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Organizing the Teaching of Physics on the Basis of Educational Principles

Odilbay Khimmatkulov
Tashkent State Technical University

Abstract: This article is devoted to the application of the principles of scientificity, interdependence of theory and practice, coherence and regularity, demonstration, student activity and independence in the process of higher physics education. As a result of the application of these educational principles in the teaching of physics, the possibilities of ensuring the perfect and integrated knowledge of students and increasing the effectiveness of education were discussed.

Keywords: principles of education, elements of scientific research, virtual laboratory, systematic analysis, problem lecture, independent education, synergistic approach.

INTRODUCTION

Ignoring the principles of education in the educational process, not knowing them or misunderstanding them, not following their requirements does not allow to ensure the scientificity of the educational process and increase its efficiency. Adherence to educational principles is an important condition for the effectiveness of the educational process and is an indicator of the teacher's pedagogical culture. The system of educational principles is the educational process represents the laws and is determined by the goals of education. Accordingly, the principles of education are the main basis for the correct theoretical and practical solution of the most important issues of the educational process. It is important to consider the principles of education in the teaching of physics in educational institutions.

MAIN PART. It is known that physics serves as a fundamental basis for many natural and engineering sciences, which plays an important role in the development of these sciences and in creating a scientific picture of the universe.

The scientific principle of education requires that the fundamental character and characteristics of physics be preserved in educational processes. Unreasonable, excessive shortening and simplification of lesson hours undermines the content of education, its fundamental basis. Students receive new knowledge in physics, information about new scientific research being conducted in lectures. Based on the scientific principle of education, students should be presented with scientifically based, experimentally confirmed information, and at the same time, the newest achievements of science should be reflected in the content of higher physics education.

The pedagogue is always aware of the news of science from the staff, and it is consistent with the requirements of the scientific principle of education to introduce students to this new knowledge during classes.

In recent decades, great progress has been made in modern physics in open systems physics, nanotechnology, condensed matter physics, nonlinear optics, high-energy nuclear physics, quantum physics, and other fields of physics.

One of the requirements of the scientific principle is to train students to engage in scientific research, to introduce them to scientific research methods, to work independently with literature, to analyze the results of research and draw conclusions. This, in turn, helps the development of students' creativity. Pedagogical observations of recent years show that students lack knowledge and skills in scientific research during the completion and defense of a qualified graduation thesis. In our opinion, it is necessary to pay more attention to the development of knowledge and skills of students during laboratory training. That is, in order to introduce elements of scientific research into the process of performing laboratory work, it is necessary to organize the lessons in a problematic manner. In many cases, if the technical capabilities of laboratory work are limited or non-existent, it is possible to use information technology tools, for example, virtual laboratory methods, where laboratory work is modeled. As a result of such an approach to the educational process carried out in laboratory conditions, students strengthen the acquired theoretical knowledge, in addition to in-depth study of the essence of the laws and quantities of physical phenomena being studied, they develop knowledge and skills in creative scientific research, and creative activity increases. Perfection of knowledge in the field of physics requires organization of education based on the principle of coherence and regularity. It is important to achieve a logical sequence and systematization of the knowledge to be given. In the study of all branches of science, dividing topics into a logical sequence, determining the interrelationship and coherence between physical phenomena and laws, drawing general conclusions with the help of systematic analysis, helps to make the acquired knowledge comprehensive and comprehensive.

The rapid development of techniques and technologies in recent years requires specialists to have deep theoretical knowledge and be able to apply them in practice. Application of the demonstration principle of education helps a lot in perfecting theoretical knowledge.

Relying on the principle of interdependence of theory and practice in modern physics education is of great importance in forming students' skills in practical application of theoretical knowledge. A creative approach to practice and laboratory training, the use of computers and other technical tools, and the use of advanced innovative and information technologies will give positive results.

The principle of student activity is one of the important factors of increasing the effectiveness of training in physics. Traditional training in natural sciences, including physics, is boring for students, and they are in a "passive" position when acquiring knowledge. Prepared information and information will not be kept in the memory of students for a long time, and their skills of creative approach to learning will not be developed.

One of the active methods of imparting knowledge is problem-based teaching. In a problem-based lecture, the student's or student's cognitive process approaches creative research and research activities. The effective passage of the problem lecture is provided by the cooperative, joint action of the teacher and students. The main task of the speaker is not to impart knowledge to the students by direct information delivery, but to involve the listeners in the objective conflicts of the cognitive process and in the process of finding answers to them.

Students "discover" new knowledge unknown to them through intellectual research in cooperation with the teacher, learn the theoretical features of the science that is the foundation for their specialty.

Problem lecture is fundamentally different from traditional lecture in terms of content and logic. If in a traditional lecture, information is given to students as previously known, ready-made knowledge only for memorization, then in a problem-based lecture, new knowledge is referred to the students' judgment as unformed, unknown, knowledge. In this, students should not be limited to memorizing and repeating information, but should actively participate in the

process of formation, perception and assimilation of new knowledge unknown to them. One of the important didactic methods of involving students in the process of active learning in a problem lecture is the creation of problem situations. Problem situations can be created with the help of special questions, problems, tasks that embody a conflict. It should be clear to the students that the level of complexity of such special questions or tasks corresponds to their abilities.

In order for a specialist graduating from an educational institution to have a wide range of knowledge, it is desirable to follow the principle of coherence and interdependence of subjects, subjects and departments in physics education. It is known that physics is inextricably linked with mathematics and many natural and technical sciences and serves as a basis for their development. As a result of the application of the achievements of physics to the problems of natural sciences, new directions of science have arisen within them. For example, these include chemical physics, physical chemistry, biophysics, geophysics, astrophysics, and others. In these processes, the integrative character of science is revealed. An integrative approach in education requires interrelationship, coherence, synthesis and commonality between certain topics, activities, disciplines and methods. For example, it is possible to consider the trends of interrelationship, synthesis, and generalization between some phenomena, laws, their systematizing departments, and types of training that are studied separately within the framework of physics.

The importance of independent education of students in the learning process is reflected in the principle of independence of education. In modern physics education, independent work of students remains an integral part of the educational process. Materials about newly discovered phenomena, laws, created new theories, which were not covered by the curriculum, can be presented to students for independent learning.

Elements of a synergistic approach are manifested in independent education. Self-organization in education means teaching oneself. The meaning of this is not to give knowledge ready-made, but to increase knowledge, perfect it, find a quick way in the system of networked knowledge, and master the methods of self-education. From the point of view of synergetics, education is not a transfer of ready-made knowledge from one person to another, but a process that takes place in a non-linear situation consisting of open communication, positive and negative communication, consensus and cooperation between the teacher and the student.

CONCLUSION. As a result of applying the scientific principle in higher physics education, students get acquainted with the latest achievements of physics. They will acquire the skills of scientific research activities in laboratory conditions. Based on the principle of coherence and regularity of education, as a result of imparting knowledge of physics based on the principles of logical sequence, coherence and interrelationship, the theoretical knowledge acquired by students will be deep and integrated. Interaction of theory and practice in the process of teaching modern physics relying on the principle of dependence allows students to form the skills of practical application of the acquired theoretical knowledge.

Application of the demonstration principle of education is of great importance for the theoretical knowledge acquired by students to be perfect and to be retained in memory for a long time. The application of the active principle of education greatly helps to increase the effectiveness of training in physical science. As a result of an integrative and systematic approach to modern physics education, students will gain comprehensive knowledge. It is important to follow the principle of independence of education in the development of independent research and creative abilities of students. A synergistic approach to education ensures mutual cooperation of students and teachers in the learning process and increases students' interest in learning physics.

References:

1. I.P. Podlasyy. Pedagogy. New course : Uchebnik dlya studentsov ped. vuzov: V 2 kn. M.: Vlados, 2005
2. V. V. Davydov. Teoriya razvivayushchego obucheniya. M., 1996
3. Dyachenko V.K. Novaya didaktika M. Prospectus, 2001
4. V. Okon. Vvedenie v obshchuyu didaktiku. - M., 1990.
5. V. I. Zagvyazinsky. Theory of learning: modern interpretation. - M., 2004.
6. E. S. Polat. New pedagogical and information technologies and educational systems. Editorial office - M., 2003.
7. V. A. Slastenin, I. F. Isaev, E. N. Shiyanov. Obshchaya pedagogy: Ucheb. Posobie dlya studentov vysshchikh uchebnyx zadevaniy/ Pod ed. V.A. Slastenina: V 2 ch. M., 2002
8. A.V. Khutorskoy. Sovremennaya didaktika: Uchebnik dlya vuzov. SPb.: Peter, 2001.
9. I. Ya. Lernera, I. K. Zhuravleva. Modern didactic: theory and practice / Pod editor. M., 2004
10. Oh. Khimatkulov I. _ G. _ Tursunov. O liy education _ _ in institutions physics science problematic o ‘ school issues. "Economics and society" No. 5(96) 2022. 5 p.