

## PROBLEMS AND SOLUTIONS OF ORGANIZING STUDENTS' SCIENTIFIC RESEARCH WORKS

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**Abstract.** *In this article, it is considered to conduct practical training in physics for students of technical education enriched with elements of scientific research and based on new scientific achievements. The contents, types of scientific research works of students and tasks necessary for their successful implementation are presented.*

**Keywords:** *scientific researches, modern higher education, thinking, creativity, research, individuality, lesson efficiency.*

**Introduction.** Today, one of the important tasks of the education system is to provide independent thinkers and highly qualified specialists in their professional career. For this, every training conducted in a higher educational institution should be based on a scientific approach. In order to achieve this goal, it is necessary to carry out every training session enriched with elements of scientific research.

The scientific research process of students is an activity that forms students' ability of thinking, creativity, research, and individuality, and fully expresses the readiness of a person for self-realization. This activity develops the ability of students to analyze the scientific problem, to describe it in their own comprehension, to analyze the possible result in advance, and to ask questions.

In modern higher education, the educational process of physics is organized in the form of lectures, practical and laboratory exercises. Practical training is a necessary component of educational programs in all directions. The correct organization of practical training, the correct use of the necessary educational and methodological manuals leads to an increase in the effectiveness of classes [3-6].

Scientific research works include creative processes in students' educational activities. The pedagogical significance of students' research work depends on its organization.

For the successful implementation of scientific research, students need the following:

- a comprehensive approach to the planning and organization of students' scientific work;
- unification of all kinds of scientific works of students;
- ensuring control over the quality of students' scientific works.

Depending on the content and method of implementation, students' research activities are divided into the following three types.

Research activity included in the educational process integrated into the educational process of students. The main task of carrying out scientific research activities included in the educational process of students is to consistently activate their study process according to the principle "the higher the preparation is, the more effective the scientific work will be."

Such work is carried out in accordance with the curriculum and programs of academic subjects. In the course of classroom and independent training in subjects, students learn the analytical, production, search and synthesis elements of scientific work. This type of research

activity of students includes independent performance of classroom and homework tasks (abstracts, analytical works, translations of articles, etc.), preparation of educational and production reports with elements of scientific research under the methodical guidance of professors and teachers. The results of all kinds of research activities of the students included in the educational process are monitored and evaluated by the professor.

Conducting scientific research activities of students in parallel with the educational process. The main task of students' participation in scientific research conducted in parallel with the educational process is to develop their ability to think scientifically. The main form of this type of scientific-research activity of students is participation in budget and commercial scientific research included in the university's scientific plans. This type of research activity allows students to master the methods and specific features of scientific research and to acquire the skills of working in scientific teams [1-2].

Project technology is another type of scientific research work of students. Its perspective is that the project assignment directly connects the process of mastering knowledge in a certain subject with the real use of the acquired knowledge. The obtained result can be seen, thought and applied in real practice. To achieve such results, it is necessary to train students to think independently, to find and solve problems, to be able to see the results, and to teach them how to find solutions. The professor-teacher has a great role in project technology.

The stages of project work are presented in the following form:

- search for and identify the topic (designation of project problems, goals, tasks, determination of the final product);
- finding information collection methods and means of obtaining (diagrams, tables, questionnaires are drawn up);
- systematization and analysis of received data;
- assessment of project results, preparation of reasonable conclusions, preparation of results, presentation of them.

A list of necessary literature and journal articles are attached to each topic. From the proposed list, the student can choose a topic based on his interests and needs or create it independently.

When a student is inspired by a scientific idea or is interested in philosophical questions that arise in acquiring knowledge, he deeply feels the need for science. The important results of strengthening theoretical knowledge in the form of practical training are that the student performs a certain part of this scientific work with his own hands, develops working skills and appreciates the work of scientists working in this environment. Examples of such works are given below [7]. In teaching the topic "Magnetic interactions", the student should know the magnetic field, Ampere's law, be able to determine the magnetic field induction of a permanent magnet using Ampere's law, and be able to derive the Bio-Savar-Laplace law for different currents. On the basis of this topic, it is possible to organize scientific research on the topic of magnetic field induction, Bio-Savar-Laplace law. The teacher explains to the students that the Bio-Savar-Laplace law should be used to calculate the magnetic field for different currents. Students should find evidence from relevant literature to derive the formula for calculating the magnetic field for these various currents and name any experiments. Then the students are divided into 4 small groups, they will do experiments for direct current, alternating current, solenoid and thyroid. They calculate the magnetic field induction for different currents and draw a general conclusion [8].

Conducting practical training enriched with elements of scientific research is more beneficial than simple practical training. But scientific research should be done in the last part of the course. Because at the beginning of the course, students should learn to determine the goals of practical training, making reports, working with tools, mastering research methods, making accurate measurements and identifying their errors and drawing conclusions. Such tasks are not a global problem like the formation of knowledge and skills discussed earlier in this article, but they are necessary for solving them, successfully completing the course and mastering special subjects at the university.

Like any research paper, an essay should have a clear logic and structure:

- interpret the introduction containing the problem in relation to some analyzing thesis;
- the main part – justification of the formulated thesis;
- the final part - conclusions based on the analysis.

The work text must contain references to the used literature.

The project method is based on the development of cognitive skills, the development of critical and creative thinking of students based on the ability to build their own knowledge and act in the information space. The project method focuses on the results that can be obtained by solving one or another practical and theoretically important problem.

The use of a creative essay in the educational process helps to think deeply about the educational material, to analyze the theoretical knowledge acquired by future professionals, to develop the ability of students to research and to conduct independent scientific research [9-12].

Making a speech is one of the ways to stimulate the student's initiative to learn new things. If a student is interested in a current issue that has not been discussed in the lectures and seminars on the studied topic, he can prepare a lecture and give a lecture. The preparation of the document is carried out independently, but its protection must be of a public nature, and most importantly, it will be necessary to prepare the best documents for public presentation. The more carefully the professor-teacher prepares the topics of the lectures offered to the students, monitors and analyzes the work done, the more interesting and even unique the professor-students will be, as a result of which the students' achievement in independent research will be at a high level [1-2].

It is important for students to organize documents using multimedia technology because:

- helps to actively perceive the lecture, to activate the learning process by increasing attention, taking into account its design and clarity;
- increases skills and interest in research;
- introduces students to various possibilities of using a computer;
- serves as a basis for the student's current attestation.

When using this form of scientific work, the teacher determines the structure of the lecture and recommends literature. Gives special recommendations on the approach to the presentation of the material on slides, considers various options for the solution, and determines the result. When preparing a paper, a student learns more material than a typical answer, and the learning process becomes interesting and effective.

Summary. It is important to prepare a presentation with audiovisual observation, which develops not only speaking skills, but also the ability to logically structure the speech, choose the right strategy and communicate with the audience. Thus, the above-mentioned forms of scientific research activities create a wide opportunity for students to develop research activities.

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