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CONTENT, FACTORS AND PRINCIPLES OF PREPARING FUTURE TEACHERS FOR RESEARCH ACTIVITY

Lola Namazbayeva,
Doctoral student of the
Pedagogical Research Institute of Uzbekistan named after Qori Niyozi
Tashkent, Uzbekistan

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Abstract:

In this article the content, composition, factors and principles of the research activities of future educators are highlighted and the reaction to them is expressed. General and special research develops competences, organizes the student's joint research activity and causes the development of research activity.

Keywords: research activity, factors, principles, research competencies, interdisciplinary integration, motivational value, emotional-volitional, intellectual-cognitive criterion, diagnostic, prognostic, observation, praximeter, cognitive (cognition).

In recent years, higher education has grown changes are happening. This requires the professor-teacher to organize his pedagogical activity in keeping with the times. Despite the fact that scientists have comprehensively studied the problems of organizing students' educational activities, research activities in various categories (natural sciences, humanities, philology, technology) in higher education institutions, including preschool education students There are debates in the teaching of the subject "Introduction of children to nature", which is part of the sciences of the natural sciences. The goals, content and social effect of preparing future teachers for research activities are carried out in an integral relationship. It is desirable to create a comfortable environment aimed at the development of general and special research competences of students in the process of studying the subject "Introduction of children to nature".

Research competence is formed by organizing joint research activities of the teacher and student in the process of solving research issues. The problem-search direction is in the leading position in teaching, and during this period it is implemented on the basis of development of the student's personality, creative, research-cognitive activities, elements of creative thinking, assimilation of the system of value relations.

Research activities of future educators are carried out on the basis of stages (problem identification, goal setting, planning, implementation, reflection). When choosing a research topic, the features of the student's interest and motivational field are taken into account, and they are given the opportunity to make an independent choice. However, our observations suggest that the preparation of future teachers for research activities requires solving the following tasks in practice:

1. Organization of types of experimental work that directs students to study nature and its features .
2. Formation of research competence in students, development of the ability to work with scientific sources, giving priority to independent research.
3. Taking into account the great role of curiosity in the intellectual development of students, ensuring the variety and scientific orientation of research tools in the planning of activities organized in the pedagogical process.
4. Wide application of interdisciplinary integration in the organization of research activities.
5. Expanding the use of scientific resources and experimental tests as a factor influencing research activities.
6. To develop students' scientific worldview, to strengthen the transformation of verbal, demonstrative, practical methods in the formation of independent thinking, self-awareness skills, to introduce the requirement of pedagogical improvisation into the methodical activities of professors and teachers.
7. In practical training and pedagogical practice, " Children orientation to solving problems related to the science of " acquaintance with nature " .
8. Organization of scientific seminars and circles on the preparation of students for scientific research activities .

In this case, professors and teachers are required to take into account the following factors:

- taking into account the nature of the student's mental development ;
- providing students with necessary resources for research activities ;
- to create a highly conducive pedagogical environment for each student to successfully acquire knowledge;
- to understand the educational material and the experience of experimenting with nature ;
- ensuring the development of the student's special competence in research activities ;
- to give priority to the student's independent research activity in the educational process ;
- to provide a person-oriented approach in the organization of research activities [1.57].

In the process of higher education, the professor-teacher relies on general didactic and special principles in preparing future educators for research activities. These principles require the effective application of the educational content in practice and students' clear knowledge of nature (animate and inanimate nature, natural phenomena, laws of development, expression in natural-scientific and historical-geographical form, scientific concepts and imaginations). forms a lamina. As a result, the student's thinking activity is systematized and helps to form research competence, helps to develop observation skills, analysis, comparison and generalization, conclusion, understanding of causal relationships, discussion and diagnosis.

The result of future teachers' research activity depends on a number of factors, and in our study we determined the factors of students' research activity.

Future _ success factors in educators ' research activities

Subjective : _

- individual characteristics of students ;
- of students preparation level _

Objective : _

- r developer education _ environment ;
- research-knowledge activity ;
- of students research activities diagnosis and control to do
- media area;

In preparing students for research activities, teachers should follow the following principles:

1. Scientific.
2. Demonstration.
3. Systematicity and consistency.
4. Preparation of educational assignments based on the principle of simple to complex.
5. Awareness and activity.
6. Scientific basis.
7. Comparability.
8. Dimensionality.

During the research period, the principles of scientificity, demonstrability, systematicity, consistency, consciousness and activity, comparability were relied upon in the preparation of future teachers for research activities.

of science is that students are given new knowledge based on their existing knowledge of nature. The teacher interprets and analyzes the logic and historicity of the data along with scientific justification.

Demonstration , various district visual aids are effectively used in imparting knowledge. A student remembers 15-20% by hearing, and 80-85% by seeing.

of systematicity , students will be able to imagine and master the general laws and relationships of nature and natural phenomena , and solve various tasks. The educational situation and free conditions created for them serve for the effective passage of knowledge acquisition. In practical training, it is possible to determine the sequence and duration of activities of your choice to create a comfortable environment. Students play the role of researchers, become an active participant rather than a follower of the teacher's instructions.

It is given continuously on the principle **of consistency .** For example, as a result of theoretical and practical training, scientific club, independent study, laboratory work, the student understands the knowledge acquired today based on what was learned yesterday, strengthens it and prepares the ground for what will be learned tomorrow.

Consciousness and activity In order for students to be able to apply the knowledge they acquire in life, the teaching process is focused on active thinking, they are guided to consciously and actively participate in the lesson.

Comparability is a comparative analysis of new and previously acquired knowledge. Shows ways to apply new information in future pedagogical activities.

of dimensionality means that learning materials should be appropriate to students' potential and mastery level. It is a pedagogical requirement to conduct lessons in research and project methods. Research ensures that students implement a "subject-to-subject", "feedback" and "self-evaluation" relationship. Innovative projects are used to organize students' logical thinking, creative and research activities. Subjects of experience related to nature are conducted at their discretion.

When working with students working on research in the educational process, the teacher acts as an equal partner. The teacher and the student should work on the basis of a common goal, because they exchange knowledge and experience. It is important that the teacher encourages the student to be active. The teacher is a source of information for students, he gives the necessary instructions and advice[6.78].

Research activities include motivational value, emotional-volitional, intellectual-cognitive, practical criteria as part of preparation. We highlight the following components:

Motivational value

Motivation for learning and cognitive activity, interest in nature; having a desire for innovation in the field of natural sciences, having independence in the process of making decisions and evaluating them.

Emotional and volitional

Emotional (positive) attitude in education and research activity (existence of creative impulse); the ability to overcome cognitive difficulties.

Intellectual-cognitive

Level of intelligence; cognitive reflexive ability, experimental thinking; cognitive reflection; the ability to distinguish evidence from non-evidence; the ability to classify evidence; the ability to compare and contrast opposing arguments; the ability to be creative.

Practical

The ability to cross-post problem and search questions and problem tasks; the ability to advance hypotheses; the goal; determine the topic; the ability to sequence the resource; have the skills to conduct experiments; to have ways of acting in non-standard situations; the ability to search for knowledge; the ability to describe the progress and results of the work; the ability to classify evidence; the ability to explain, prove, defend one's ideas [8. 145].

The readiness of a student of preschool education for research in the subject "Introducing children to nature" consists of several components. The preparation structure that we propose assumes the preparation of students for research activity and the interdependence of the component and component criteria indicators.

The general preparation of future educators for research activity is determined by low, medium, and high levels. The content of each level was developed by us in the empirical part of the study. Thus, the organizational-pedagogical conditions for preparing higher education students for research activities in the process of studying natural sciences, which we have identified, allow us to embark on an empirical study of solving research problems.

Practical and independent research activities of future educators are organized on the basis of the following topics:

- Experimental determination of water properties.
- Experimental study of paper properties.
- Determining the weight of invisible air based on experimental experience.
- Conducting experiments with natural colored paints.
- Carrying out experimental experiments using natural materials.
- Experimental study of properties of sand and clay.
– Measurement of the volume of spreadable substances.
- Experimenting with vegetables and fruits using dyes.

The teacher should encourage the students engaged in research and create a pedagogically favorable environment for its successful implementation. Only then, a high level of readiness for research activities will be realized.

When planning the research work, an individual plan is drawn up for each student. This stage of the work is carried out under the guidance of the teacher. In addition, it is necessary to organize independent work of students with literature, Internet resources (working on the theoretical part) on the research topic. The teacher gives methodical instruction to the students in covering the introductory and theoretical part of their research. Each student is advised to keep a research diary, its importance and structure are explained.

Experimental studies are conducted only under the guidance of the teacher according to the individual work plan for each student.

The teacher gives recommendations on conducting research, teaches each student to make an individual plan. Special counseling is organized for each student 2-3 times a week. A total of 3-4 hours are allocated for counseling one student. Under the guidance of the teacher, statistical processing of research results is carried out, analysis and registration of its results is carried out, conclusions and recommendations for work are developed. The teacher's methodological support allows students to develop research skills and abilities in activities outside the classroom. This guarantees the successful completion of research activities of students in the science of introduction to nature [5. 77].

In addition, educational and methodological support of the research activity of the students of the higher educational institution is also required. They include a number of methods:

- diagnostic (questionnaire , test, conversation, interviews);
- prognostic (distribution, self- assessment, expert assessment);
- observability (direct and indirect observation, self-observation);
- praximetric (analysis of activity products);
- methods of statistical processing of results.

Methods such as artificial modeling and role-playing games are used for diagnostic purposes.

The selection of diagnostic methods or the development of authoring methods was carried out in three main groups that were appropriate:

1. Determining the degree of formation of the components of readiness for research activities.
2. To determine the general level of development of research skills and qualifications.
3. Future _ to determine the favorable (optimal) didactic conditions that encourage the development of research skills and qualifications in educators .

We came to the conclusion that it is important to observe and diagnose the following when choosing an effective method in experimental work:

- increasing the level of cognitive activity and independence of students;
- formation of readiness for research activity;
- to direct the student's desire to develop his abilities to the maximum and to use them effectively in research activities;
- increase the level of knowledge;

• ensuring social- psychological flexibility, self-development and manifestation of the student.

An individual approach plays an important role in the development of skills and competencies of organizing research activities in future teachers.

Advantages and disadvantages of individual studies of students are as follows:

Advantage :

- the student will gain experience in all phases of research;
- personal initiative, responsibility , determination , activity develop;
- the research topic increases the student's intellectual potential to the maximum extent;
- the student will have experience in all stages of research ;
- the student develops a scientific outlook and thinking;
- the ability to conduct scientific research is formed;
- can identify problems related to familiarization with environment;
- analyzes and evaluates oneself ;

Disadvantages:

- the experience of intergroup cooperation is not formed;
- b there is no opportunity to study the experience of others and see effective work strategies;
- t requires hard work and responsibility at all stages of research ;
- the opportunity to exchange experience is not created;
- students cannot set a common goal;
- will need the teacher's support;
- only a one-sided approach is possible in the search for a solution to the problem;
- there will be no possibility of evaluation by others [3. 131].

Research activity helped to develop the following qualities in students: offering different ways of identifying and solving problems, motivation for creativity, ability to think outside the box, ability to cooperate, ability to make reasonable criticism and intelligently defend one's point of view, etc.

During the research period, we selected the criteria for evaluating the research activities of future educators (Table 1).

1- Table

Future _ evaluation indicators of educators ' research works

Stages of research work	**Level-matching requirements**	**Research features**
Preparation stage	Dolzarbligi	Updating the topic and current research work to eliminate existing conflicts on this topic
Work planning	Notification	Sufficient use of available resources on the subject (at least 10–15) and mastery of resources
Research activity	Scientific	The ability to work on the topic and the studied issues with the sources studied and presented in the research work, as well as with similarities in this scientific field.
	Independence	Independent implementation of all stages of educational research by themselves, directing the actions of students without the direct participation of the teacher
Results or conclusions	Importance	Identifying and applying the generalized method of action in solving specific practical tasks within the scope of students' research work
	Systematic	The level of theoretical understanding of the research work by the author and the presence in it of connections that form a system specific to this subject area
	Structure	Covering the introduction and main parts of the study

These indicators make it possible to clearly determine the diversity of students' opinions, to develop a uniform level of requirements for evaluating research works.

Research activities play an important role in the need to create theoretical and methodological bases of research activity of students of preschool education, modernization of education, as well as internalization of knowledge acquired by them, socialization and formation of personal qualities. The research activity of future educators is carried out during

the teaching of the subject "Introduction of children to nature". The content of the subject is to teach the factors and ecological processes that affect natural phenomena, environment, human, animate and inanimate nature, animal and plant life. As a result of this, many aspects of the student's intellectual development and worldview are formed. In the teaching of this subject, close interdisciplinary connections are made, which allows students to organize research activities in natural sciences. The research activity of students has certain specific characteristics. At the same time, "Introducing children to nature" subject content allows creating conditions for the formation of creative activity skills (research and project studies), raising the level of general culture of students, sufficiently scientific perception of the world, humanistic and ecological direction of the individual. formation, the impact of natural sciences on the environment, economic, technological, social and ethical spheres of human activity, allows students to integrate into modern society, participate in solving scientific problems in the process of research activities, and apply knowledge not only in ordinary, but also in non-standard situations , students develop self and motivation.

the requirements of the state educational standard, the study of the subject "Introduction of children to nature" includes the following.

- forming the foundations of the whole scientific landscape of the world;
- development of understanding of the interdependence of natural sciences , their impact on the environment, technological, economic, moral and social spheres of human activity;
- creating conditions for encouraging students to self-develop and self-educate in order to form educational activities, design and research activities, creative activity skills ;
- development of skills to generalize scientific data , evaluate and analyze the results obtained during experimental work , and check their reliability;
- formation of safe labor skills in the use of laboratory equipment during laboratory experiments, work, research and experimental activities.

As a result of mastering the subjects of "Introduction of children to nature", students of the preschool education direction will acquire fundamental concepts, theories, laws and regulations; terminological signs; basic methods of scientific knowledge in natural science (observation, description, measurement, experiment); processing, analysis, summarization and conclusion of the results of experiments; the student will have the ability to use cognitive methods in solving practical problems. Cognitive means knowledge, research and project activity skills, problem solving methods, using knowledge in different forms, independently searches for ways to solve practice-oriented issues. The interrelationship of natural sciences understands the impact of natural sciences on the environment, habitat, and various areas of human activity. During the introduction to nature, students learn about the role of nature in the modern scientific landscape of the world, biological concepts, animate and inanimate nature, ideas about stages and evolution in the organization of mother nature, biological terminology and symbols, general laws of nature, laws, theories, living water get acquainted with the methods of scientific knowledge that can be used in the biological research of objects and ecosystems. In the main place is observation, description, measurement, experimentation, identification and assessment of anthropogenic changes in nature, interpretation of the results of biological experiments and experiments, information from various sources about various environmental problems and their solution options. will have their own opinion about it. Research and analysis of natural phenomena, foresee the consequences of the most important researches of biology, understand the origin of the origin of life, global changes taking place in the world (biosphere).

Based on the above considerations, it can be concluded that the science "Introducing children to nature", which is part of the natural sciences, opens wide opportunities and perspectives for students to independently perform experiments, describe them, and organize research activities.

Our observations of the situation in practice showed that the problem of preparing students for research activities is a targeted, planned, systematic activity, the content of this process should be scientifically based, and it is necessary to define new organizational forms of interaction between the student-researcher and "young researchers". . When teaching the subject "Introduction to nature for children", it is necessary to explain the characteristics of students' research activities, first of all, it is necessary to emphasize the content, personal importance and practical orientation of these subjects for students . In particular, the opportunity to study the natural processes that affect a person and his life, the basics of a healthy lifestyle, environmental problems, etc. By mastering the science, students will gain knowledge about simple experiments and their transfer, basic scientific knowledge methods (observation, description, measurement, experience, experiment) used in the teaching of science. Mastering each of these ways of knowing is carried out in parallel with the interrelationship of scientific concepts of natural science. Working with scientific concepts allows the student to use theoretical and scientific sources and to understand them more deeply, to analyze and explain observed phenomena and evidence.

Another feature of the organization of research activities in the field of "Introduction of children to nature" is the opportunity to form a holistic scientific view of the world, a system of general scientific knowledge about nature, the diversity and unity of objects and natural phenomena. Students learn the elements of nanotechnology by carrying out research activities. As a result, the formation of the scientific outlook of a modern pedagogue is achieved.

Research activity is an interdisciplinary process and is called "integrated-complex". An example of this is the subject of "Introduction of children to nature": "Formation of children's ideas about ecological connections in nature, the earth and the sun". Here, the contents of scientific subjects such as biology, ecology, chemistry, physics intersect.

The following topics are offered for research activity to future educators in the field of "Introducing children to nature":

1. The technology of biologically explaining to children the interdependence of plants and animals in nature.
2. Creating a program for introducing children to nature based on the principle of changing seasons.
3. Practical method of introduction to nature and types of games related to natural science.
4. Simple experiments and experiments, their content and formation of research skills in children.
5. Walks to introduce children to the nature of the country and the methodology of their organization.

Research activity in natural sciences is also compatible with the ecological direction. Students are instructed to theoretically study and deal with locally relevant environmental linkages, situations, and global environmental problems.

In research activities, students examine the properties of various substances, acquire the skills of predicting, analyzing, and evaluating environmental consequences related to natural science. In the process of research activities, students are taught to discuss problems related to the study of the impact of environmental factors (natural and social) on human, plant and animal organisms and to search for ways to solve them, to strengthen children's health. recommendations are offered. Lessons help increase students' interest in science. This ensures their constant intellectual activity, develops creative independence and encourages interaction between the student and the teacher, which helps to evaluate the characteristics of knowledge acquisition, develops personal qualities of students, and research skills.

An important feature of the research activity in the subject "Introduction of children to nature" is that it is carried out by high-level students of a higher educational institution. The higher level is the most effective and convenient for scientific research activities in the natural sciences. During this period, the student has the opportunity to choose a scientific direction in the future. It is during this period that the character of the student, who is able to consciously find his way to research activities, reaches a high level and can apply them in practice without hesitation. One of the most important signs of the presence of a scientific worldview in students is the unity and integrity of the perception of reality. At this stage, the development of the student's cognitive-cognitive processes reaches the highest level, which allows him to be ready to use all types of mental activity in practice, even if it is very complex. Cognitive processes such as memory, speech, thinking, perception, attention, and imagination improve in students. Students can think logically, discuss theoretically, conduct independent analysis, work with hypotheses, draw general and personal conclusions. Students learn biological, physical, and chemical concepts and can use them more broadly to solve research problems. A characteristic feature of this period is the growth and expansion of consciousness and self-awareness, observation of new types of activity, content, goals and tasks, deepening of knowledge about people and the world around them. Students develop self-control, which is manifested in the ability to control each behavior, but most students do not have enough planning skills. Intellectual activity of students, creative independence develops and helps to implement feedback between the teacher, which allows to evaluate learning characteristics, and skills develop personal qualities of students[2.70].

Various teaching technologies are used for effective research activities of future educators: developmental, problem-based, block-module, game, teaching to develop critical thinking, research-project. The introduction of a research approach to the teaching of "Introducing children to nature" helped to increase student motivation. Research involves the use of innovative technologies and interactive methods of teaching in natural sciences. Thus, problem lectures in class; working in a project group (on a project); laboratory (experiments and experiments) and practical training; role-playing games; classes-seminars; colloquium classes; conference classes were held.

Extracurricular activities include work on a specific research topic, participation in science olympiads, work within the scope of science, essay and article competitions, republican, city-regional level olympiads, and, of course, scientific and practical conferences at higher educational institutions.

Another important feature of the research activity "Introducing children to nature" in the system of natural sciences is the formation of practical skills, the promotion of the hypothesis of natural science and its experimental verification, self-planning and the technique of conducting experiments in compliance with safety rules. consists of mastering.

In the course of research activity in the field of "Introduction of children to nature", scientific information is summarized, the results obtained during the experiment-trial work are evaluated, analyzed, and the skills of checking their reliability are formed.

Another distinctive feature of research activities in the natural sciences is the need to observe safety measures, that is, the formation of safe work skills during research activities (laboratory experiments and experiments, work, compliance with safety rules when working with chemicals, and others).

The structure of research activities of learners consists of the following components: goal, cause, element, actions, product, result.

However, the components of educational and research activities have a science content and are different from other types of activities.

The purpose of research activities is to direct students to scientific and creative research based on new knowledge. The process of their interaction with the surrounding world is actively and consciously regulated. Satisfying basic needs is at the heart of human life. Research activities help to satisfy the knowledge needs of a person, such as knowing himself and the world around him. However, the need cannot determine the exact direction of activity. It gets its accuracy only in the subject of activity. This object becomes the motive of activity and stimulates it. Learners cannot be forced to engage in any kind of research, but can be encouraged by creating certain conditions for their creative activity, we developed the structure of research activities of future teachers (Fig. 1).

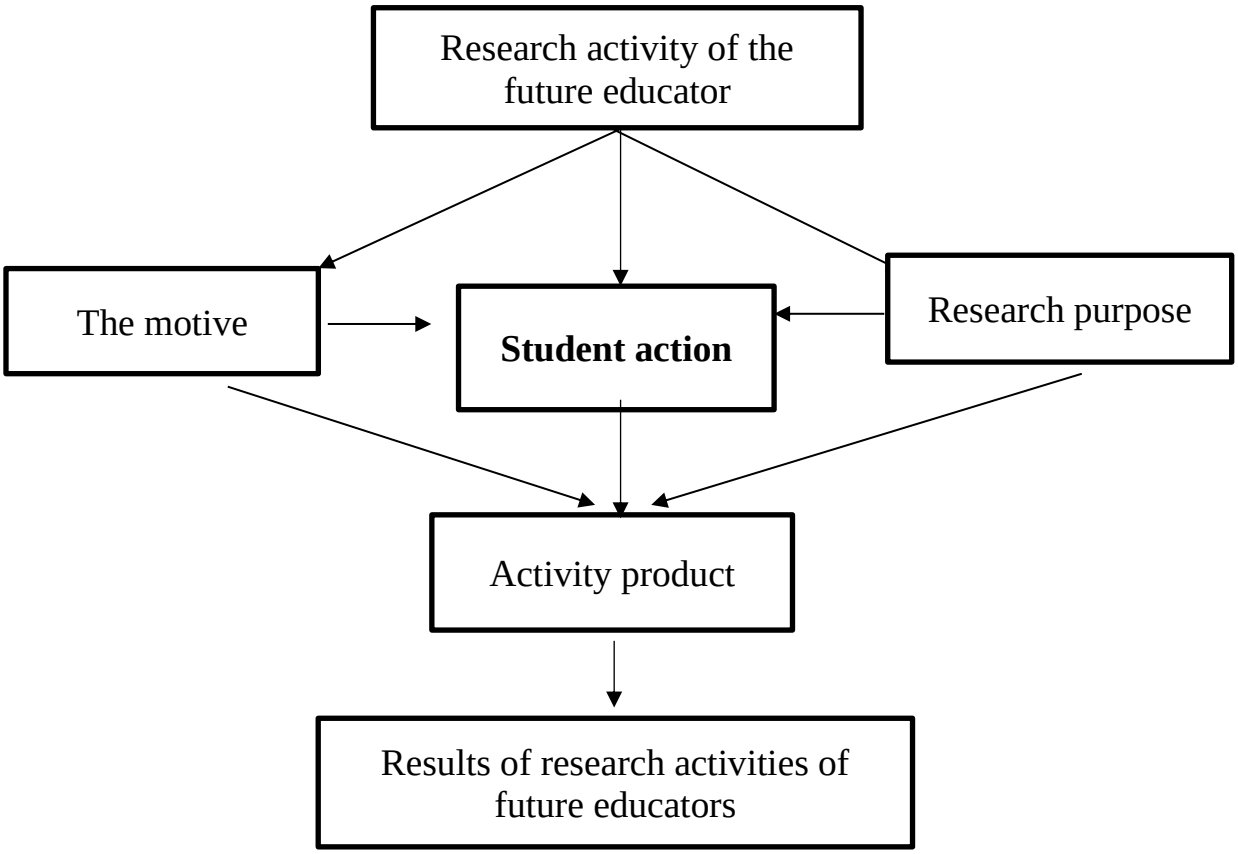

Figure 1. Structure of students' research activity

The development of cognitive processes in students reaches the highest level, which allows them to be almost ready to perform all types of mental work, even complex ones. Cognitive processes such as memory, speech, thinking, perception, attention , and imagination are improved. Students can think logically, think theoretically, introspect, work with hypotheses, draw general conclusions and specific conclusions.

Future educators learn many scientific concepts and can use them to solve research problems. A distinctive feature of the student age is the growth of consciousness and self-awareness, the expansion of the circle of consciousness, the deepening of knowledge about oneself, people and the surrounding world. Students develop self-control, showing the ability to control any step, but many are unable to plan their own activities. All this is to a certain extent guided by the teacher in research activities.

In the process of teaching the subject "Introducing children to nature", they should be taught to ask problematic questions, find solutions to them, analyze the obtained results, draw conclusions and generalize. The quality of the educational process depends on the integration of natural sciences. research activities help to increase students' motivation.

Students try to plan their future life through class activities. Along with cognitive motivations of personal value, social motivations appear. Among the motives of student activity, the most important is the desire for success, the achievement motive, which is manifested in achieving the set goal. Systematic organization of research activity, implementation of individual experience, learning of new information on natural sciences are the main educational activities of students.

higher education, educational activities that include analytical and research elements allow training of professional specialists. The skillful organization of the educational process affects the formation of the student as a subject of further pedagogical activity, and his becoming a mature specialist of his profession in the future. This is largely based on properly organized research activities, and students acquire new knowledge.

It is known that knowledge has an important functional characteristic, which is always a means of solving some problem situation. Dj. As Dewey noted, "the problem determines the purpose of thought, and the purpose directs the process of thinking" [4. 75].

It has been shown that the development of critical thinking, problem-based education, nanotechnology, and the use of project technology, which ensure the improvement of general and special research competencies, are appropriate in preparing future educators for research activities. Students consciously replace everyday concepts of life with scientific understanding. They can combine in their thinking the knowledge gained in the study of related sciences that are part of the system of natural sciences, make theoretical conclusions, establish connections and relationships, and give a more complete definition of the knowledge gained.

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