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## THE MAIN FEATURES OF AN INNOVATIVE APPROACH TO THE TEACHING OF TECHNICAL SCIENCES

**Abstract:** This article discusses the use of innovative technologies in the teaching of technical sciences. It is based on methods that can be used in higher education.

**Key words:** method, methodology, technical sciences, innovative approach, innovative methods.

**Language:** English

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### Introduction

Innovative technologies are those that involve not so much mastering the discipline as the formation of competencies, for which they use active and interactive teaching methods. Such technologies include, for example, information and communication technologies (involving computer science in the study of technical disciplines), student-centered technologies (developing natural data of students, communication skills), didactic (using new techniques, methods in the educational process), etc.

From the first meetings with students, teachers of technical disciplines should provide a concrete understanding of the goals of studying the discipline, the contribution of this discipline to the formation of competencies. For this, the educational program should provide for the most part a problematic, research nature of education, motivating future graduates to acquire the required competencies. It is customary to single out several basic methods of organizing classes used by teachers in their field [2-3]. The passive method is a form of interaction

between the teacher and the student, in which the teacher is the main actor who controls the course of the lesson, and the students act as passive listeners. We do not believe that the passive method should be completely abandoned. The question is in the ratio, in the share of passive methods in the entire process of cognition. This method shouldn't take over.

An active teaching method is the organization of the educational process, which promotes a more active than with a passive method, interaction with the teacher. If passive methods presupposed an authoritarian style of interaction, then active ones presuppose a democratic style. At the same time, the teacher "has to revise the traditional teaching methodology, when the classroom has only the usual blackboard and chalk" [4, p.158].

Interactive method. Today it is not enough to be competent only in one's own field and be able to transfer a certain amount of knowledge to students. Currently, the teacher needs to organize the process in such a way as to involve the students themselves in obtaining knowledge, which is facilitated by active,

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and even more - interactive teaching methods. It is known that learners can more easily understand and remember the material they have learned through active involvement in the learning process. The interactive method is the "closure" of students to themselves. The main thing is the communication of students with each other in the process of obtaining knowledge. The role of the teacher in interactive classes is reduced to the direction of students' activities to achieve the objectives of the lesson. Interactive learning is primarily interactive learning.

There are many forms of active and interactive learning, we will recall only some of them: creative assignments, lectures with a mistake, brainstorming, conferences with presentation of reports and discussion, educational discussion, teaching using computer programs, case method. The case method can be presented as a complex system, which includes other, simpler methods of cognition. It includes modeling, systems analysis, problem method, thought experiment, simulation, classification methods, game methods that play their roles in the case method [5]. The acquisition of competencies is based on performance. This means that the very possibility of assimilating knowledge, skills, abilities depends on the activity of students. It is the task of a teacher of a higher educational institution to organize this activity correctly.

Long-term observations of the educational process revealed an increasingly weaker mathematical preparation of applicants, a lack of independence and interest in learning, a desire to look for an answer on the Internet for any reason, inability to concentrate, fear of public speaking and a lack of tolerance for the statements of others. All this stimulated the search for some new approaches to working with current students.

In the learning process, it is necessary to pay attention, first of all, to those methods in which listeners identify themselves with the educational material, are included in the studied situation, are encouraged to take active actions, experience a state of success and accordingly motivate their behavior. For example, a discussion in small groups gives each participant a chance to bring something of their own into the discussion, feel independence from the teacher, show leadership qualities, and repeat the material. And while the new perspectives on learning are not accepted by all teachers as a guide to changing their own teaching patterns, finding interactive ways to interact with the group, research evidence confirming that using active approaches is an effective way of learning cannot be ignored.

The purpose of our experimental study was to determine the possibility and effectiveness of using active and interactive forms in teaching technical

disciplines. The objectives of the study were as follows: within three years, monitor the results of intermediate attestations in several technical disciplines in a number of groups; in several groups, gradually from year to year, increase the share of active and interactive approaches both in lectures and in practical and laboratory classes; to conduct traditional classes in technical disciplines in one group; to carry out a comparative analysis of the results of intermediate certification in groups with a large share of active methods and in the group of traditional education for three years; gather information as far as possible on the main best practices. Classes in all groups were taught by the same teacher.

### Research methods

Based on the objectives of the study, the groups of directions 03/08/01 were selected. "Construction", 13.03.02. "Power Engineering and Electrical Engineering" (bachelor's degree profile), with which the authors of this article worked. We used active forms of interaction in teaching such disciplines as "Theoretical Mechanics", "Technical Mechanics", "Modeling in Engineering". Theoretical mechanics is studied in the third semester, students take an exam and coursework with grades. Technical Mechanics is given in the fourth semester and students should receive credit as a result. The course "Modeling in Engineering" is taught to bachelors of the third year of study, intermediate certification is a test.

### Several methods were selected.

The brainstorming method was used mainly in the lecture. Lectures necessarily contained problematic questions, the answer to which was proposed to be found by this method. In theoretical mechanics, for example, it was necessary to determine the number of unknown reactions of supports in statics, to formulate the concept of a vector-moment or the order of solving problems. In the course of technical mechanics, at the first acquaintance with the Assur groups, it was proposed to calculate the class of a given Assur group, to simulate a 4th grade group, followed by a performance in front of the entire audience, in which it was necessary to justify your choice. In a lecture on the discipline "Modeling in Engineering", after explaining the classification of types of modeling, it was proposed to characterize the computational fluid dynamics program, which reproduces on a computer the process of flowing around an object with any liquid or gas (which was demonstrated by a slide show). It was necessary to answer the questions: real or mental model, dynamic or static, discrete or continuous, etc.

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