

# THE USAGE OF MODERN EDUCATIONAL TECHNOLOGIES IN PHYSICS CLASSES

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**Abstract.** *This article is devoted to the issues of teaching physics using modern educational technologies, such as: “Analysis of situations”, “Round table”, modular training, “Collective creative solution”, computer models.*

**Keywords:** *innovation, physics, education, teacher, student, knowledge, motivation, module, problem solving, experiment.*

The modern educational system is faced with the task of creating an effective educational environment focused on supporting students’ successful mastery of the fundamentals of fundamental science and new technologies. Solving these problems in a situation of intensive development of modern technologies and knowledge-intensive industries is impossible without a radical change in the role of physics and mathematics education, without increasing its scientific attractiveness, intellectual prestige, qualities, efficiency of application and close relationships with various areas of practical application in life.

A holistic perception of the surrounding world is a characteristic feature of the student’s modern style of scientific and intellectual thinking. The fragmentation of knowledge in individual subject areas does not contribute to the motivation of learning and the development of intellectual creativity of students in teaching physics.

When organizing the educational process in physics, one of the main tasks is to form a holistic idea of the structure and evolution of the Universe, revealing the physical picture of the world through the use of modern educational approaches, forms, methods, technologies, including in the field of space educational technologies. The use of modern educational technologies makes it possible to effectively organize teaching in the classroom and in extracurricular activities, increases interest in the subject, activates the scientific and cognitive activities of students, and develops their creative potential. The effectiveness of the assigned pedagogical tasks increases significantly in the case of direct participation of students in practical activities.

Innovative activity in education is currently a necessary condition for training a competitive specialist in his specialty, capable of competing in the labor market with graduates of other universities, not only in our country, but also foreign ones. Today, the most widespread orientation in society is the innovative type of education. Innovativeness is, first of all, novelty, openness and insight, an alternative to traditional teaching and upbringing [2. P. 95-97].

It is university teachers who have modern intellectual and scientific thinking, who are proficient in new educational and digital technologies, and who are ready to act effectively in the new socio-economic conditions of the country, who determine the pedagogical innovative activities of the university. To this end, through innovation, it is necessary to create informativeness and activity of participants in the educational environment.

Analysis of the conducted research allowed us to identify several types of readiness for innovation and stages of attracting teachers to their implementation.

At the first stage of introducing innovations into the educational process, it is advisable to attract teachers with the following types of readiness [1]:

- readiness based on a positive emotional perception of everything new;
- readiness subject to personal and professional self-realization.

At the second stage, teachers with the following types of readiness are involved in the innovation process:

- willingness, subject to availability of opportunity, to take responsibility for innovation;
- willingness to innovatively transform your past teaching experience;
- willingness to follow the leader, use their innovative ideas and take on the role of leader.

At the final stage, teachers with the following types of readiness are involved:

- willingness to take part in the process of applying innovation, subject to material reward;
- readiness, provided there are no serious pedagogical changes;
- readiness to develop innovative scientific potential, promoting interest in new ideas in the educational policy of employers in various fields of scientific knowledge to train competitive future specialists in demand in the labor market.

Let's consider the possibilities of using some innovative teaching technologies in physics classes.

Working in a group using the "Situation Analysis" technology allows students to acquire new theoretical knowledge in physics and acquire practical skills to solve problematic practical problems. The purpose of this technology is to combine theory and practice, to develop critical thinking, subject and personal competencies, and skills to evaluate alternative options. The "Situation Analysis" technology places emphasis on the clear formation of a critical problem, on the ability to ask questions: "Why?", "How to achieve a positive result?" and so on.

In the practice of a teacher, you can use illustration situations, assessment situations, exercise situations, the methods of presentation of which can be very different: oral description of physical processes, written text, demonstration of physical laws, etc. For example, a pedagogical situation is proposed: in order to work successfully, a physics teacher must be familiar with professional periodicals of scientific and methodological publications, the teacher must master the methodology for using published scientific materials, know the forms of working with them, be able to carry out a critical analysis of texts, offer their own solutions to the problems studied, be able to generalize pedagogical experience reflected on the pages of magazines.

Physics classes can be conducted in the form of a "Round Table". For example, the problem of introducing modular technology into the educational process is being studied, which is considered as a means of implementing person-centered learning. Students can imitate the activities of teachers, analyze the content of scientific articles reflecting the experience of introducing modular learning into the educational process; find out the possibilities of using this technology, the positive aspects, the conditions under which this technology can be used, the difficulties that teachers and students may encounter during modular training. It is advisable that the round table participants prepare presentations of their messages and their defense.

Summary of the lesson: theoretical knowledge about this technology, principles of organizing modular training, requirements for the module program, requirements for didactic material, features of preparing a lesson using this technology, forms of conducting classes and monitoring students' knowledge at the end. In addition, each round table participant must compile

a bibliography on this issue and propose for analysis his own version of the module program on one topic of a university physics course.

When performing laboratory work in physics, the method of “Collective creative solutions” is used. Students are given a general task on the topic and the methods for completing it on individual topics are specified. When completing part of the task proposed to everyone, the student must be able to evaluate the role of this task in the overall plan of work and subordinate its implementation to a common goal.

Computer technologies provide a unique opportunity, not implemented in a real physical experiment, to visualize a physical natural phenomenon, but rather its simplified theoretical model, which allows you to quickly and effectively find the main physical laws of the observed phenomenon. In addition, the student can simultaneously observe the construction of the corresponding graphical dependencies while the experiment is progressing. It is also necessary to take into account that students are not able to imagine all processes, phenomena, and historical experiments in physics without the help of virtual models. Interactive models allow the student to see processes in a simplified form, imagine installation diagrams, and conduct experiments that are generally impossible in real life [3. pp. 115-119].

The experience of using computer interactive models for conducting physical experiments in physics lessons has shown increased intensity and effectiveness of classes, increased student interest in studying physics. Of course, a computer experiment should not be the only panacea. Only conducting alternating real and computer experiments provides invaluable experience in assessing the errors of real experiments and teaching analysis of the possibilities and limitations of computer modeling. Considering that computer modeling is increasingly being introduced in all areas of professional activity, this experience is important for the formation of a future specialist. In this regard, students show significant interest in this type of work, their motivation to learn increases, as modern teaching tools are used, which appeals to modern students [4].

Thus, due to the rapid development of society, the role of innovative technologies and the need for an education system capable of meeting the challenges of modern pedagogical requirements are increasing. In our opinion, pedagogical innovative technologies as a form of educational activity meets modern pedagogical requirements and can be actively used to achieve high quality education in the teaching of physics.

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