PHYSICS BASED ON CASE TECHNOLOGY

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Abstract.*This article presents a methodology for introducing complex case technology into the teaching of physics in technical universities. The relevance of the development of such technology is associated with modern requirements for the level of training of future process engineers, the need to develop their professional competence not only when studying special subjects. To ensure such training, it is advisable to organize practice-oriented classes in physics at a technical university based on a situational approach. The purpose of the article is to scientifically substantiate and describe a model of the process of teaching physics at a technical university, developed on the basis of complex case technology.*

Keywords: *case technology, physics, case, technology, situational task.*

Modern concepts for the development of scientific research and innovation in higher education institutions, the radical modernization of the Russian economy and the training of personnel with new professional competencies, the development and application of innovative methods and technologies in the higher education system, the improvement and development of one's own knowledge determine the directions. students' activity in educational and cognitive activities, scientific research and invention [1]. The activities of a modern engineer are associated with the development, creation, use and improvement of various types of technical objects, which are complex and multifunctional systems. Experience shows that rash and arbitrary actions and professional errors can lead to unpredictable, irreversible consequences and often fatal results [2]. Thus, when preparing a bachelor, it is necessary to equip him with "tools" that will allow him to perform competent, meaningful actions when making production decisions of professional importance, minimizing the possibility of error.

Among all the fundamental sciences that determine modern scientific and technological progress, physics occupies a special place in preparing future undergraduates for active participation in modern engineering production. The need to improve physical education in higher educational institutions is determined by the development of physics as a science, the growth of its role in the development of technology, and its reflection in professionally oriented subjects taught in technical universities [3]. Despite the importance of physics, many students have problems studying this subject, which is primarily due to a

lack of interest in the subject. Therefore, the organization of quasi-professional activities in teaching physics serves to understand the role of science and the formation of professional competencies among graduates of technical universities. When teaching physics at a technical university, traditional teaching technologies are used more, aimed at developing knowledge, skills and competencies. Explanatory, illustrative and reproductive methods of teaching students prevail. Disadvantages of such training [4]: a single average amount of knowledge acquired by students; most of the knowledge is acquired by students through the teacher, without relying on independent work in acquiring this knowledge; the difficulty of students' independent work with educational and scientific-technical literature due to insufficient understanding of the educational material; superior load on students' memory. But in future professional activities, these methods of memorizing and accurately reproducing information from memory are not used. Thus, there is a gap between the results of teaching physics in traditional education and the requirements of the Federal State Educational Standard, aimed at the real professional activities of graduates of technical universities. A way out of this situation may be a practice-oriented approach to teaching physics in technical universities. However, practice shows that in these cases the main attention is paid to solving technical problems and establishing interdisciplinary connections [4]. The technical problems solved are mostly standard, and the objects considered in them are often outdated. Work to implement a practice-oriented approach does not take into account the prospects for the development of new technologies in production conditions. In this regard, we turned to a review of practice-oriented teaching technology, taking into account promising directions for the development of methods and technologies. This educational technology is based on solving production issues in a real engineering situation using physics.

Thus, we see the need to develop technology that activates professionally oriented activities of students aimed at achieving effective results in real situations. Here's how Case technology can help teach physics at technical universities. By event we understand a pedagogical tool that can be considered as a complex event that includes a set of simple events. By case technology we understand a professionally oriented educational technology based on an integrated approach to solving a situational problem, which is a description of a specific situation that arises in professional activity, with an obvious or hidden problem.

To implement a comprehensive case technology based on the formulation of a problem and its step-by-step solution, we analyzed the content of subjects at a technical university and identified connections between the physics department and professionally oriented special subjects. Each of the selected subjects has its

own goals and objectives, on the basis of which general professional problems of the educational process can be formulated. For example, when analyzing the goals and objectives of the science “Measurement Theory”, we formulated the following general tasks: 1) carrying out control operations and finding the dimensions of products that do not harm the product; 2) the problem of creating and analyzing an error model, proving the truth and objectivity of the sample obtained as a result of measurements. Based on these problems, the objectives of teaching physics were formed: 1) familiarization with methods for determining the dimensions of products; 2) developing the ability to find measurement errors and evaluate the objectivity of measurement results. Similarly, based on the analysis of other special subjects, general problems and related tasks for teaching physics were formulated.

The process of creating a case that teaches students general physics and contributes to the formation of professional competencies is a complex system of activities. Following the steps above, the process includes:

1. Development of a situational task or several similar tasks based on a structured professionally oriented problem.

2. Drawing up a map of the program situation, consisting of the main theses that should be embodied in the text of the case.

3. Collection of educational, scientific and technical information related to the theses of the case map of the program.

In conclusion, we note that the structure of the technology of complex cases we presented allowed students of a technical university to realize the principle of fundamental and practical unity in teaching physics. The content of individual parts of the work reflects the basic physical laws within the section being studied and at the same time brings it closer to solving the problem situation. Testing of the model developed during the pedagogical experiment proved the effectiveness of the methodology for teaching physics to students of a technical university based on the technology of a complex case.

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