subjects, thereby affecting the quality of the results obtained. Controlled variables are those conditions that should not change during the experiment. Otherwise, the validity of empirical evidence will be violated: the dynamics of the dependent variable can be explained not by the influence of the independent variable, but by other, unplanned and unnoticed by the experimenter himself. Thus, experimenting means studying the influence of independent variables on dependent variables with constant characteristics of controlled variables and intermediate variables taken into account.

A latent variable is a variable that cannot be directly observed or measured. For example, any social attitude has a latent (hidden) character. It is not amenable to direct observation and measurement with the help of directly posed questions. There is a need to build models for studying this setup by means of observable features, from which the index of the latent variable is constructed.

**The index** is a generalized estimate of a latent variable obtained by aggregating the measurement results of the observed variables. Examples of the use of latent variables in education can be measurements of students' academic performance, the formation of their competencies, general academic and subject skills. Obviously, these are very different variables in their properties, and therefore we can say that the variables differ in characteristics, in particular, the type of measurements, the role they are designed to play in research, etc.

Since the values of variables are not constant, you need to learn how to describe their variability. To do this, there are the simplest descriptive (descriptive) statistical indicators: minimum, maximum, average, variance, standard deviation, median, quartiles, mode, etc.

The average is the sum of variable values divided by  $n$  (the number of variable values).

**Minimum and maximum** are the minimum and maximum values of a variable.

**Trend** (from the English *trend*) is the main trend in the dynamics of the indicator, cleared of random influences and individual characteristics of individual periods.

One of the indicators of variation of a quantitative variable is variance.

Variance (from English *variation*) and standard deviation (from English *standard deviation*) are the most commonly used measures of variable variability. The variance varies from zero to infinity. An extreme value of 0 means that there is no variability when the values of the variable are constant. The higher the variance or standard deviation, the more the variable values are scattered relative to the.

### 5.3. Additional variables

In a pedagogical experiment, it is especially important to critically evaluate various additional variables that may affect the results of the experiment. They can be divided into four main groups:

1) ***variables determined by the student's personality***: the level of knowledge, skills and abilities, attitude to study, abilities, interests, age, gender, health status, learning ability, performance, physical condition (fatigue, mood, fear), social environment (position in the group of students, home environment, etc.);

2) ***variables determined by the teacher's personality***: professional skills, communicative abilities, pedagogical tact, personal qualities, age, mental state, health status, attitude to students, etc.;

3) ***variables depending on the educational process***: the content and volume of the studied material, the duration of the working day (lesson schedule), the social environment (attitude to studying in the classroom, the number of students in the classroom, the composition of the class, the relationship with the teacher, student relationships), etc.;

4) ***variables that depend on the control of the results of educational activities***: validity (they check what they want to check), objectivity, the form of control (oral interview, control papers, tests), the duration of control sections, the degree of complexity of control tasks.

For example, in the control group of students, underachieving students have a significant impact on the results of the experiment. These students are allowed to participate in the experiment, but their results are not taken into account.

Several students of the experimental class are especially interested in an experimental subject (for example, physics), read additional literature, participate in the work of the corresponding circle, It is clear that these students will significantly influence the results of the experiment and. their results must be eliminated (excluded).

When conducting a pedagogical experiment in experimental and control classes, equivalent conditions should be created.

There are several possibilities for creating such conditions:

1) ***equalization of additional variables caused by the person who is learning (cross-group experiment)***. This experiment is carried out in two stages. At the first stage, one group is experimental, the other is control, at the second stage (in the second half of the year) - on the contrary. This technique is mainly used to evaluate an additional variable due to the personality of the student.



In this case, the experiment is carried out according to the following scheme (Table 1).

Table 1. Scheme of the experiment of cross groups

Stages of the experiment	Group of students	
	A	B
The first is an	experimental	control
The second	control	experimental

With this method, all students and teachers will be able to engage in both new and old ways, and their permanent properties will equally affect both results. If the preliminary knowledge of the students was also relatively even, then additional factors affecting the experiment mutually compensate for each other and the effectiveness of the new educational method remains dominant.

To obtain objective results, it is necessary to determine the students' knowledge at three stages: before the experiment; after the first stage; at the end of the experiment.

The cross-experiment is especially objective when it is conducted in the same group during one lesson. In this case, all experimental material should be presented to students in writing, so that the teacher does not have to give various oral explanations in experimental and control groups. Then factors such as the teacher's condition, his skill and other conditions affect the students of both experimental and control groups.

It is necessary to pay attention to the fact that the cross-group method cannot be used to study the influence of a particular teaching method on the development of students (for example, on the development of mental abilities). In this case, the same teaching methods should be consistently used in one group.

2) equalization of additional variables due to the personality of the teacher. One of the main variables in a pedagogical experiment is the teacher's attitude to the experimental material. One teacher, for example, may be a supporter of the innovative method, and the other is not. Therefore, in the first case, the teacher will strive to implement it as best as possible, and in the second, complete indifference will be observed, which will undoubtedly affect the course and results of experimental work. These circumstances affect, of course, the results of the experiment.

A cross-experiment is also used to equalize additional variables due to the personality of the teacher. In this case, with the constancy of experimental and control classes, teachers change at the second stage. The experiment proceeds according to the following scheme.

Table 2. Scheme of the experiment with alternating additional variables

Stages of the experiment	Experimental group	Control group
The first half of the year	Teacher A	Teacher B
The second half of the year	Teacher B	Teacher A

One of the ways to equalize teachers with the same attitude to the experiment is the way when the same number of teachers with the same attitude to the experiment work in experimental and control groups. Then the experiment can take place according to the following scheme (Table 3).

Table 3. The scheme of the experiment with alternating additional variables

Teacher's attitude	Experimental groups	Control groups
Proponent of the new method	I	IV
Disapproves of the new method	II	V
Neutral attitude	III	VI

As can be seen from the table, in such an experiment it is necessary to have six identical groups of students:

Groups I and IV - teachers who support the new;

Groups II and V are teachers who do not support the new;

Groups III and VI are teachers, neutral.

In this case, it is necessary to choose people with approximately the same pedagogical abilities.

### **Questions for self-control**

Explain the significance of dependent and independent variables for pedagogical research.

Give examples of dependent and independent variables.

What errors can occur during the experiment and how can they be overcome?

### **Literature**

Demidko, M.N. Pedagogical experiment as one of the methods of pedagogical research // Mastery online [Electronic resource]. – 2018. – 4(17). - Access mode: <http://ripo.unibel.by/index.php?id=3808>

Access date: 15.08.2023.

Trapyanok, N. G. Fundamentals of pedagogical measurements: a course of lectures / N. G. Trapyanok. – Gorki : BGSMA, 2018. – 76 p.

## **Lecture 6. Methods of pedagogical research**

### *Lecture questions*

6.1. The essence of the concept of "method of pedagogical research".

6.2. Classification of methods of pedagogical research.

6.3. Methods of theoretical research

6.4. Methods of empirical research

### **Basic concepts**

Methods of pedagogical research as ways and means of cognition of the objective reality of pedagogical phenomena; features of the use of methods of scientific and pedagogical research; principles of the choice of research methods; theoretical and empirical methods of pedagogical research.

**6.1. The essence of the concept of "method of pedagogical research".**

Any research activity only becomes research when it is carried out through the methods of scientific research.

**Method** (from the Greek *methodos* - the way of research, theory, teaching), a way to achieve a goal, solve a specific task; a set of techniques or operations of practical or theoretical development (cognition) of reality.

**The scientific method** (the method of research activity) is a way of obtaining new knowledge, or achieving the goal of research. It is a complex of various cognitive approaches and practical operations aimed at acquiring scientific knowledge.

*The main function of the scientific method* is the internal organization and regulation of the process of cognition or transformation of an object. The scientific method is considered:

- - *in a broad sense* - as a cognitive process involving several methods (for example, a method of theoretical analysis of a research problem);
- - *in a narrow sense* - as special methods of cognition (observation, survey, etc.).

The effectiveness of the scientific method depends on the ability of the researcher to use it. When using scientific methods, the following requirements must be observed:

- 1. Research methods must correspond to its goals, task, subject.
- 2. It is necessary to use a set of interrelated methods, and not be limited to one of them.
- 3. In its application, the method is modified depending on specific conditions.

*The signs of the scientific method are:*

- - objectivity - allows you to get objective, accurate results;
- - reproducibility - it can be repeated by other researchers;
- - heuristic makes it possible to discover new knowledge;
- - necessity;
- - specificity - usage depends on specific conditions.

## **6.2. Classification of pedagogical research methods**

Research methods can be classified on various grounds. Depending on the research objectives, different types of methods are used. Here are the most common classifications of research methods.

*1. According to the field of use, there are:*

- o - methods of ideal activity;
- o - methods of material (practical) activity.

*2. According to the role and place in the process of cognition, there are methods:*

- o - meaningful - allowing to obtain new meaningful knowledge;
- o - formal - knowledge necessary for registration (for example, mathematical methods in psychological and pedagogical research);
- o - theoretical - used to analyze the theory of the object and subject of research;

o - empirical (experimental) - used to analyze the practice of the research object;

o - fundamental - used to obtain new conceptual provisions;

o - applied - used to improve certain activities.

**3. According to the purpose, the following methods are distinguished:**

o - diagnostics;

o - explanations;

o - forecasts;

o - corrections.

**4. According to the content of the objects of research, there are:**

o - methods of natural sciences that are used to study wildlife;

o - methods of social sciences and humanities, which are used to study nature and society.

As a rule, the methods of natural sciences are more accurate and require mandatory experimental confirmation. The methods of social and humanitarian sciences are more subjective. The effectiveness of their use largely depends on the ability of the researcher to reasonably state his own point of view, concept.

**5. According to the accuracy of the results, the methods are distinguished:**

o - unambiguously deterministic;

o - probabilistic.

**6. According to the method of cognition, there are methods:**

o - direct cognition - in the course of experimental activity;

o - mediated cognition - using the results of other researchers.

**7. According to the tasks performed, the methods can be:**

o - qualitative;

o - quantitative - application of mathematical formulas.

**8. According to the generality and breadth of application, there are methods:**

o - philosophical: dialectical, metaphysical. Analytical, intuitive, hermeneutical (understanding), phenomenological;

o - general scientific: system-personal, structural-functional, modeling, formalization, etc.;

• - private scientific: methods of mechanics, physics, chemistry, biology, social and humanitarian sciences, etc.;

• - interdisciplinary: psychological and pedagogical experiment, etc.

**9. According to the peculiarities of use, there are:**

o - the actual methods;

o - methodological techniques;

o - methodological approaches (dialectical, genetic, etc.).

### **6.3. Methods of theoretical research**

**Theoretical research methods** are the basis of any scientific work. They allow us to penetrate into the very essence of the investigated phenomenon, explain its causes, the peculiarities of existence, to detect hidden patterns in objects and scientific facts, general and necessary, essential and non-essential, i.e. to

understand the mutual influence of factors that determine the dynamics of general development. The theoretical method of research is in a fairly close relationship with mental activity, with the comprehension of empirical material, its refinement and analysis. Theoretical methods are defined by the main mental operations: analysis and synthesis, comparison, abstraction and concretization, generalization, formalization, induction and deduction, idealization, analogy, modeling, thought experiment.

Theoretical research methods are closely related to the analysis of various literature:

- works of classics;
- general and specialized works;
- historical documents;
- periodicals, etc.

From the complex of theoretical methods, the first thing to pay attention to is the so-called theoretical analysis as a method, which implies the identification and discussion of specific aspects, signs, distinctive features or characteristics of phenomena and processes. In the process of analyzing individual precedents, grouping, systematizing them, it is possible to determine their common, as well as various features, a general principle is established, in other words, a rule. The course of analysis in most cases runs in parallel with synthesis, which contributes to a deeper understanding of the essence of the phenomena under study. For the reason that theoretical research methods are a concept that is closely related to the study of literature, this makes it possible to determine which issues and problems have already been sufficiently studied, and which of them need to be subjected to additional study. The process of working with literature implies the introduction of a list of the following techniques:

- creation of a bibliography, that is, an assortment of sources selected on the topic under consideration;
- abstracting or a more concise display of key content;
- taking notes, or in other words, keeping sufficiently detailed records, the basis of which is the allocation of the main thoughts that consist in the work;
- annotation denoting a brief record of the general content of the book or article;
- quoting, which consists in verbatim recording of expressions or digital data contained in the literary source in question.

In addition to the above methods, the following methods are also used at the theoretical level.

**Abstracting.** This method consists in distracting from certain properties of objects subject to research and determining those qualities that are being studied just in a given direction. Abstraction has a multi-purpose character for the reason that each step of the idea turns out to be associated with the given action or with the use of its result. The essence of this method lies in the mental distraction from secondary parameters, connections, relationships, objects and in the simultaneous

identification, fixation of one or several sides of the objects under study that are interesting to the prospector.

**The axiomatic method.** The essence of this method lies in the fact that from the very beginning of the research process, a set of basic provisions is set that do not require any evidence, for the reason that they are taken as absolutely explicit. Such propositions are defined as truths or, in other words, axioms. From them, according to certain rules, a system of deductive judgments is formed. A complex consisting of all the basic axioms and judgments derived from them is an axiomatically constructed theory.

**Analysis and synthesis.** As mentioned above, theoretical analysis is a method based on the process of decomposition of an object into its component parts. When a researcher applies this method, he mentally differentiates the object being examined, learns what parts it consists of, what are its parameters and features.

Synthesis is the unification of the parts obtained during the analysis into something unified. As a result of the use of synthesis, the knowledge acquired through the use of analysis is combined into a single system.

Methods of analysis and synthesis in scientific research are organically interrelated and can take various forms depending on the qualities of the object being studied and the purpose of the study.

Direct analysis and synthesis find their application at the stage of external acquaintance with the object. At the same time, the selection of individual parts of the object, the determination of its characteristics, simple measurements are realized. Structural-genetic analysis and synthesis provide an opportunity to get deeper into the essence of the object. To implement them, it is necessary to isolate its components in a complex multilateral phenomenon. It is supposed to focus on them. Thus, it helps to have a key influence on all the remaining aspects of the entity of the object.

In order to study developing objects, **the historical method is used.**

**Idealization.** This is the mental formation of concepts about objects that are not valid in nature, but for which there are prototypes in the real world. Idealization, as a method of abstraction, focuses on the essential features that are absent in their pure form in the subject. Idealization is a mental act associated with the formation of some abstract objects that are fundamentally not feasible in experience and reality. The method of idealization is used both in the natural sciences and in the humanities, in particular in pedagogy.

**Induction and deduction.** These two methods are directly opposite to each other. If induction is a kind of reasoning from the particular to the general, then deduction, on the contrary, is based on obtaining a conclusion in the process of reasoning from the general to the particular.

**Classification** [*lat. classis – category and facio – to do*] – the distribution of objects of any kind into classes in accordance with the most essential features inherent in objects of this kind and distinguishing them from objects of other genera, while each class, in turn, is divided into subclasses.

**Comparison** – comparison of objects in order to identify similarities and differences between them. Only homogeneous concepts that reflect homogeneous objects and phenomena of objective reality are subject to comparison. Any comparison presupposes something in common in different subjects.

**Modeling** is the activity of creating models. This is an artificial object that replaces the real one.

There are the following types of modeling:

- - **material** - when the model is created from a certain material (models of airplanes, ships, etc.);

- - **ideal** - when the basis of the model are representations, images.

Among the ideal models can be distinguished:

- - **descriptive** - the real or future object is described by words;

- - **graphic** - created using drawings, graphs, diagrams;

- - **mental** - exist only in the imagination of research - for example, a mental model of an experiment.

#### **6.4. Methods of empirical research**

The empirical method is a way of scientific cognition of the surrounding reality by experience.

**Observation** is a purposeful, systematic, systematic, active perception associated with the solution of a specific scientific problem.

It allows you to obtain certain primary information about the object of research for further theoretical understanding and interpretation.

The main cognitive functions of the observation method are the registration of facts, the accumulation of empirical information about the object under study, the preliminary classification of recorded facts, the verification of hypotheses and theories.

The process of observation is not passive contemplation. The indisputable advantage of observation is that the process of studying an object occurs simultaneously with a change in any phenomena, in real time and in a natural setting, regardless of the desire and behavior of the object being studied. But on the other hand, the observation is limited to a specific situation, which means that its indicators are of a private nature, in another case they will certainly be different, and it is possible that it will not be possible to repeat this at all.

According to the method of conducting, direct, indirect and indirect observations are distinguished. With direct observations, information is obtained only with the help of the senses. Indirect observation is carried out using any technical means. Observation not of the objects under study themselves, but of their visible manifestations or the results of exposure to other objects is called indirect observation.

The observation can be aimed at describing the qualitative characteristics of the object or is carried out in order to establish its quantitative parameters.

The disadvantages of the observation method are due to the presence of a subjective factor. The researcher's personal characteristics, expectations, interests,

mood, assessments and interpretation of facts can significantly affect the results of observation.

The final stage, the cognitive outcome of the observation is the description.

The following requirements are imposed on the observation: the purpose of observation; the choice of methodology; the plan of observation; control over the correctness and reliability of the results obtained; processing, comprehension and interpretation of the information received.

**Measurement** is a technique in cognition by which quantitative comparison of quantities of the same quality is carried out. The qualitative characteristics of the object are usually recorded by instruments, the quantitative specificity of the object is determined by measurements.

**Monitoring** is constant supervision, regular monitoring of the state of an object, the values of its individual parameters in order to study the dynamics of ongoing processes, predict certain events, as well as prevent undesirable phenomena. Monitoring can be divided into external and internal. For educational institutions, the objects of external monitoring can be the parameters (indicators) of the educational services market, the labor market in the region, the dynamics of the development of economic sectors in it, the solvency of the population and its various categories to predict the development opportunities of paid educational services, the employment of graduates and their further educational and professional growth, etc. The object of internal monitoring is often the regular study of the attitude of students to their educational institution, to the conditions of study and recreation, to teachers, to educational programs, etc. Such a study is carried out, for example, regularly, at least once a semester, by questioning students. Other private empirical methods are also used in monitoring: studying documentation (including available statistics, departmental reports, etc.), expert assessments, etc.

**An experiment** is an active and purposeful intervention in the course of the process under study, a corresponding change in the object under study or its reproduction in specially created and controlled conditions determined by the objectives of the experiment. In its course, the object under study is isolated from the influence of side circumstances obscuring its essence and is presented in its "pure form".

The main features of the experiment: a) a more active (than during observation) attitude to the object of study, up to its change and transformation; b) the ability to control the behavior of the object and verify the results; c) multiple reproducibility of the studied object at the request of the researcher; d) the ability to detect such properties of phenomena that are not observed in natural conditions.

Basically, there are four types of experiment:

1) **ascertaining** - determining the initial data for further research (for example, the initial level of knowledge and skills of students in some section of the program). The data of this type of experiment is used to organize the following types of experiment;



2) **training**, in which training is carried out with the introduction of a new factor (new material, new tools, techniques, forms of training) and the effectiveness of their application is determined;

3) **controlling**, with the help of which, after a certain period of time after the training experiment, the level of knowledge and skills of students, the development of any personality quality based on the materials of the training experiment is determined;

4) **comparative**, in which in one study group work is carried out on one material (method), in another group - on another material (method).

There are 3 main types of survey: conversation, interview, questionnaire.

**The conversation** is conducted according to a pre-planned plan with the allocation of issues that require clarification. It is conducted in a free form without recording the answers of the interlocutor.

**Interviewing** is a method of obtaining information during oral direct communication. When conducting an interview, the researcher adheres to pre-planned questions asked in a certain sequence. During the interview, the answers are recorded.

An interview is a type of survey in which the goal is to identify the experience, assessments, point of view of the interviewee based on his answers to a pre—formulated question or group of questions. Unlike a conversation between two or more interlocutors, each of whom is equal in principle and must express his opinion, give an assessment, determine a position, the interviewer is interested in the opinion and assessment of the person being interviewed (the respondent).

According to the goal that the researcher seeks to realize, there are interviews of opinions that clarify the assessment of phenomena, events, and a documentary interview related to the establishment of facts (N.V. Kuzmina).

Interviewing has the following features:

- • provides registration and analysis of answers to questions, study of the characteristics of non-verbal behavior of the interviewees;
- • has a clear purpose. It involves preliminary planning of actions to collect information. Processing of the results obtained.

The main advantages of interviewing are versatility and quick results. The disadvantage is subjectivity, an increased risk of obtaining false intentionally or accidentally distorted information.

**A questionnaire** is a type of survey in which the same goals are set and achieved based on the analysis of the respondents' written responses; this is a written survey procedure using pre—prepared forms.

*The advantages of the questionnaire are:*

- • high efficiency of obtaining information;
- • possibility of mass surveys;
- • small labor intensity of preparation and carrying out;
- • lack of influence of the personality and behavior of the interviewer.

*Disadvantages of the questionnaire:*

- • you cannot change the order and wording of questions;

- • biased responses (the influence of unconscious attitudes, the desire to look in a more favorable light).

*The composition of the questionnaire is constructed as follows.*

- 1. Instructions.
- 2. Easy, interesting questions.
- 3. Difficult questions.
- 4. Easy, interesting questions.
- 5. Expression of gratitude.

*The preparation and conduct of the survey includes the following stages.*

- 1. Analysis of the questionnaire topic. The allocation of particular problems in it.
- 2. Development of a trial questionnaire with a predominance of open questions.
- 3. Pilot questionnaire. Analysis of the results.
- 4. Clarification of questions.
- 5. Basic questionnaire.
- 6. Processing and interpretation of the results.

### **Questions and tasks for control**

1. What is meant by the method of pedagogical research?
3. Formulate the requirements for the use of scientific methods.
4. Classify scientific methods.
5. How does the choice of the research method affect the nature of its conduct?
6. Illustrate how you will take into account the requirements for the use of scientific methods when performing research.
7. What, in your opinion, causes the wrong choice of research method?
8. What leads to inefficient use of research methods?
9. Describe the research methods that you most often use in your practice. What is the reason for this? For what reason do you prefer them? Are they included in the same classification of research methods or not?
10. What methods of scientific research are considered theoretical?
11. Describe the theoretical methods of research.
12. For what purposes are the methods of idealization and abstraction used? What do these methods have in common?
13. What is the place of modeling as a research method in modern education?
14. What requirements must be met when using the method of studying scientific literature?
15. What is the essence of theoretical analysis as a method of scientific research, and what are its main tasks?
16. Why are the methods of analysis and synthesis, induction and deduction in dialectical interaction?
17. What requirements must be met when compiling classifications?

18. Choose a topic in order to make a comparison: by one attribute; by two or more phenomena by several attributes; by different stages of one phenomenon.
19. Describe the role of idealization as a research method.
20. In which cases will you use modeling as a research method?
21. List the requirements that must be followed when using the method of studying scientific literature.

### **Literature**

1. Bayborodova, L. V., Chernyavskaya A. P. Methodology and methods of scientific research: Textbook / L.V. Bayborodova, A.P. Chernyavskaya. — M.: Yurayt.- 2018.- 222 p.
2. Drechinsky, V. A. Methodology of scientific research. Textbook for undergraduate and graduate studies / V.A. Drechinsky. — M.: Yurayt. 2019. 274 p.
3. Zubova, S.S. The sequence of the organization of research activities // Researcher / Researcher – 2014. - № 1-2. - pp. 95-98.
4. Research activity of students. Scientific and methodological collection in two volumes / Under the general editorship of A.S. Obukhov. Vol. 2: Practice of organization. - M.: All-Russian social movement of creative teachers "Researcher", 2007. – 495 p.
5. Methods and means of scientific research: studies.manual / Yu. N. Kolmogorov et al. — Yekaterinburg : Ural Publishing House.un-ta, 2017.— 152 p.

## **Lecture 7. Types and types of research activity of a teacher**

### *Lecture questions*

- 7.1. Types of research activities.
- 7.2. Theoretical, experimental and theoretical-experimental research activities.
- 7.3. Types of educational research: by location (academic and extracurricular); by topic (free and subject); by time (long-term and short-term); by number of students (group and individual).

### **Basic concepts.**

Types of research activities; theoretical, experimental and theoretical-experimental research activities; types of research activities: creative project and the main stages of its development.

### **7.1. Types and types of research activities**

Types of research activities

The main types of research activities are:

- ***problem-abstract***: analytical comparison of data from various literary sources in order to highlight the problem and design options for its solution;
- ***analytical and systematizing***: observation, fixation, analysis, synthesis, systematization of quantitative and qualitative indicators of the studied processes and phenomena;

- **diagnostic and prognostic:** study, tracking, explanation and prediction of qualitative and quantitative changes in the studied systems, phenomena, processes;
- **inventive and innovative:** improvement of existing, design and creation of new devices, mechanisms, devices;
- **experimental research:** checking the assumption of confirmation or refutation of the result;
- **project-search:** the search, development and protection of a project is a special form of a new one, where the target setting is the methods of activity, and not the accumulation and analysis of actual knowledge.

A **scientific report** is a document containing a summary of the results of research or development work, published in print or read in the audience.

Requirements for the report:

- The novelty and practical significance of the topic is reflected.
- The main content of the topic is revealed.
- Conclusions and suggestions (author's) are substantiated.
- May take the form of a coherent text or abstracts (published in collections following the results of the event: conference, seminar, symposium, etc.).

**Poster presentation.** This form of the report is accepted in modern international practice as the most successful, providing ease and concentration of perception of the content at conferences, exhibitions and other events.

A special stand is provided for each research work. The materials intended for the poster presentation can be pre-arranged on a sheet of paper. The name of the work (840 × 100 mm, font no less than 48) is attached to the upper part of the stand, the surname of the author and the supervisor (font 36), the name of the institution, the city are indicated under it. In the left corner, the booth number highlighted during registration is indicated.

Requirements for the poster report.

**Visibility.** It is aimed at forming an idea of the subject and nature of the work performed.

**The ratio of illustrative (photographs, diagrams, graphs, flowcharts, etc.) and textual material is set to 1:1.** In this case, the text must be made in a font that is freely readable from a distance of 50 cm.

**Optimality.** The amount of information should allow you to fully explore the stand in 1-2 minutes.

**Popularity.** The information should be presented in a form accessible to the conference participants.

The structure of the poster report.

- Goals and objectives of the work.
- Description of what was done during the research.
- Methods used in the course of research activities.
- Main results and conclusions.
- Thanks to organizations and specialists who provided assistance in the work.

- It is advisable to present the methods and results of the study in graphic or illustrative form.

A ***literary review*** is a brief description of what is known about the phenomenon under study from various sources, indicating the directions of research conducted by various scientists.

The order of work on the literary review.

- General familiarization with the source of information (cursory reading or viewing).

- Highlighting the most important parts of the read.

- Preparation of the thesis plan of the read.

- Writing out full and meaningful quotations from the text with exact references to the source, specify its output data.

- Comparison of this information with that obtained from other sources.

- Critical assessment of what has been read, making comments only on an objective basis.

In a literary review, it should be shown that its author is familiar with the field of research from several sources and is able to set himself a research task.

Preparation of a literary review is a mandatory stage of research work, focused on deep mastery of the material and ensuring scientific reliability and validity of judgments.

A ***scientific article*** is a kind of literary genre. The purpose of writing a scientific article is to consider a scientific problem and known ways to solve it.

Structural components of a scientific article.

- Description of the problem and its relevance for theory and practice.

- Brief data on the research methodology.

- Analysis of own scientific results and their generalization.

- Conclusions and suggestions for conducting research activities in the future.

- References to the cited literature.

A ***scientific report*** is a document containing a detailed description of the methodology and progress of the research, its results, as well as conclusions obtained in the course of research or experimental work.

The purpose of the scientific report is to comprehensively highlight the work performed upon its completion or for a certain period of time.

Structure of the scientific report

- Summary of the plan and program of the completed stages of scientific work.

- The significance of the work carried out, its research value and practical significance.

- Characteristics of the research methods used.

- Description of the results of the study.

- A conclusion summarizing the results of the study and noting unresolved issues.

- Conclusions and suggestions for conducting research activities in the future.

**Review** (from *lat. recensio* – review) – critical analysis and evaluation of a new work of art or scientific work.

The review can be presented in various genres: critical articles, essays, reviews.

The review highlights the content of the reviewed document and gives a critical assessment of both individual provisions and the reviewed document as a whole. It can take the form of a handwritten or published (for example, in a journal) text. Any kind of writing contains an analysis, but the plan, theses, and summary record its results in a dissected form, by paragraphs and sub-paragraphs, while the review gives these results in the form of a "solid", coherent presentation. The evaluation conclusions of the review should be motivated and formulated either in the course of reasoning, or as the conclusion of the analysis.

Reviews are written mainly on new, recently published works and placed in periodicals (newspapers, magazines). The main functions of the review — informative and evaluative — can be implemented in different ways. It is possible that one of them dominates, which creates variants and varieties of review texts. Depending on the significance of the work, its magnitude and a number of other circumstances, reviews can be relatively small and quite lengthy. If the review is written on several works, united by some characteristics (for example, thematic, chronological, etc.P.), then it acquires the character of a critical review.

There is a standard plan for writing a review in the literature.

1. Object of analysis;
2. Relevance of the topic;
3. Summary;
4. Formulation of the main thesis;
5. General assessment;
6. Shortcomings, shortcomings;
7. Conclusions.

The object of evaluation can be:

1. completeness, depth, comprehensiveness of the disclosure of the topic;
2. the novelty and relevance of the problems posed;
3. the position from which the author considers the problems;
4. correctness of argumentation and evidence system;
5. the nature and reliability of examples, illustrative material;
6. the credibility of the conclusions.

To write reviews, the following speech standards are used:

The object of analysis — a book, an article in a journal, a PhD thesis, an abstract, a thesis project, etc. — it is customary to call: the author's work, the reviewed work, etc.

The relevance of the topic is revealed with the help of phrases: "The work is devoted to an actual topic ...", "The author dedicated his work ...", "The relevance of the topic is due to..." etc.

The summary includes a list of available introductions, chapters, sections, conclusions, all appendices, an indication of the number of pages, figures, sources mentioned in the bibliography, etc. For example: "At the beginning of the work (articles, monographs, thesis...) the author indicates that ..."; "The author analyzes the available literature on this problem ..."; "Shows the inconsistency of the positions of his opponents ..."; "Considers the question of ..."; "... proves that ..."; "... claims that ..."; "... comes to the conclusion that ...".

The main thesis is formed using the following expressions, for example: "The central issue of the work is the question of ..."; "The article highlights the question of ...".

A positive assessment of the analyzed work can be given with the help of phrases and expressions: "The absolute (obvious, main) advantage of the work is the relevance of the problems raised in it"; "The work is valuable because the theory is interpreted in a new way ..."; "... an interesting analysis of the current stage is given ..."; "...various points of view on the issue ..."; "The work is highly informative ..."; "... rich in factual material ..."; "... non-standard approach to the analysis of the problems raised..."; "The author rightly notes ..."; "... convincingly shows ..."; "...substantiates..."; "... clearly defines..."; "... analyzes in detail..."; "... evidently criticizes..."; "... carefully considers..."; "... successfully solves the issue..."; "... reasonably refutes the thesis that..."; "The author is right, claiming that..."; "It is difficult not to agree that (with the author that ...) ...".

Ambiguous assessment: "While presenting the author's argumentation, it is necessary to note a number of controversial points"; "However, this interesting idea is not supported by facts, which makes the author's reasoning declarative in this case, but in general the work deserves a positive assessment"; "Rightly pointing to... the author mistakenly believes that ..."; "In support of this thesis, the author cites a number of arguments that do not always seem convincing ..."; "Despite disagreement with a number of provisions of this work, one should not underestimate its significance and relevance for ..."; "The shortcomings noted are local in nature and do not affect the final results of the work ..."; "The shortcomings noted do not reduce the high level of work in general ...".

**Abstract** (from Lat. *referre* – to report, to report) – 1) a brief oral report or a written presentation of the contents of a book, scientific work, problem, results of scientific research, etc.; 2) a report on a topic covering it based on a review of literature and other sources.

This is a secondary text created as a result of systematization and generalization of the original source material, its analytical processing.

It should be remembered that the abstract is not a summary of literary sources. The genre of this work requires the author to analyze the information used and draw independent conclusions.

Principles of organization of work on the abstract

- It is advisable to involve students who are inclined to research activities, have analytical abilities and critical thinking in such work.

- The decision to engage in this kind of activity should be made by the student himself.
  - The teacher provides assistance in choosing the topic of the abstract and advises the student in the process of work.
  - Research activities should not be of a mass nature.
  - When starting work, it is necessary to know the exact deadlines for completing the abstract (they depend on the complexity of the topic).
  - Deadlines for the delivery of the first version of the abstract are necessarily stipulated, time is allocated for revision and editing.
  - The abstract is submitted for review to the supervisor no later than a week before the defense.
  - The requirements for the design of the abstract should be the same for everyone and expressed in formal indicators
- The structure of the abstract
- Content (table of contents with pages).
  - Introduction.
  - Justification of the choice of topic, formulation of the problem, its relevance.
  - Goals and objectives of the work.
  - Subject and object of research, hypothesis (if it is an abstract of a research nature).
  - A brief presentation of the primary sources (who developed this problem, in which articles, what points of view exist on this problem, what trends have developed in the interpretation of the problem, etc.).
  - The volume of the introduction should not exceed 1-2 pages.
  - The main part.
  - Structuring the material by sections in accordance with the key concepts of the topic, on the basis of which the problem is revealed.
  - Building each section (chapter) according to the type of reasoning (thesis – arguments).
  - Description of the essence of the concept or problem, argumentation system (examples).
  - Mandatory decoding of the information used (design of footnotes, comments).
  - Each section of the main part of the abstract ends with a logical conclusion arising from the content of the reviewed sources, its own assessment of the material.
  - Conclusion.
  - Summarizing the results of the work, drawing conclusions based on the analyzed sources.
  - Confirmation of the relevance of the stated topic (problem), its practical significance (where the results can be used, etc.).
  - Formulation of one's position (generalization).



- Identification of prospects for solving the stated problem (including access to new problems formed during the study).
- The volume of the conclusion should not exceed 1-3 pages.
- List of sources.
- It is drawn up in accordance with GOST: in alphabetical order, all bibliographic data are indicated: the surname and initials of the author, the title of the book, the year and place of publication, section, chapter, page, etc.
- May contain not only literary sources, such as books, magazines, newspapers, but also information gleaned from the Internet, information from television and radio broadcasts, as well as private messages from any specialists expressed in personal conversations with the author of the abstract.
- Evaluation of the abstract
- When evaluating the abstract, it is necessary to take into account the following components of the work:
  - Content part (dominant) :
    - the depth and completeness of the disclosure of the topic,
    - originality (freshness, novelty) of the theme,
    - relevance of the topic,
    - scientific evidence (adequacy of information transmission),
    - structure of the work (compositional integrity),
    - unity of presentation style, etc
  - Design:
    - compliance with the design standard (A4, font 14 kegel, interval 1.5; margins at least 2 cm, page numbering in the upper right corner, starting from the 3rd page) ,
    - aesthetics of illustrative material.
- Submission to the protection procedure (in accordance with the requirements for the protection procedure)

The review is written by the supervisor in accordance with the requirements for the design of the review and on the basis of the specified components of the work.

**The project** (from Lat. *projectus* – thrown forward) -1) an idea, a plan; 2) a developed plan of a structure, mechanism, process diagram; 3) a preliminary text of a document. Design is the process of creating a prototype project, a prototype of the intended object or condition.

#### **Types of project**

- **Single-subject project** → within one subject. It is carried out in the conditions of a class –based system.
- **Interdisciplinary (interdisciplinary) project** → within several subjects, based on over-subject skills and abilities. It is carried out in extracurricular activities.
- **Over-subject project** → at the intersection of fields of knowledge and beyond the content of school subjects. It is carried out in extracurricular activities, is of a research nature.

Table 4 Stages of work on the project

n/a	Stages of work on the project	The content of the work at this stage	The activity of students	The activity of the teacher
1.	Preparation	Definition of the topic and objectives of the project. Formation of a working group.	Discuss the subject of the project with the teacher and receive additional information if necessary. Set goals.	Introduces the meaning of the project approach and motivates students. Helps in setting the project goal. Monitors the activities of students.
2.	Planning	a) Identification of information sources. b) Determination of ways to collect and analyze information. c) Determination of the method of presentation of results (project form). d) Establishment of procedures and criteria for evaluating the results and process of project activities. e) Distribution of tasks (responsibilities) between team members.	Formulate tasks. Develop an action plan. Choose and justify their criteria and indicators of success of project activities.	Offers ideas, makes assumptions. Monitors the activities of students.
3.	Research	Collecting and clarifying information, solving intermediate tasks. Discussion of alternatives by the method of "brainstorming". Choosing the	Perform research by solving intermediate tasks.	Observes, advises, indirectly directs the activities of students.

		optimal option. The main tools: interviews, surveys, observations, experiments, etc.		
4.	Formulation of results and (or) conclusions	Analysis of information. Formulation of conclusions.	They carry out research and work on the project, analyzing the information. Design the project	Advises students.
5.	Project protection	Preparation of the report: justification of the design process, presentation of the results obtained. Possible forms of the report: oral report (including demonstration of materials), written report.	They participate in the collective self-analysis of the project and self-assessment of activities.	Listens, asks reasonable questions in the role of an ordinary participant. If necessary, directs the analysis process.
6.	Evaluation of the results and process of project activity	Analysis of project implementation, achieved results (successes, failures) and their causes.	Participate in the assessment through collective discussion and self-assessment of the activity	Evaluates the efforts of students, their creativity, the quality of the use of sources. Determines the continuation potential of the project and the quality of the report.

## **7.2. Theoretical, experimental and theoretical-experimental research activities.**

There are three main types of research activities:

**1. Theoretical research activity.** In its course, it is not supposed to conduct an experiment. The study and description of a certain problem, phenomenon,

action, fact is carried out, and the result is conclusions made based on the analysis of the collected information (data).

The result of theoretical research activities can be *historical and methodological research*.

Historical research is devoted, as a rule, to the study of unknown pages of domestic or foreign history. They also include: the study of trends in the development of certain ideas or phenomena, a comparative description of any facts, data, scientific positions that have arisen in different time periods, etc.

Methodological research is most often carried out as phenomenological, devoted to the theoretical study and description of a scientific phenomenon, as well as scientific, conceptual and aimed at the development of new research methods.

**2. Experimental research activity.** The experimental research work is based on an experiment. It must be remembered that the experiment involves not just observation, but observation with variable conditions. The result is the conclusions made based on the analysis of the data obtained during the experiment.

There are also experimental works performed on the basis of an experiment already described in science and having a known result. Such works are rather illustrative in nature, suggest an independent interpretation of the results depending on changes in the initial conditions.

There are three types of experiment:

**A natural experiment.** Observation of the object at home or in natural conditions for the object.

**Laboratory experiment.** This is the most common type of experimental work. The result is the data obtained in the experiment, which are placed in the form of tables, diagrams, graphs and further analyzed, compared and draw conclusions.

**Computational experiment.** Due to the high development of information technology, students have the opportunity to demonstrate their level of proficiency in various computer programs.

Sometimes a study of any dependence is carried out with the help of mathematical applications and ready-made programs. You can create an animation of some phenomenon.

**3. Theoretical and experimental research activities.** This is the highest level of the conducted research. The experiment is preceded by a theoretical calculation. The experiment should confirm or refute the theoretical results you have obtained. Maybe the other way around. First, an experiment is carried out, and then the results are confirmed by a theoretical calculation.

### Questions and tasks

1. List and describe the types and types of research activities.
2. Reveal the content and stages of students' project activities.
3. What is the difference between educational and research activities from scientific research?
4. Determine the types of research activities in modern educational practice.

5. Expand the content of the concepts of "research activity" and "educational and research activity".

### **Literature**

1. Buyanova, E.A. Fundamentals of educational and research activities: a workbook for practical classes and extracurricular independent work. – Kasimov: Branch of OGBPOU "PKK" in Kasimov, 2017. – 25 p.

2. To the teacher about the educational research: requirements, organization, results. Educational and methodical manual for teachers of secondary educational institutions / Petrasyuk L.G., Orlova I.V., Kovalyuk S.Yu., Klyucheva E.E., Golubchikova N.N. - St. Petersburg, 2015. - 120 p.

## 2. PRACTICAL SECTION

### Seminar lesson 1. Methodological and ethical principles of pedagogical research

**The purpose of the work:** to master the essence, content and features of the implementation of methodological and ethical principles of pedagogical research.

**Task:** fill in the table "The essence and content of methodological principles of pedagogical research"

The name of the methodological principle	Essential characteristics	Requirements for the implementation of the principle	Features of implementation
1. The principle of objectivity			
2. The principle of essential analysis			
3. The genetic principle			
4. The principle of unity of historical and logical			
5. The principle of conceptual unity of research			
6. The principle of historicism			
7. The principle of taking into account comprehensive relations and development			
8. The principle of consistency			
9. The principle of integrity			
10. The principle of the combination of being and due			

### Practical tasks

1. Analyze the section "Methodological foundations of research" in the introductions to master's, PhD, doctoral dissertations on pedagogy and psychology. Which approaches do researchers choose most often? What, in your opinion, is this related to? (To get acquainted with the research, you can use the abstracts of

dissertations that are in the reading room and in the methodological offices of the departments of pedagogy and psychology of the university or on the Internet).

2. Compare the sections "Methodological foundations of research", "Theoretical foundations of research", "Research methods" in the dissertations you have chosen for analysis. Is the requirement of consistency of educational methodology levels observed in dissertation research?

3. In the dissertations you have chosen for analysis, analyze how the research topic and methodological apparatus correlate.

4. What types of hypotheses are used by the authors of dissertation research?

5. Explain what are the principles of pedagogical research?

6. Reveal what problems does the ethics of scientific research include?

7. List and disclose the content of ethical principles and norms of the teacher's research activity.

8. Read the following fragments. Analyze the texts from the point of view of the usefulness of the above arguments for a teacher-researcher organizing experimental work. Do you think that the given information restricts the experimenter in any way? Why? Justify your position.

1) "It can be considered a well-known principle that not every single statement or statement can be evaluated as true or false through practice. By the way, for the same reason, in the developed sciences we are not satisfied with one observation, but strive to carry out an experiment, i.e. to create special artificial situations in which we could test abstract theoretical propositions. But even in this way, not all the provisions from the theory can be verified, but only a few of them. So, it is necessary to evaluate the effectiveness and correctness of new ideas, methods, and provisions first of all theoretically. For this, humanity has developed a number of special criteria. One part of them is the general logical principles of building knowledge, the other part is the general ideas about the nature of the subject under study." (Shchedrovitsky, G. P. System of pedagogical research (methodological analysis) / G. P. Shchedrovitsky // Pedagogy and logic. – M.: Kastal, 1993. – pp. 74-75.)

2) "The situation is particularly difficult with facts in the sciences of man and society. The problem is not only that some facts may turn out to be doubtful, or even simply untenable. It also lies in the fact that the full meaning of the fact and its specific meaning can be understood only in a certain theoretical context, when considering the fact from some general point of view. This particular dependence of the facts of the humanities on the theories within which they are established and interpreted has been repeatedly emphasized by the Russian philosopher A. F. Losev. In particular, he wrote that facts are always random, unexpected, fluid and unreliable, often incomprehensible. Therefore, willy-nilly, one has to deal not only with facts, but even more so with those communities without which it is impossible to understand the facts themselves." (Ivin, A. A. Fundamentals of the theory of argumentation / A. A. Ivin. – M., 1997. – p. 33.)

3) "The requirement of falsifiability presupposes that statements compared with experience are formulated using sufficiently defined terms to exclude doubts

about whether these statements contradict some facts or not. This assumption is not satisfied by many hypotheses, especially in the humanities. Let's say someone claims that all actions are committed solely out of selfish motives. Until the concept of egoism is properly clarified, the hypothesis put forward will be invulnerable to criticism. Every counterexample of behavior that seems altruistic can be interpreted by shifting the meaning of the word "egoistic" as a confirmation of deep egoism, which finds its paradoxical expression in altruism." (Ivin, A. A. – Cit. op. – p. 78.)

4) "Technical standards of experimentation and methodological standards play a dual role. – Firstly, they make sense insofar as following them guarantees obtaining a reliable result. – Secondly, they also act as a form of social control within the scientific community. The controlling function of such elements of a scientific article as the description of the experimental methodology or the theoretical and methodological justification of the study becomes clear. This information is usually enough for a trained specialist to judge how serious the article is. The problems of the ethics of science intersect in certain respects with the problems of the methodology of science. One of the objectives of the methodology is to analyze and substantiate the methods and procedures used in scientific activity, as well as to identify those far from obvious prerequisites that underlie a particular theory, a particular scientific direction. The methodology is also interested in the norms of scientific activity, such as historically changing standards of evidence and validity of knowledge, patterns and ideals that scientists are guided by. As noted in this regard by the Norwegian philosopher G. Skirbekk, "being an activity aimed at the search for truth, science is regulated by norms: "seek the truth", "avoid nonsense", "express yourself clearly", "try to test your hypotheses as thoroughly as possible" – this is what the formulations of these internal norms of science look like." Consequently, he concludes, ethics in this sense is contained in science itself, and the relationship between science and ethics is not limited to the question of good or bad application of scientific results." (Yudin, B. G. Ethics of science and responsibility of a scientist / B. G. Yudin // Philosophy and methodology of science. – Part II. – M., 1994. – P. 135–136.)

## **Seminar session 2. The main components of pedagogical research**

**The purpose of the work:** to master the essence, content and purpose of the methodological apparatus of scientific and pedagogical research.

### **Questions and tasks**

1. Give several definitions of the concept of "problem" from different sources. Compare them, revealing common features.
2. Determine how the practical task and the scientific problem relate.
3. Find in the list the concepts that could be the object (subject) of the study. Formulate the topics of research papers using words and phrases: Influence, problem, as a path, role, features, creativity, cognitive activity, pedagogical activity, self-government, traditional folk holidays, the process of socialization,



incomplete family, patriotic education, level, conflict, student, student, teacher, future specialist, formation, and ways to overcome it.

1.Object \_\_\_\_\_

Subject \_\_\_\_\_ T  
opic \_\_\_\_\_

2.Object \_\_\_\_\_

Subject \_\_\_\_\_  
Subject \_\_\_\_\_

3Object \_\_\_\_\_

Subject \_\_\_\_\_  
Subject \_\_\_\_\_

4. Formulate and add definitions, revealing their relationship.

The purpose of the study is \_\_\_\_\_

The objectives of the study are \_\_\_\_\_

Relationship \_\_\_\_\_

5. Determine the possible goals of pedagogical research if the topic is: "Value self-determination of the individual in university education"

1 \_\_\_\_\_ ;

2 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_.

Determine the object and subject of pedagogical research, if the topic and purpose are known.

Topic: Formation of intercultural competence of students

Objective: to determine the effective tools of the process of formation of intercultural competence of students.

Subject \_\_\_\_\_

6. Using additional literature, give 2-3 different definitions of the methodological category "hypothesis", identify in them the common understanding of it.

1 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_;

2 \_\_\_\_\_

\_\_\_\_\_;

3 \_\_\_\_\_

General \_\_\_\_\_

6. Think and answer in writing: why is it necessary to formulate a hypothesis by organizing a study?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Write down the stages of pedagogical research in order of priority. 1. Awareness of knowledge about something as a contradiction and the emergence of a need for new knowledge.

2. Definition of the subject of the study.

3. Study of literature and past experience.
4. Putting forward a working hypothesis. Pedagogical experiment Stating
5. Accumulation of empirical information, facts of pedagogical content.
6. Primary analysis of facts.
7. Corrections in research work.
8. Final analysis, conclusions, generalizations.
9. Presentation of the material in a form that is convenient for others to perceive – a report, an article, a monograph, a dissertation, etc.

### **Seminar lesson 3. Preparation of the research program and methodology**

**The purpose of the work:** to master the methodology and technique of drawing up a program of pedagogical research

Fill in the table “Stages of scientific research and their summary”

Stage name	Summary of the stage
1. Choosing a research topic	
2. Definition of the object and subject of research	
3. Definition of the purpose and objectives	
4. Formulation of the title of the work	
5. Development of a hypothesis	
6. Drawing up a research plan	
7. Working with literature	
8. Selection of the studied	
9. Selection of research methods	
10. Organization of research conditions.	
11. Conducting research (collecting material).	
12. Processing of research results	
13. Formulation of conclusions.	
14. Registration of the work.	

#### **Questions for self-control**

1. Expand the content of the pedagogical research program.
2. Define the concepts: verification, representativeness, validity.
3. Classify the types of pedagogical research in accordance with the parameters of the scale and complexity of the tasks to be solved.
4. What is the specificity of the questionnaire as a type of pedagogical survey?
5. Reveal the content of the main stages of pedagogical research.
6. What are the components of the pedagogical research program?

7. What are the requirements for the development of a pedagogical research program?

8. . Describe the main content of the stages of psychodiagnostic examination.

9. What is the fundamental difference between the plan and the program of research activities?

Task. Develop a program of sociological research. The research topic should be chosen independently, but it should correspond to the specialty.

#### **Seminar lesson 4. Designing a scientific apparatus**

**Objective:** to determine the subject and theoretical composition of the scientific research project.

**Methodological support of practical work:** the text of the lecture on the topic.

**Task.** According to the scheme below, answer the questions posed and formulate the scientific apparatus of your research:

#### **Scientific research apparatus**

<b>Structure of the scientific research apparatus</b>	<b>Supporting issues</b>
Problem	What should be studied from what has not been studied before? What should I call it?
Topic	
Relevance	Why does this problem need to be studied at the present time?
The object of the study	What is considered in the study? How is the object viewed? What new relationships, properties, aspects and functions does this study reveal? What is the expected result in the end? What needs to be done to achieve the goal? What results (intermediate) should be obtained in the process of research in order to achieve the goal – the final result?
Subject of research	
Goal	
Task	
Hypothesis and protected provisions	What is not obvious in the object? What does the researcher see in him that others do not notice?
Scientific novelty	What has the researcher done that has not been done by others before? What results were obtained for the first time?
Significance for science or theoretical significance	What problems, concepts, theories, branches of science are being changed for development?

**Questions for discussion:**

Build the logic of the scientific apparatus of research.

Reveal the contents of the components of the scientific apparatus.

Based on the chosen topic, develop the components of the scientific research apparatus: problem, contradiction, relevance, object and subject of research.

**Seminar lesson 5. Determining the variables of pedagogical research**

**Purpose:** mastering the methodology of designing variables of pedagogical research and criteria based on the results of pedagogical activity

**Tasks**

1. Design an independent variable.
2. Design a dependent variable.
3. Design additional variables depending on the student, the teacher, the organization of the educational process and the type of diagnosis.
4. Analyze the subject of the study – an independent variable.
5. Identify the factors (phenomena, characteristics) that change in the process of research activity.
6. Determine the criteria for the effectiveness of pedagogical research.

**Seminar lesson 6. Methods of pedagogical research**

**The purpose of the work:** to learn the essence of the concept of "methods of pedagogical research"; to learn to independently analyze, compare, compare the data obtained; to apply knowledge in a specific situation.

**Questions and tasks**

1. What is meant by research methods?
2. What research methods belong to the methods of theoretical search?
3. What research methods belong to the methods of studying students and student groups?
4. What are the advantages and disadvantages of the observation method.
5. How can the objectivity of pedagogical observation be improved?
6. Describe the survey methods.
7. What are the requirements for the selection of experts?
8. What types of tests are used in pedagogy?
9. What is the method of sociometry?
10. What research methods relate to the methods of measuring the effectiveness of pedagogical activity?
11. Reveal the essence of the pedagogical experiment, its difference from observation.
12. What are the stages of the experiment? What does the experiment plan include?
13. Think about the advantages and disadvantages of each of the methods of empirical research. Formalize the results in the table:

<b>Research method</b>	<b>Advantages of using</b>	<b>Disadvantages of methods</b>
Observation		
Discussion		
Survey		
Testing		
Experiment		

14. What concepts are not directly related to the studied topic? Methodology of pedagogy, education, scientific pedagogical research, methods and methodology of pedagogical research, pedagogical technologies, pedagogical systems, theoretical research methods, empirical methods, pedagogical process, observation, experimental work, pedagogical experiment, surveys and types of surveys, pedagogical anthropology, pedagogical consultation, pedagogical testing, theories of personality development, topic, problem, the purpose, objectives, object, subject and hypothesis of the study.

15. Find inconsistencies between the definition and the defined concept

Pedagogical observation is a method of cognition of the pedagogical process and the phenomena of education through purposeful, systematic, direct perception of them, tracking the change and development of conditions and results of educational practice.

Research conversation is a written survey method developed in detail in sociology.

A questionnaire is an exchange of opinions, thoughts of two or more persons, a group. Interview – getting characteristics on the same person from different people on the same topic.

Independent characterization is one of the main types of survey through a conversation conducted by a researcher according to a pre-planned plan either with one person or with a group.

The study of pedagogical experience is an organized cognitive activity aimed at establishing historical links of education, identifying common, stable in educational systems.

A pedagogical experiment is a scientifically formulated experience of transforming the pedagogical process in precisely considered conditions.

15. From the listed statements, select the correct ones.

1. Pedagogical supervision can be organized only in a secondary education institution.

2. Pedagogical supervision is carried out not by chance and spontaneously, but purposefully and systematically.

3. A questionnaire is a questionnaire consisting of a series of ordered questions and statements.

4. The ascertaining experiment is usually carried out at the beginning of the study and has as its task to clarify the state of affairs in school practice on a particular problem being studied.

5. Viewing notebooks and homework of students gives an idea of how they read, what their interests are in choosing literature.

16. Task 4. Working with the text "Document analysis":

Text: The most important knowledge about the processes taking place in nature and society, people draw from documentary sources: print media, radio, television, business documents. These are the most important sources of human culture.

What is the difference between the use of documentary information for scientific purposes and its usual mass use?

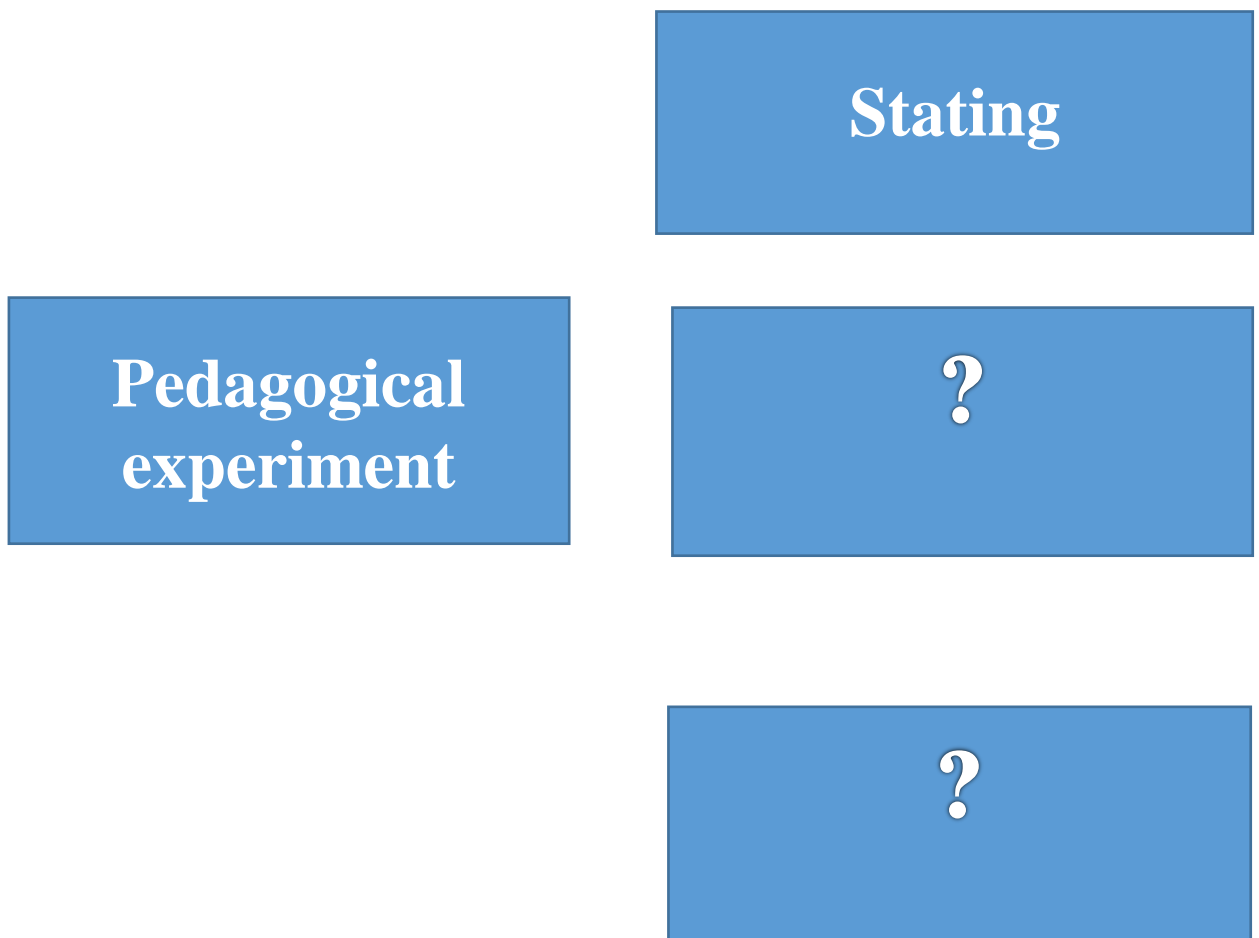
Why is this method called document analysis?

What is the difference between the use of documentary information in the natural and social sciences?

Is there a difference between the application of this method in sociology and other social sciences (in psychological, historical, legal and economic sciences)? If so, what is it?

Answer the questions: 1) Try to compare the features of the document analysis method with other methods of collecting social information (observation, survey, social experiment); 2) Try to show: by what means, procedures for analyzing documents, a more complete use of its advantages is ensured? How and how the influence of its shortcomings is weakened and compensated; 3) What other methods of collecting information can be supplemented with documentation to compensate for each of the listed shortcomings.

16. Complete the scheme "Types of experiment"



### Seminar lesson 7. Designing questionnaires

**The purpose of the work:** to form students' practical skills in developing a questionnaire for conducting pedagogical research in specifically specified conditions.

1. Highlight the advantages and disadvantages of the questionnaire method.
2. List and describe the main stages of the questionnaire
3. Analyze the questionnaire for students compiled by the curator. What questions are superfluous in it and why? Suggest your own version.

1. What specialty are you getting?
2. What was the last movie you saw?
3. What motivates your actions?
4. How often do you brush your teeth?
5. Do you like the profession of an engineer you are getting?
6. How many books do you read per month?
7. How much time does it take you to do your homework?
8. What time do you think the first pair should start?
9. What do you do after class?

4. Fill in the table "Advantages and disadvantages of different types of questions"

Open questions		Closed questions		Semi-closed questions	
Advantage s	Disadvantage s	Advantage s	Disadvantage s	Advantage s	Disadvantage s

5. **Task:** Read the introductory part of the questionnaire and make a questionnaire based on this appeal. The number of questions from 10 or more.

"Dear friend! We conduct a study of the interests and preferences of students of the technical university. Your answers to the questionnaire questions will be of great help in organizing leisure and useful activities. The truth of the research results depends more on the sincerity and thoughtfulness of the answers, the quality of filling out the questionnaire. You can't skip questions without answering them. Circle the number of the option corresponding to your opinion or enter your own option. Thank you in advance for your help. The last name can be omitted."

### Seminar work 8. Types and types of research activities

**The purpose of the work:** to learn the essence and content of the types and types of research activities; formation of the ability to make a plan and develop the structure of research work

1. Answer the questions of the theoretical part of the practical work



1. Expand the content of the concepts of "research activity", "research behavior"
2. Define the term "monograph".
3. What does the collection of scientific articles include?
4. What are the differences between an article in a conference collection and an article in a periodical scientific journal.
5. What should a master's thesis display?
6. Name the differences between a doctoral dissertation and a PhD thesis. 6. What is the abstract of a dissertation?
7. What is a study reading?
8. Describe the scheme of working with scientific literature and sources.
9. What are the requirements for a poster presentation?
10. What is the difference between educational and research activities from scientific research?
11. What role do the types and types of research activities play in the formation of scientific thinking?

2. Fill in the table

**Stages of research activity**

<b>Stages of research activity</b>	<b>Goals and objectives of research activity</b>	<b>Content</b>
1. Preliminary		
2. Choosing a research problem		
3. Study of scientific literature		
4. Formulation of the object and subject of research, topics, hypotheses, definition of goals, objectives, methods		
5. Collecting material		
6. Processing of the received material		
7. Formulation of conclusions		
8. Creating text and formatting results		
9. Presentation of research results		
10. Job evaluation		

3. Establish a correspondence between the levels of research and the types of their implementation

Theoretical level	Law
	Experiment
Empirical level	Hypothesis
	Observation

4. Read any article (of your choice) from the magazine. Write a review of this article using speech standards.

### **Seminar lesson 9. Evaluation criteria and design of research results**

**The purpose of the work:** to consolidate students' knowledge about the forms of presentation of research results; to form on this basis practical skills and abilities for the use of research skills and abilities in future professional activity; to identify the main ways of evaluating the results of educational and research activities of students.

#### **1. Questions**

1. What is the result of the research work?
2. Name the forms of publication of the results of the study.
2. What are the main requirements for the presentation of research results?  
What requirements should be taken into account when drawing up a plan for presenting the results of scientific research.
3. How are the results of scientific research framed?
4. How to evaluate research work? What are the criteria for evaluating the results of scientific research?
5. List the requirements for the design, logic and methodology of presenting the results of research activities.
6. How to formulate conclusions based on the results of scientific research?. How are the structure and content of the conclusion of a scientific study related to the purpose and objectives set out in the introduction?
7. List the principles of formulating recommendations based on the results of the study
8. What makes it possible to determine the results of the diagnosis of the educational situation in a higher education institution?

Task 1. Make a subscript primary link (in Russian and foreign languages):

- a) to a scientific monograph;
- b) for a scientific article;
- c) for a scientific report;
- d) if this link follows a link to another work by the same author;
- e) in case of quoting not from the original, but from another article or monograph, in which the corresponding quotation from the source itself is given.

Make a subscript re-link (in Russian and foreign languages):

- a) to the scientific monograph;

- b) for a scientific article;
- c) to a scientific monograph, which was cited at the first mention;
- d) a scientific article that was cited at the first mention;
- e) in a row to another page of the same publication;
- f) in a row to the same page of the same publication.

Task 2. Make a bibliographic description of the book under the name of one author in accordance with the requirements for the design of literary sources

Task 3. Make a bibliographic description of the book under the name of several authors in accordance with the requirements for the design of literary sources

Task 4. Make a bibliographic description of the book under the title in accordance with the requirements for the design of literary sources

Task 5. Make a bibliographic description of the article from the journal in accordance with the requirements for the design of literary sources

Task 6. Make a bibliographic description of an electronic resource in accordance with the requirements for the design of information sources

Task 7. Make a bibliographic list, including 3 sources of different types, to the topic of your course (final qualifying) work. (15 sources)

Use different types of sources when completing the task:

- regulatory legal acts;
- books by one, two or more authors;
- publications that do not have an individual author (books under the title);
- articles from magazines;
- electronic publications.

### **Seminar session 10. Pedagogical culture and skills of the researcher**

**The purpose of the work:** to form the skills that form the basis of pedagogical skills and culture of the researcher.

Questions:

1. What is the essence of the methodological culture of a teacher-researcher?
2. Reveal the content and main aspects of the organization of the work of a teacher-researcher.
3. What are the professionally significant qualities of a teacher-researcher?
4. What general psychological and pedagogical qualities should a teacher-researcher possess?
5. Name the professional psychological and pedagogical qualities that a teacher-researcher should possess.
6. What individual professional psychological and pedagogical qualities are necessary for a teacher researcher?
7. Expand the concept of "the skill of a teacher-researcher".
8. What are the criteria and indicators of the skill of a teacher and a teacher-researcher?
9. What professional knowledge, research abilities and skills should a teacher engaged in research activities have?

10. Give an example of a teacher-researcher who has the necessary professional and personal qualities and possesses pedagogical skills.

### **3. KNOWLEDGE CONTROL SECTION**

#### **3.1. EXAM QUESTIONS**

1. The concept of scientific and pedagogical research. Fundamental and applied pedagogical research.
2. The concept of methodology. The structure of the methodology of pedagogy.
3. Methodological approaches in modern pedagogical research.
4. Ethical principles and norms of research activity in pedagogy.
5. Levels of methodological knowledge.
6. The essence of the system approach as a general scientific methodology of pedagogy.
7. The specific scientific level of the research methodology.
8. Technological level of pedagogical research.
9. General scientific and concrete scientific principles of pedagogical research.
10. The content of the stages of pedagogical research.
11. Methodological apparatus of pedagogical research.
12. Definition of pedagogical research variables
13. The concept of logic and structure of pedagogical research. The problem and the topic of the study.
14. The object and subject of the study. Goals and objectives of the study. Idea, conception and hypothesis as the theoretical core of research.
15. The concept of the research method. Classification of research methods in pedagogy.
16. Research capabilities of various methods. The specifics of the choice of methods in psychological and pedagogical research.
17. Requirements for reliability, validity and sensitivity of the applied techniques. Ways of presenting data.
18. Definition of pedagogical research variables
19. Experiment and its types. Characteristics of the experimental procedure and its requirements.
20. The main stages of the experimental study.
21. General characteristics of the testing method. Requirements for the testing procedure.
22. The survey as a method of obtaining sociological and psychological information. Types of survey.
23. The specifics of the questionnaire, interview, conversation and group survey. Requirements for the survey procedure.
24. features of the use of interview and survey methods (oral and written).
25. General characteristics of methods of observation and self-observation.

26. Projective methods. The method of expert evaluation. The method of analyzing the results of activities.
27. Methods of document analysis: biographical, product analysis, content analysis.
28. The method of studying and generalizing pedagogical experience.
29. Theoretical research methods.
30. Methods of statistical data processing: types, specifics, conditions of application.
31. Requirements for the application of research methods.
32. The content of experimental work in modern educational institutions.
33. Research project and research program in the system of experimental work in modern educational institutions.
34. Scientific, theoretical and practical significance of the study.
35. Ways of presenting the results of the data obtained.
36. requirements for scientific genre texts – theses, articles, dissertations.
37. Requirements for the design of scientific work.
38. Types of scientific publications.
39. Efficiency and effectiveness of pedagogical research.
40. Criteria for the success of the research search and monitoring of the research process and results.

### **3.2. The main types and forms of independent work of students in the discipline "Methodology of scientific and pedagogical research":**

1. Independent study of the subjects of the discipline, taking notes, performing tasks on the studied material.
  2. Preparation for practical classes.
  3. Preparation of multimedia presentations by students.
  4. Work with the recommended basic and additional literature. Study of individual chapters of scientific literary sources and lecture material
  5. Acquaintance with periodicals, legislative documents on the problems of vocational education, scientific and popular scientific literature on the methodology of scientific research, technologies and methods of professional activity of the teacher. Formation of a bank of educational and methodological, regulatory documents.
  6. Work on compiling a dictionary of professional terms of a teacher-researcher.
  7. Improving the skills of working with scientific and pedagogical literature
  9. Search for information on the Internet.
  10. Work with legal reference and information systems ("Consultant Plus", "Guarantor", "Code");
  11. Study of scientific and research resources of the Internet;
- Educational and methodological support for independent work in the discipline "Methodology of scientific and pedagogical research" includes:

- lectures on the discipline;
- tasks to prepare for practical classes;
- a list of sources and literature for self-study of the discipline.

### **3.3. Methods of independent work of students with educational and scientific texts**

Independent reading of textbooks, primary sources and summaries, can be used in different educational situations: in preparation for lectures; in practical classes; in preparation and writing of term papers and theses; in preparation for passing the test.

One of the actual methodological problems of this type of independent work is teaching the skills of meaningful reading, developing the skills of understanding scientific and pedagogical texts.

To improve the efficiency of reading and viewing, the appropriate order of acquaintance with the contents of the book is of great importance. This order may not be the same for different readers, but it is important that it is always observed, and that, before taking up the main text, the listener must familiarize himself with the title page available in each book, as well as with the table of contents (contents), preface (introduction), conclusion (afterword), reference apparatus (if these elements are available in the book). The habit of passing by these elements when starting a new book is harmful, since it leaves the reader in ignorance of many characteristics that illuminate the content of the book and facilitate the upcoming work with a scientific text.

To study something means to gain thorough knowledge about the subject, phenomenon, to comprehend in detail, to become an expert in this matter. But such a degree of mastery is not achieved immediately, concentrated and attentive reading is necessary, allowing you to cover the content of the book, section, chapter as a whole. Such coverage of the content as a whole does not yet give a clear knowledge, but creates the conditions to understand what has been read and understand it.

To understand the text means to move from the whole to the parts, to mentally break the whole into semantic fragments, to establish how they relate to each other and to the meaning of the whole.

All this work can be carried out mentally, but its benefits will increase many times if what is read and thought out is recorded in one form or another. Writing is an important auxiliary tool when reading, without writing it is impossible to ensure truly serious work with the book.

To fully assimilate the material, the listener needs to: understand, comprehend and assimilate the material read.

#### ***Working with reference literature***

***An encyclopedia*** is a reference work containing all the accumulated knowledge in an abbreviation.

**Reference books.** The essence of using the directory is that you can quickly find the information you need. Reference books exist for all branches of human knowledge, they are academic and applied.

**Popular science publications.** The skills of obtaining information in the information environment of the library require knowledge of algorithms and search rules. Library and bibliographic knowledge facilitates the organization of the search and provides an additional opportunity to expand the educational horizons.

### 3.4. SUBJECT OF ABSTRACTS

1. Research activity of a teacher.
2. Experienced work of a teacher.
3. Experimental work of the teacher.
4. Experimental work of the teacher.
5. The activity of the teacher on the introduction and testing of new (in the content, methods, forms of organization of the educational process, in the system of control and evaluation of the student's educational activities, in management, etc.).
6. Types of innovations in modern educational practice.
7. Criteria and indicators of the effectiveness of pedagogical innovations.
8. Analysis of pedagogical innovations in Belarus and abroad.
9. Ways of reflecting pedagogical reality in the process of cognition.
10. What does it mean to study pedagogical reality in a scientific sense?
11. What is the scientific search for a teacher?
12. Scientific and pedagogical research as a special type of cognitive activity of a teacher.
13. Methodological features of scientific and pedagogical research.
14. Types of pedagogical research.
15. Stages of pedagogical research.
16. Logic of pedagogical research.
17. Methods of pedagogical research.
18. Requirements for texts of the scientific genre – theses, articles, master's theses.
19. Specifics and logical structure of a scientific text
20. Theoretical and applied problems of pedagogical innovation. Principles of innovation process management.
21. Characteristics of empirical methods of pedagogical research (observation, survey methods, study of documentation, ranking, sociometry, etc.).
22. The essence of pedagogical experiment. Types of experiments. Stages of experimental research.
23. The concept of the logic of research.
24. The problem, topic and relevance of the study.
25. The object and subject of the study.
26. The purpose and objectives of the study.
27. Idea, conception and hypothesis as the theoretical core of research.
28. Methods of studying literature and other sources.

29. The method of observation.
30. Methods of conversation and questioning (oral and written).
31. Learning and using best practices.
32. Interpretation of the research results and approbation of the work.
33. Registration of the results of the study.
34. Requirements for writing scientific papers of different levels.

### 3.5. TESTS

#### Choose one answer option

##### 1. Methodology is:

- a) the direction of scientific knowledge;
- b) the doctrine of the structure, logical organization, methods and means of activity;
- c) the doctrine of the principles of construction, forms and methods of scientific knowledge;
- d) scientific recommendations for practical activities;
- e) the doctrine of the scientific method of cognition; a set of methods used in any science;
- f) the doctrine of the ideological positions of science, the logic of its development and research methods.

##### 2. The sphere of methodology is:

- a) science;
- b) religion;
- c) practical activity;
- d) household;
- e) spiritual.

##### 3. The method of collecting primary data based on verbal communication is called:

- a) observation;
- b) by test;
- c) by questionnaire;
- d) conversation.

##### 4. A comprehensive characteristic, including, on the one hand, information about whether the methodology is suitable for measuring what it was created for, and on the other hand, what its effectiveness, efficiency, practical usefulness is:

- a) reliability;
- b) validity;
- c) criterion;
- d) the concept.

##### 5. A kind of research method in psychology and pedagogy that allows, based on written answers to the proposed questions, to identify points of view and trends taking place in a group of respondents is called:

- a) by test;



- b) by questionnaire;
- c) by a survey;
- d) interview.

**6. The accuracy of psychodiagnostic measurements, as well as the stability and stability of their results in relation to the action of various extraneous factors is:**

- a) validity;
- b) reliability;
- c) creativity;
- d) confidentiality.

**7. A scientifically based, but not obvious assumption that requires special proof for its final statement as a theoretical position or its refutation is:**

- a) theory;
- b) the idea;
- c) hypothesis;
- d) the task.

**8. A set of psychological tests aimed at identifying the level of formation of specific knowledge, skills and abilities are:**

- a) intellectual tests;
- b) personality tests;
- c) achievement tests;
- d) criteria-oriented tests.

**9. The stage of movement towards the goal, the goal set in a specific situation requiring transformation, encouraging the student to be active, are called:**

- a) a link;
- b) the task;
- c) theory;
- d) an idea.

**10. The idea associated with the ideas of how to implement it, methodically designed, but existing only in the mind of the researcher (teacher) is:**

- a) the task;
- b) thought;
- c) hypothesis;
- d) the idea.

**11. The sudden finding of a solution to a problem that you think about for a long time in search of a solution is:**

- a) improvisation;
- b) observation;
- c) identification;
- d) insight, insight, guess.

**12. A kind of research method in psychology and pedagogy in the form of an oral survey is:**

- a) an interview;
- b) conversation;
- c) test;
- d) improvisation.

**13. Interpretation (Latin interpretatio) is:**

- a) intuition;
- b) a set of operations to interpret, clarify the meaning of the results obtained, explain the reasons and conditions that gave rise to them;
- c) hypothesis;
- d) insight.

**14. A comprehensive pedagogical experiment allows:**

- a) to most accurately test innovations in pedagogical practice;
- b) accurately record the initial and final results;
- c) check how much the subject has knowledge, skills of mental actions;
- d) plan the content and sequence of search steps.

**15. The system of initial theoretical positions, which serves as the basis for the research search, is:**

- a) the concept of;
- b) intuition;
- c) hypothesis;
- d) the idea.

**16. The content and sequence of search steps that should ensure the solution of the tasks set are:**

- a) the logic of psychological and pedagogical research;
- b) the hypothesis of psychological and pedagogical research;
- c) the theory of psychological and pedagogical research;
- d) methodology of psychological and pedagogical research.

**17. The process of creating models, diagrams, iconic or real analogues reflecting the essential properties of more complex objects (prototypes) is:**

- a) modeling;
- b) management;
- c) planning;
- d) construction.

**18. The system of control, monitoring of the process and the results of the study is:**

- a) the criterion;
- b) monitoring;
- c) indicator;
- d) methodology.

**19. The research method, which consists in the systematic and purposeful perception of the studied object in order to collect information, fix actions and manifestations of the behavior of the object for its study is:**

- a) experiment;
- b) experience;
- c) hypothesis;
- d) observation.

**20. The reliability of the technique shows:**

- a) the stability of the diagnostic measurement;
- b) how stable are the results obtained using the methodology to the action of extraneous and random factors;
- c) the presence of a reduced level of development of the studied property or phenomenon;
- d) an increased level of development of the studied property.

**21. A kind of research method of experiment, which is focused on studying the dynamics of the development of psychological properties or pedagogical phenomena in the process of the researcher's active influence on the conditions of performance of activity, is an experiment:**

- a) laboratory;
- b) natural;
- c) genetic modeling ;
- d) formative.

**22. Specific knowledge about ignorance, the idea of the nodal tasks that need to be solved, about the essential questions that need to be answered is:**

- a) the problem;
- b) the idea;
- c) hypothesis;
- d) evaluation.

**23. A set of psychological tests focused on the study of personality and based on the idea of projection mechanisms are tests:**

- a) personal;
- b) abilities;
- c) intellectual;
- d) projective.

**24. A standardized task that allows you to identify the presence or absence of any characteristics of the studied object is:**

- a) conversation;
- b) interview;
- c) survey;
- d) test.

**25. The image of the needed (desired) future, anticipating the results of transformations of the educational system or its elements is:**

- a) the goal in pedagogical research;
- b) the task of pedagogical research;
- c) the prospect of education;
- d) the subject of pedagogical research.

**26. The type of techniques when the interaction of the experimenter and the subject occurs one-on-one is ...**

- a) Group;
- b) Collective;
- c) Individual;
- d) Private.

**27. Strictly formalized research methods include:**

- a) Questionnaires, tests, projective techniques;
- b) Persuasion, retraining, encouragement, punishment;
- c) Observation, conversation, analysis of products of activity;
- d) Conversation, questionnaires, punishment.

**28. The general principles of cognition and the categorical structure of science as a whole constitute the content of such a level of methodology as...**

- a) specifically scientific;
- b) philosophical;
- c) general scientific;
- d) theoretical.

**29. One of the methodological parameters of pedagogical research is ...**

- a) the method of teaching;
- b) the subject;
- c) theory;
- d) the object.

**30. Methods of obtaining scientific information, with the help of which various aspects of upbringing, education and training are studied.**

- a) methodology;
- b) observation;
- c) methods of pedagogical research;
- d) experiment.

**31. What methods serve as a means of studying hidden interpersonal relationships in a team.**

- a) testing;
- b) questionnaire;
- c) sociometric methods;
- d) survey methods.

**32. Observation, which assumes the fact of covert tracking of the actions of the subjects.**

- a) conspiratorial;
- b) open;
- c) solid;
- d) discrete.

**33. Pedagogical research according to their orientation is divided into:**

- a) fundamental, theoretical, practical;
- b) empirical, theoretical, methodological guidelines;
- c) fundamental, applied, developments;

d) theoretical, historical and pedagogical, fundamental.

**34. The generally accepted methodological parameters cannot include:**

- a) the problem;
- b) the topic;
- c) the object and subject of the study;

**35. The research hypothesis is:**

- a) a set of theoretically sound assumptions, the truth of which is subject to verification;
- b) the expression of a need in any area of social life;
- c) the most significant side of the object, which is subject to direct study;
- d) what the educational process is aimed at.

**36. The form of work with literary sources is not:**

- a) extracts;
- b) abstract;
- c) consultation;
- d) the plan.

**37. A research method based on the study and theoretical understanding of the practice of the best educational institutions and teachers is a method:**

- a) conversations;
- b) study and generalization of advanced pedagogical experience;
- c) pedagogical experiment;
- d) ranking.

**38. Research conversation is:**

- a) direct perception of the activity of objects in various conditions;
- b) a set of questions posed in a certain sequence in accordance with the purpose of the study, and the answers to them;
- c) scientifically organized experience;
- d) observation of pedagogical phenomena in precisely considered conditions.

**39. A purposeful examination, the same for all subjects, conducted under strictly controlled conditions, is:**

- a) testing;
- b) study of school documentation;
- c) modeling;
- d) observation.

**40. Questionnaire translated from French means:**

- a) examination;
- b) research;
- c) investigation;
- d) cognition.

**41. General fundamental concepts reflecting the most essential properties and relations of objects and phenomena of pedagogical reality are:**

- a) principles of pedagogy;

- b) the functions of pedagogy;
- c) the subject of pedagogy;
- d) categories of pedagogy.

**42. General theoretical methods of pedagogical research do not include:**

- A) mental modeling;
- B) analysis;
- C) synthesis;
- D) questionnaire.

**4. AUXILIARY SECTION**  
**4.1. FRAGMENT OF THE CURRICULUM IN THE SPECIALTY 7-06-0111-01 "SCIENTIFIC AND PEDAGOGICAL ACTIVITY"**

No. p / p	Name of the module, academic discipline, course project (term paper)	Exams	Tests	Number of academic hours						Distribution by courses and semesters			Total credits	Код компетенции	Шифр кафедр
				Total Classroom	Total Classroom	Из них				1 semester 17 weeks					
						Lectures	Of Laboratory	Practical	Seminars	Total hours	Aud. hours	per unit			
1.1.1	Methodology of scientific and pedagogical research	1		96	34	14			20	96	34	3	3	УК -1	ИПФ 10

## **4.2. THE CONTENT OF THE DISCIPLINE "METHODOLOGY OF SCIENTIFIC AND PEDAGOGICAL RESEARCH"**

### **SECTION 1 Methodology of pedagogical science**

#### **Topic 1.1 Methodological foundations of pedagogical research**

Definition of science, scientific research. Science as a special field of activity. An object, a subject of science. Classification of sciences.

The concept of research. The concept of science and the scientist. Purpose of research.

The basic principles of any scientific knowledge. The main terms of the methodology of cognition: methodology, methodology, object, subject, theses, model, theory, hypothesis, problem, arguments, argumentation, category, concept, principle, fact, paradox, law, judgment, experiment.

Norms of scientific activity. Cases and causes of subjectivism and bias of researchers. Ethics and neutrality of the scientist in relation to the object of research.

The essence of the concept of "methodology of pedagogical science". The main provisions of methodology in pedagogy. Functions of methodology in pedagogy. The structure of methodological knowledge: philosophical level, general scientific level, concrete scientific methodology, technological methodology. The essence of the concept of "pedagogical research".

#### **Topic 1.2 Methodological and ethical principles of research activity**

Principles and requirements of scientific research.

General scientific principles used in pedagogical research: objectivity, essential analysis, unity of logical and historical, genetic, conceptual unity of research.

Methodological approaches (systemic, activity-based, subjective, integrative-differentiated) and principles (activity, determinism, etc.) of psychological and pedagogical research.

The concept of "method" and "methodology". Multilevel concept of methodological knowledge. Philosophical and methodological analysis of science. General scientific methodology of cognition. Methodological principles of scientific research. The principle of unity and practice in psychological and pedagogical research.

The principle of consistency in psychological and pedagogical science.

The role of laws and categories of dialectics in psychological and pedagogical research.

The functions of methodology in pedagogy: epistemological, praxeological, axiological, reflexive, prognostic, the function of normative prescription, heuristic. The main methodological approaches and their implementation in the study are: systemic, personal, activity, axiological, cultural, anthropological, ethnopedagogical.

Methodological approaches underlying pedagogical research (holistic, personal, activity, political, cultural, ethnopedagogical, anthropological). The essence and characteristics of the methodological principles of objectivity,



evidence, essential analysis, identification of the main factors, inconsistency of the studied subject, genetic, unity of logical and historical, continuity and conceptual unity.

Subjective conditions and objective factors affecting the effectiveness of pedagogical research.

Ethical principles of research activity: collectivism, universalism, selflessness, organized skepticism. Scientific ethics as a set of officially published rules and moral principles that scientists adhere to in scientific activity and that ensure the functioning of science.

## **SECTION 2. Structure and content of pedagogical research**

### **Topic 2.1. Logic and structure of pedagogical research**

The concept of the logic of research. Empirical and theoretical levels of research, their specificity and interrelation. Logical and historical in scientific research. General and variable in the construction of search logic. The construction of the logic of research as its special stage and as a continuous process. The problem as the essence of research. Correlation of practical tasks and research problems. Objective and subjective prerequisites for choosing a topic. Characteristics of the topic: relevance, perspective, novelty and problematic. The problem of topic selection and localization. Goals and objectives of the study. Initial theoretical provisions of the study. The main ideas and intent of the study. Hypothesis, its types, methods of promotion and development. Selection of methods and design of research methodology. Requirements for the formulation of conclusions and their approbation.

### **Topic 2.2 The main components of pedagogical research**

The main components of pedagogical research. Goals and objectives of the study. The object and subject of the study, their commonality and differences. Idea, conception and hypothesis as the theoretical core of research. Identification of criteria for the success of a research search. Criteria (generalized indicators) for evaluating the success of a research search: educational, sociological, valueological, upbringing and psychological comfort, individual and personal development, the course of innovative processes. Scientific, theoretical and practical significance of the study.

The relationship between the purpose, objectives, object and subject of research.

### **Topic 2.3. Preparation of the research program and methodology**

The concept of "methodology". The concept of the research program. The studied phenomena, processes, signs, parameters. The methods used, their subordination and coordination. The sequence and technique of summarizing the results of the study. The composition, role and place of researchers in the process of implementing the research plan. The constituent elements of the research program. Principles of drawing up an observation program and a guide program for in-depth interviews. The specifics of biographical interview programs. Focused interview. Discussion of the guide program on the example of the program

"Anthropology of professions". Skills of adaptation of a standard program to the specifics of a specific environment (professional).

Stages of research: the selection of the object and subject, the formulation of the problem (topic), the development of a hypothesis, the construction of a new or addition to an existing theory. Stages of cognition: studying the object of research, clarifying the problem (topic) of the study, hypothesizing, building a model to test the hypothesis.

Choosing the general direction of research (viewing the topics of past projects, discussing with teachers, monitoring literature, keeping a notebook of "ideas", etc.). Detailing the general direction of the study. The formulation of the research topic. Signs of a good research topic. Formulation of control questions. Formulation of the purpose and objectives of the study. Preparation of a research plan (program) (title, introduction, control questions, purpose and objectives of the study, methods, schedule of the research project, list of references).

#### **Topic 2.4 Design of scientific apparatus**

Development and implementation of a scientific project and research program. Location of the scientific research apparatus. Components of the scientific apparatus.

Formulation of the topic of pedagogical research. Strategy operations, research tactics, evaluation actions. Research operations of a strategic nature: determination of the relevance of the topic; identification of contradictions; definition of the problem; formulation of the ultimate goal of the study. Designing research tactics: the object of research; the subject of research; research hypothesis; research objectives; research methods; research methodology; research stages. The technological part of the scientific apparatus.

Stages of research: the study of theoretical material; the study of practice; generalization of the experience of pedagogical activity; writing the work itself.

Determination of variables, scientific and theoretical and practical significance of pedagogical research.

#### **Topic 2.5 Definition of pedagogical research variables**

Classification of variables based on causal relationships and dependencies between the studied phenomena. Three types of variables: dependent; independent; independent indirect. A side and additional variable.

Design of dependent, independent, additional and spontaneous variables on the topic of pedagogical research.

### **SECTION 3 Theoretical Foundations Of Pedagogical Research Methods**

#### **Topic 3.1 Methods of pedagogical research**

Methods of pedagogical research as ways and means of cognition of the objective reality of pedagogical phenomena. Features of the use of scientific and pedagogical research methods. Principles of the choice of research methods. The principle of adequacy of the method to the essence of the phenomenon being studied. Classification of research methods. Division of research methods into experimental and non-experimental.

Theoretical methods. Scientific and applied methods. Experimental. The experiment, its types, methods of preparation and conduct. Pedagogical experiment as a scientifically formulated experience of transformation of the pedagogical process in precisely considered conditions. Complex psychological and pedagogical experiment.

Laboratory and natural experiments. The general structure of a scientific experiment.

Experiment as a method of practical research in psychology: advantages and disadvantages.

Theoretical and empirical methods of pedagogical research. Their classification. Characteristics of research methods: observation, oral interview (conversation, interview), questionnaire, testing, expert evaluation method, experimental work, experiment, its types. Special research methods: timing of labor actions, photographing the working day, biomechanical method, psychological methods (electromonography, electrocardiography, electrocardiography).

### **Topic 3.2 Designing questionnaires**

Designing questionnaires to diagnose the results of the educational process. Definition of structural components of questionnaires; development of a system of questions for the main part of the pedagogical questionnaire. Features of the choice of research methods for a specific methodological problem. Justification of research methods.

The specifics of using the questionnaire method for the study of a pedagogical problem.

The specifics of using the method of pedagogical observation. Types of recording the results of pedagogical observation.

The specifics of using methods of pedagogical interview and conversation. Types of recording the results of interviews and conversations.

## **SECTION 4 Research activity of a teacher**

### **Topic 4. 1 Types and types of research activity of a teacher**

Types of research activities. Theoretical, experimental and theoretical-experimental research activities. Types of educational research: by location (academic and extracurricular); by topic (free and subject); by time (long-term and short-term); by number of students (group and individual). Types of research activities: educational and research tasks, project activities, laboratory research, monograph, abstracts of classification, cognitive and research type, reports, scientific article, scientific report, review, literary review, term papers, research competitions, scientific associations and societies of students, participation in conferences, final qualifying works. Their structure, content, design. Creative project and the main stages of its development.

The main components and the structural and logical scheme of a scientific article, report and review.

The main components and the structural and logical scheme of the course and diploma design.

The main components and the structural and logical scheme of the creative project of a teacher - researcher.

Methodological recommendations for the design of a scientific article, review, term paper and thesis, creative project.

Typology of research activities by purpose, place and time of the event, the composition of participants.

#### **Topic 4.2 Evaluation criteria and design of research results**

Criteria for evaluating research papers. Criteria characterizing the realization of the research goal; knowledge of the methodology of preparation, conduct, interpretation of research results.

Forms of approbation of research results. Methods of processing the results of pedagogical research. Requirements for scientific genre texts: theses, articles, abstracts, dissertations. Registration of research work. Abstract, article, report as types of registration of the results of scientific research. Acquaintance with the types of research works: dissertation, abstract, article, report, scientific report. Methods and methods of describing the progress and results of the experimental part of pedagogical research. Preparation of a report and presentation on the conducted research.

Graphs, tables, formulas as a data formalization tool. The technique of constructing graphs, tables, formulas. Types of diagrams, chart selection. Types and forms of written representations of scientific information. Criteria of novelty and significance of pedagogical research. The effectiveness of the study. The problem of evaluating research results in pedagogy. Processing, interpretation and analysis of research results. Drawing up conclusions and practical recommendations based on research data. Methods of evaluating the effectiveness of the study: monitoring and rating assessment.

Assessment of success in the implementation of scientific research. Development of the content of the criteria for evaluating a research project: the degree of independence; the degree of comprehension of the information used; the level of complexity and the degree of mastery of the methods used; the originality of the idea, the method of solving the problem, etc.

#### **Topic 4.3. Pedagogical culture and skills of the researcher**

Professionally significant personal qualities of a teacher-researcher. Pedagogical skills of the researcher: general culture and erudition, professional knowledge, research abilities and skills, research pedagogical orientation. Creativity and innovation in the work of a teacher-researcher. Reflection of a teacher-researcher in the system of his scientific and practical activities. Scientific integrity and ethics, the art of communication and the culture of behavior of a teacher-researcher.

### 4.3. THE LIST OF EDUCATIONAL PUBLICATIONS AND INFORMATION AND ANALYTICAL MATERIALS RECOMMENDED FOR THE STUDY OF THE DISCIPLINE

#### Basic literature

1. Bayborodova, L. V. Methodology and methods of scientific research: Textbook / L.V. Bayborodova, A.P. Chernyavskaya. — M.: Yurayt. 2018. 222 p.
2. Drechinsky, V. A. Fundamentals of scientific research: Textbook for SPO /V.A. Drechinsky. — M.: Yurayt. 2019.- 274 p.
3. Puyman, S.A. Methodology of research activity in professional education : studies.- method. manual / S.A. Puyman. – Minsk : RIPO, 2021.- 163 p.
4. Snopkova, E. I. Methodology and methods of pedagogical research: textbook / E. I. Snopkova, E. A. Yaroshevich. – Mogilev: Kuleshov Moscow State University, 2019. – 208 p.

#### Additional literature

5. Afanasyev V. V. Methodology and methods of scientific research [Electronic resource]: textbook for universities / V. V. Afanasyev, O. V. Gribkova, L. I. Ukolova. — Moscow : Yurayt Publishing House, 2020. — 154 p. — Access mode: <https://urait.ru/bcode/453479>
- Бусыгина , N. P. Qualitative and quantitative methods of research in psychology : textbook for undergraduate and graduate studies / N. P. Busygina. — M. : Yurayt Publishing House, 2019. — 423 p.
6. Drechinsky V. A. Methodology of scientific research [Electronic resource]: textbook for universities / V. A. Drechinsky. — 2nd ed., reprint. and add. — Moscow : Yurayt Publishing House, 2020. — 274 p. — Access mode: <https://urait.ru/bcode/453548> .- Date of access: 03.04.2023.
7. Dudyashova, V. P. Methodology of scientific research : textbook / V. P. Dudyashova. — Kostroma : N.A. Nekrasov KSU, 2021. — 80 p. — ISBN 978-5-8285-1132-7. — Text : electronic // Lan : electronic library system. — Access mode: <https://e.lanbook.com/book/177619> . - Access date: 03.04.2023)
8. Ermolaev-Tomin, O. Y. Mathematical methods in psychology in 2 h. Part 2. : textbook for academic bachelor's degree / O. Y. Ermolaev-Tomin. — 5th ed., ispr. and add. — M. : Yurayt Publishing House, 2019. — 235 p.
9. Karandashev, V. N. Methodology and methods of psychological research. Performance of qualification works : studies. handbook for bachelor's degree, specialty and master's degree / V. N. Karandashev. — 4th ed., reprint. and additional — M. : Yurayt Publishing House, 2019. — 132 p.
10. Mikhalkin, N.V. Methodology and methodology of scientific research / N.V. Mikhalkin. - Moscow: SINTEG, 2019. – 252 p.
11. Moki, V. S. Methodology of scientific research. Transdisciplinary approaches and methods : studies. handbook for undergraduate and graduate studies / V. S. Moki, T. A. Lukyanova. — M. : Yurayt Publishing House, 2019. — 160 p.

12. Rozanova N. M. Fundamentals of scientific research. Educational and practical manual. - M.: KnoRus. 2020. 328 p.

13. Educational and methodological complex on the academic discipline "Methodology of pedagogical research" for the specialty of retraining: 1-08 01 71 "Pedagogical activity of specialists" // Comp. S.A. Puyman.- 2020.- Access mode:

chrome-extension://efaidnbmnnnibpcajpcgclefindmkaj/viewer.html?pdfurl=http%3A%2F%2F86.57.153.145%3A81%2Fpluginfile.php%2F6555%2Fcoursecat%2Fdescription%2F1%25D0%259C%25D0%25B5%25D1%2582%25D0%25BE%25D0%25B4%25D0%25BE%25D0%25BB%25D0%25BE%25D0%25B3%25D0%25B8%25D1%258F%2520%25D0%25BF%25D0%25B5%25D0%25B4%25D0%25B0%25D0%25B3%25D0%25BE%25D0%25B3%25D0%25B8%25D1%2587%25D0%25B5%25D1%2581%25D0%25BA%25D0%25B8%25D1%2585%2520%25D0%25B8%25D1%2581%25D1%2581%25D1%2581%25D0%25BB%25D0%25B5%25D0%25B4%25D0%25BE%25D0%25B2%25D0%25B0%25D0%25BD%25D0%25B8%25D0%25B9%2520%25D0%25A3%25D0%259C%25D0%259A%2520%25284%2529.pdf&cflen=987109&chunk=true. - Дата доступа: 11.01.2022.

14. Tsy-pin G. M. Work on a dissertation. Navigator on the "route" of scientific research. — M.: Yurain. 2019. 36 p.

#### 4.4. GLOSSARY

**A CONSULTATION** is a method that involves a collective discussion of the results of studying the upbringing of schoolchildren according to a certain optimal program in terms of its scope and according to common characteristics, a collective assessment of certain aspects of personality, identification of the causes of possible deviations in the formation of certain personality traits, as well as collective development of means to overcome the detected shortcomings.

**A PROBLEM** [from the Greek *problēma* – difficulty, obstacle, task, task] is a form of scientific knowledge in which the boundaries of reliable are determined and the ways of developing new knowledge are predicted. **PROGRAMMED control** is a method in which punched cards, mechanical quizzes, machines with cards, control rulers are used.

**A SAMPLE** is a set of cases (subjects, objects, events, samples) selected from the general population to participate in the study using a certain procedure.

**A TRAINING EXPERIMENT** is an important diagnostic tool. Its essence lies in the fact that students in the course of ordinary training are put in such conditions under which they must independently acquire new knowledge, "discovering" for themselves a new principle, a new rule or a pattern.

**ABSTRACTION** [<Latin *abstractio* – removal, distraction] is the process of mental distraction from a number of properties of objects or signs of an object from the object itself, from its other properties. It can be in the form of a sensually visual image (e.g. a model of interpersonal relationships in a group), in the form of a judgment ("This person has a melancholic temperament"), in the form of a

concept (when a set of signs, properties, sides and connections of an object or class of objects is abstracted: "motive", "giftedness", "problem"), in the form of a category (the broadest concept of a certain sciences: "education", "training", "development").

**An ALTERNATIVE HYPOTHESIS** is a hypothesis according to which the differences between the samples are significant, i.e. reflect the corresponding difference between the populations from which these samples are taken. Usually the alternative hypothesis corresponds to the working hypothesis of the researcher

**ANALOGY** [*<Greek. analogia – correspondence*] – 1) similarity between objects, phenomena, etc.; 2) the form of inference when, based on the similarity of two objects, phenomena in any respect, a conclusion is drawn by analogy about their similarity in other respects. A. does not give reliable knowledge, conclusions by analogy are problematic, although plausible.

**ANALYSIS** [*< gr. analysis – decomposition, dismemberment*] – 1) a method of scientific research consisting in the mental or actual decomposition of the whole into its component parts; analysis along with synthesis is of great importance in scientific cognition; 2) analysis, consideration of something.

**APPROBATION** is the establishment of truth, competent assessment and constructive criticism of the grounds, methodology and results of the study. Official approbation can take place in the form of reports, discussions, discussions, oral or written review of the work. Competent scientists and practitioners, scientific and pedagogical collectives and audiences act as judges, critics and opponents. Informal approbation can take place in the form of conversations and disputes with specialists and colleagues.

**ASCENT from the ABSTRACT to the CONCRETE** is a method in which the concrete is understood as a comprehensive reflection of the essence of the phenomenon being studied, and the abstract as the most contour description of it so far. This method is based on the consistent use of system-structural analysis. It is carried out using a sequential series of techniques and procedures.

**CATECHETICAL CONVERSATION** - memorizing questions and answers to them (in Catholic schools in a modified form is still used).

**CAUSAL ANALYSIS** is the search for the most acceptable areas for a completely scientific application of mathematics in pedagogy, leaving the main role for qualitative pedagogical analysis. The cause is the phenomenon that causes or changes another phenomenon. A phenomenon caused or modified by a specific cause is called an effect.

**CLASSIFICATION** [*< lat. classis – category and facio – to do*] is the process and result of splitting the entire set of objects (research or observation) into disjoint classes based on the common features of the classified objects. The distribution of objects of any kind into classes in accordance with the most essential features inherent in objects of this kind and distinguishing them from objects of other genera, while each class in turn is divided into subclasses. Classification is a special case of applying the logical operation of dividing the scope of a concept, which is a certain set of divisions (division of a certain class

into species, division of these species). Usually, the signs essential for these subjects are chosen as the bases of division. In this case, the classification is called natural, it reveals significant similarities and differences between objects and has cognitive significance. Classification can also be used to systematize items. In this case, signs convenient for this purpose, but insignificant for the objects themselves, are chosen as the basis.

**COMPARATIVE HISTORICAL** analysis is a method of theoretical search. Accumulation of data on school performance at the end of the school year and identification of the general trend of its evolution, as well as obtaining data on the evolution of academic performance in each class for the same period, and grouping these data by junior, middle and senior grades.

**COMPARISON** – comparison of objects in order to identify similarities and differences between them. It is an important prerequisite for generalization, plays an important role in inference by analogy, and is also used as a method of supplementing and sometimes replacing the definition. Comparing the studied subject with others according to accepted parameters helps to identify and limit the object and subject of research.

**CONCRETIZATION** [*Latin concretus* – thick, solid, fused] is a logical form that is the opposite of abstraction. Concretization is the mental process of recreating an object from previously isolated abstractions. The method of theoretical reproduction in the consciousness of an integral object is the ascent from the abstract to the concrete, which is a universal form of the deployment of scientific knowledge, the systematic reflection of the object in concepts.

**CONTROL LABORATORY** work is a method that is applicable to study the level of formation of experimental skills and abilities among students.

**CONVERSATION** — in pedagogy, a question-and-answer method of teaching; it is used to activate the mental activity of students in the process of acquiring new knowledge or repeating and consolidating previously acquired knowledge.

**CORRELATION** is the relationship between two or more variables, factors (in the latter case, the correlation is called multiple). The purpose of correlation analysis is to establish the presence or absence of this relationship, that is, to establish the fact that any phenomena, processes depend on each other or their independence.

**DEDUCTION** [*Latin deductio* – deduction] is one of the main ways of reasoning (inference) and research methods. In a broad sense, deduction refers to any conclusion in general, in a narrow sense – the proof or derivation of a statement (consequence) from one or more other statements (premises). The method of deduction is used in the process of transition from knowledge of more general provisions to knowledge of less general provisions.

**DISSERTATION** is a handwritten scientific work of one author containing a systematic presentation of the scientific research carried out by him and their results, submitted for public scientific examination (defense) for the academic degree of master (master's thesis) and the academic degrees of candidate and



doctor of Sciences (candidate and doctoral dissertations). Based on the results of the public scientific examination (defense) of the dissertation, the competent authority makes a decision on awarding the author of the research the required academic degree.

**EDUCATIONAL THEORY** is a system of generalizing knowledge that includes a description, explanation and prediction of the personal formation of pupils as a controlled and self-organizing process.

**EPISTEMOLOGY** is a theory of scientific knowledge (synonym – *epistemology*), one of the components of philosophy. In general, epistemology studies the laws and possibilities of cognition, explores the stages, forms, methods and means of the process of cognition, conditions and criteria for the truth of scientific knowledge. The methodology of science as the doctrine of the organization of research activities is that part of epistemology that studies the process of scientific activity (its organization).

**EXPERIMENT** (*experimentum* – trial, experience) is one of the main (along with observation) methods of scientific cognition in general, pedagogical research in particular. An experiment in science is a change or reproduction of a phenomenon in order to study it in the most favorable conditions. Its specificity lies in the active intervention in the situation by the researcher who carries out purposeful changes in pedagogical conditions. It provides the possibility of repeated reproduction of the studied phenomena under varying conditions. A thoroughly thought-out experiment allows you to test hypotheses about cause-and-effect relationships.

**EXTRAPOLATION** [*extra...* + Latin *polire* – to make smooth, to finish] is a method of scientific research, which consists in extending the conclusions obtained from observing one part of a phenomenon to another part of it.

**GENERALIZATION** is a mental operation, a transition from thinking about the individual, contained in a concept, judgment, norm, hypothesis, question, to thinking about the general; from thinking about the general to thinking about the more general; from a number of facts, situations, events to their identification in some properties, followed by the formation of sets corresponding to these properties. By inductive O. judgments are also formed.

**GRAPHS** are methods that are quite acceptable for pedagogy. A graph is a geometric structure located on a plane, which consists of vertices connected in a certain way by oriented lines. Graphs can be used to depict connections between certain sections and topics of a given academic subject.

**HYPOTHESIS ZERO** is a hypothesis according to which the differences between the samples are due only to chance and do not reflect the actual differences between the populations from which these samples are taken. Usually the null hypothesis is put forward in order to refute it in favor of an alternative hypothesis.

**IDEALIZATION** is one of the main mental operations – the mental construction of ideas about objects that do not exist or are not feasible in reality, but for which there are prototypes in the real world. The process of idealization is

characterized by a distraction from the properties and relations inherent in the objects of real reality and the introduction of such features into the content of the concepts formed that, in principle, cannot belong to their real prototypes.

**IDENTIFICATION** is the identification, the establishment of a coincidence, the correspondence of something with something. In control theory, the identification of systems consists in the construction (refinement of parameters and/or structure) of a system model based on measurement results.

**IMITATION** – (from Lat. *imitatio* – imitation, forgery) – reproduction of the characteristics of a certain system, situation, event or phenomenon in an environment different from the one in which the real phenomenon occurs.

**INDUCTION** [*<Latin inductio* – guidance] is one of the types of inference and research methods, the path of experimental study of phenomena, during which a transition is made from individual facts to general positions, individual facts seem to lead the researcher to a general position.

**INTERVIEWING** in scientific research is a kind of conversation in order to collect material for study and generalization. There is a conversation going on in the conversation, that is, the exchange of information, each of the participants can ask or answer a question.

**INTRODUCTION** – the use in production, in practice of the results of any experiments, research; use in practice; dissemination of innovations; achievement of practical use of progressive ideas, inventions, results of scientific research, innovations.

**METHOD** [*<gr. methodos*] – 1) a method of cognition, research of natural phenomena and social life; 2) a technique, method or mode of action.

**METHODOLOGY** is a system of knowledge about the basic or starting points of pedagogical theory, about the principles and approaches of considering pedagogical phenomena and methods of their research, as well as ways of introducing the acquired knowledge in the practice of teaching, upbringing, education.

**MODEL** [*<lat. modulus* – measure, sample, norm] a) in a broad sense – any mental or symbolic image of the modeled object (original); these include epistemological images (reproduction, display of the object under study or a system of objects in the form of scientific descriptions, theories, formulas, systems of equations), schemes, drawings, graphs, plans; b) a specially created or specially selected object reproducing the characteristics of the studied object.

**MODELING** a) a set of methods for constructing models and studying the corresponding phenomena, processes, systems of objects (originals) on them; b) a set of methods for using the results of studying models to determine or refine the characteristics of the objects of research themselves, to improve their management, to test relevant hypotheses about the original, to rationalize the ways of constructing newly constructed objects. Modeling can be expressed in physical or symbolic form.

**MONITORING** is the constant monitoring of a process in order to identify its compliance with the desired result or initial assumptions.

**OBSERVATION** is one of the most important methods of collecting information in the process of research in the field of education. Psychological and pedagogical observation consists in the direct perception of phenomena with the help of the senses or in their indirect perception through the description of others, directly observed by people.

**PROOF** is a method of research – a theoretical (logical) action, in the process of which the truth of any thought is justified with the help of other thoughts. Every proof consists of three parts: a thesis, arguments (arguments) and a demonstration. According to the method of conducting, proofs are direct and indirect, according to the form of inference – inductive and deductive.

**QUANTIFICATION** [*< lat. quantum – how much + fasere – to do*] – quantitative expression of qualitative features (e.g., score in points).

**QUESTIONING** is a method of collecting primary material in the form of a written survey of a large number of respondents in order to collect information using a questionnaire about the state of certain aspects of the educational process, attitudes to certain phenomena. The questionnaire can cover a wide range of people, which makes it possible to minimize atypical manifestations, while personal contact with the respondent is not required.

**RATING** is a method of evaluating certain aspects of activity by competent judges (experts).

**REGULARITY** is a stable, repetitive connection of phenomena, as a result of which the existence and functioning of phenomena is ensured.

**RELEVANCE** – the importance, significance of something (properties, phenomena, processes, etc.) for the present moment, modernity, materiality, topicality.

**RELIABILITY.** A sign of the reliability of a scientific theory means that in a scientific theory the truth of its main provisions is reliably established. In this respect, a scientific theory differs from a scientific hypothesis, where the truth is established with varying degrees of certainty.

**REPRESENTATIVENESS** [*<fr. representatif – representative; indicative*] in statistics, in experimental studies – the exponentiality of any observations; the correspondence of the characteristics obtained as a result of a partial (sample) examination of an object to the characteristics of this object as a whole, allowing to extend the conclusions of a partial survey to the entire object under study.

**SOCRATIC conversation** - using a system of specially selected questions, bringing students' incorrect answers to the point of absurdity in order to guide them to the right path of reasoning.

**STATISTICAL HYPOTHESIS** – a statement concerning the distribution of a population or the difference between two populations, based on data obtained from samples from these populations; exists in the form of a null hypothesis and an alternative hypothesis.

**SYNTHESIS** [*<Greek synthesis - connection, compilation, combination*] is a mental reunion, unification into a single whole of parts, properties, relationships, dissected through analysis. It is of great importance not only in obtaining new

facts, but also in formulating problems, constructing hypotheses, developing theories, it also consists in combining various theoretical statements, as a result of which an intersystem transfer of knowledge is carried out and new knowledge is born.

**SYSTEMATIC** (systematized, interval) selection - the method of systematic selection consists in the fact that a sample from the aggregate is made by selecting objects at a fixed interval, which can be used in the study of ordered objects (for example, a pack of notebooks with test papers), or rewritten objects (a list of student surnames).

**TEST** (from the English *test* - "test", "verification") — standardized, brief, time-limited tests designed to establish quantitative and qualitative individual differences.

**The APPROACH IN PEDAGOGICAL** research is the research strategy, the study of the process, the basic methodological orientation that determines the position of the teacher - researcher.

**The CITATION INDEX** is the number of links of an object that is part of a certain structure. In the scientific world, when the "object" is a scientist (or his scientific work – a book, article, etc.), the value of the citation index is determined by the number of references to the surname of the scientist /work in other sources from the relevant subject area and conditionally characterizes the "weight", "measure of significance" of this scientist / work.

**The DOCUMENTATION METHOD** is one of the methods of selecting experts. It assumes an assessment of the expert's quality based on such documentary data as the number of publications and references to the expert's work, academic degree, length of service, career success, position, etc.

**The DYNAMIC APPROACH** is an important provision of the methodology for analyzing the causes of academic failure. This is a phenomenon in which its typical causes are being considered not in this form frozen once and for all, but in motion, change under the influence of various factors and circumstances.

The final criterion for the reliability of a scientific theory is its implementation in practice.

**The GENETIC METHOD** is a method of research based on the analysis of the processes of the emergence, formation of the subject, the study of transitions from the lowest stages of development to the highest.

The goal is the anticipation in the mind of the result that actions are aimed at achieving. The purpose of the research is what needs to be achieved as a result of scientific work.

**THE HYPOTHESIS** [*< Greek. hypothesis – basis, assumption*] – a position put forward as a preliminary, conditional explanation of some phenomenon or group of phenomena; the assumption of the existence of some phenomenon. It is put forward on the basis of a certain knowledge about the studied range of phenomena and serves as a guiding idea guiding further observations and experiments.

**The METHOD OF ANALOGIES** is a method of scientific research based on the similarity of objects (phenomena, processes, etc.) in any properties - analogies. When inferring by analogy, the knowledge obtained from the consideration of an object ("model") is transferred to another, less studied (less accessible for research, less visual, etc.) in some sense, object.

The object of research is what the cognitive and other activities of the subject are aimed at. He opposes the cognizing subject in his cognitive activity. This is the part of practice or scientific theory that the researcher is dealing with. A novice researcher, when formulating an object, can easily go into the field of another science – psychology, sociology, economics, etc. The same object of science can be the subject of different studies. The object of pedagogical research is the field of purposeful educational process: the construction of the educational process, the interaction of the teacher and students, the assimilation of knowledge and methods of activity, the development of trainees.

**THE SUBJECT OF RESEARCH** is not just a side, a part of the object, but a side through which the object is visible. (The subject of a separate study includes only those elements, connections, relationships of the object that are to be studied in this work.). The structure of the subject of study includes the history of the development of the object and the teachings about it; the essential properties, qualities and laws of the development of the object; the logical apparatus and methods necessary for the formation of the subject. The same object can be the subject of different studies, different scientific directions. Such an object as the "educational process" is studied by didacts, methodologists, psychologists, physiologists, but they all have a different subject of research. The subject of the study often coincides with its topic, echoes it in wording.

**VALIDITY** [valid – suitable] is one of the main criteria for the quality of measurement, validity is understood as the exact correspondence of the content of the sample set by the control task (test) to the meaning and content of the detected feature.

**VERIFICATION** – verification, verifiability, method of confirmation, verification with the help of evidence, of any theoretical propositions, algorithms, programs and procedures by comparing them with experimental (reference or empirical) data, algorithms and programs.

When compiling the glossary, the publication was used: Novikov A.M., Novikov D.A. Methodology: dictionary of the system of basic concepts. – M.: Librocom, 2013. – 208 p.