

METHODOLOGY FOR DEVELOPING RESEARCH SKILLS OF SCHOOL STUDENTS IN THE PROCESS OF CONDUCTING PHYSICS LABORATORY CLASSES

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<https://doi.org/10.5281/zenodo.12598426>

Abstract. *Currently, due to the achievements in the field of physical science, new laws and their application in practice, it occupies an important place in the development of industry and technology. The achievements of physics are widely used not only in industry and technical fields, but also in energy, medicine, material science and our daily life. This, in turn, creates the need to train experts in various fields who have perfectly mastered the laws of physics and their fields of application. On the other hand, taking into account the formation of the skills and qualifications of future specialists for all fields in general secondary schools, it seems that it is at this stage that serious attention should be paid to the teaching of physics. This situation, in turn, places a great responsibility on pedagogical higher education institutions that train future physics teachers. This article analyzes the nature and structure of physical experiments, processing results in physical experiments and the importance of developing research skills in students in laboratory classes in physics.*

Keywords: *creative research, in-depth training, psychological, psychophysiological, physical and scientific-theoretical and practical training.*

It is known from history that man changes the world on the basis of his creative research, and manifests himself as a creator, discoverer, that is, man sets and solves various problems, their own solutions. Sometimes unique approaches and methods are used for such solutions. In the same sense, a creative person means a high ability, based on life experience, a deep understanding, a commonality of truth, justice and honesty, a state of intellectual and moral perfection, a new perspective on any thing and phenomenon, is understandable.

In the Address of the President of the Republic of Uzbekistan Sh.M. Mirziyoyev to the Oliy Majlis on December 22, 2017: "... it should be said that, unfortunately, we did not pay enough attention to the issue of educating mature people who will be worthy successors of our great grandfathers. However, we do not have the right to forget that the intellectual and cultural potential is a unique wealth, and that it is of crucial importance to educate and bring to maturity the owners of rare talents. It is the fact that developed countries have reached today's high level of development precisely because of this - this is also true" [1].

It is one of the most important tasks to provide education and training to students in the process of education in general education schools based on the requirements of the time, and to educate them as leading experts, professionals, scientists, researchers, and researchers. In this sense, it is important to prepare specialists of this category for research activities. Research activity is one of the main issues in the professional activity of a pedagogue, and in this process, it is possible to implement educational work on a new basis. According to pedagogical scientists,

research activity is a set of desires of a person to use his spiritual and mental powers, strive for a specific goal, and solve a problem with determination.

Professional training is the process of psychological, psychophysiological, physical and scientific-theoretical and practical training of a future specialist.

Article 36 of the Law "On Education" states that experimental and innovative activities in the field of education are carried out for the purpose of modernization of education and development of new educational technologies and resources, their testing and training. The task of focusing on the implementation of the learning process is defined [2].

At the same time, in the decision of the President of the Republic of Uzbekistan "On measures to further develop the activities of secondary vocational education institutions":

- selection of the most talented students of general education schools, further development of their intellectual abilities and purposeful in-depth training to continue their studies at HEIs;

- to create an educational environment that supports the manifestation and activation of students' creative potential, forms and develops independent activity skills in the process of acquiring knowledge, taking into account individual talents and the abilities and characteristics of each student, and others are defined [3].

Laboratory work is an exercise related to the use of mental and physical efforts to find previously unknown ways and means of solving scientific and everyday problems.

It is possible to form and develop the research abilities of schoolchildren by performing laboratory activities. Many modern researchers believe that it is necessary to develop not only experimental skills and competencies, but also the process of activating the research potential of students with the help of laboratory training. In the research works of many scientists, the role of educational tools to increase the experimental knowledge of students in laboratory classes, the need for a competence approach in organizing classes, and the practical application of theoretical knowledge acquired in physics teaching are devoted to increasing the skills and qualifications. Scientific solutions to the problems are described.

According to S. Arkhangelsky, the main task of laboratory training is to establish the relationship between theory and practice based on experimental research in specially equipped rooms - laboratories [4; p. 200].

Students can express the results of their research not only in writing, but also through drawings, tables, and scales. This, in turn, serves to form the elements of research skills and qualifications of schoolchildren in laboratory sessions.

Taking into account modern principles, special attention is paid to the organization of systematic work on improving the conduct of laboratory work in the continuous education system. To carry out laboratory work, first of all, laboratory equipment is necessary. With the help of these tools, an experience related to a specific topic is set. The correctness of the experimental result depends on the accuracy of the instruments, the working skills and qualifications of the experimenter, the order of laboratory work, as well as other parameters [5; p. 15].

The following appendix analyzes the importance of laboratory work in the formation of research skills and qualifications of schoolchildren and their use in the professional activities of representatives of various fields.

It is a great responsibility of the physics teacher to provide information about the relevance of the laboratory activities to the sciences and their use in professional activities in each laboratory session.

It is worth noting that integration is the teaching of various subjects used in interdisciplinarity by moving from the mutually agreed teaching to the level of their strong interaction. Exposure to subjects is carried out at different stages in education. Such connection is covered to a certain extent in methodical literature, and in its first stage, concepts, ideas and images related to other disciplines are involved in the lessons of certain subjects. In other words, the knowledge of other disciplines is effectively used at the core of a certain science [6; p. 49]. Basically, a physics teacher should be puzzled over problems such as "Chemistry in physics classes", "Biology in physics classes", "Mathematics in physics classes" and so on.

App

Using research skills and competencies in professional activities during the performance of laboratory work in physics in general secondary schools

Topics of laboratory work	Use of research skills and qualifications in professional activity
Determination of densities of bodies of different shapes	It is used in professional activities of the mining industry and geology
Determination of spring integrity	It is used in professional activities in the field of metallurgy
Determination of sliding friction coefficient	It is used in professional activities in the field of road construction
Determination of the useful work coefficient of the inclined plane	
Measurement of current and voltage in an electric circuit	It is used in professional activities in the field of electric energy
Studying Ohm's law	
Study of series and parallel connection of conductors	
Determining the power of the consumer (bulb).	
Learn how to assemble the simplest electromagnet and how it works	
Determination of EIKI and internal resistance of the current source	It is used professionally in the field of power plants
Studying the volt-ampere characteristic of a semiconductor diode	It is used in professional activity in the field of electric energy, multimedia technologies
Study of the phenomenon of resonance in an alternating current circuit	It is used professionally in the field of power plants
Determination of specific heat capacity of solid bodies	It is used in professional activities of the mining industry and geology

Determination of the surface tension coefficient of the liquid	It is used in professional activities in the field of chemical industry
Determination of relative air humidity	It is used in professional activity in the field of hydrometeorology
Determining the refractive index of glass	It is used in professional activities in the field of production, glass-glass industry
Determination of optical power of lenses	It is used in professional practice in the field of ophthalmology
Determining the wavelength of light using a diffraction grating	It is used in professional activities in the field of multimedia technologies

In conclusion, it is worth saying that research, as a unique form of human activity, shows the signs of innovation, social significance and progress. These signs are often ignored or unrecognized. But the research activity, in terms of its nature, contributes to the development of man and society, and reveals a new meaning and essence of the world. In this sense, research work is manifested in human activity and affects the development of society and individual by solving problem situations.

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