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## **INNOVATIVE TECHNOLOGIES IN TEACHING TECHNICAL DISCIPLINES**

*Abstract: This article considers innovative technologies in teaching technical disciplines*

*Keywords: engineering, technical sciences, method, intractive method, teaching*

## **ИННОВАЦИОННЫЕ ТЕХНОЛОГИИ В ОБУЧЕНИИ ТЕХНИЧЕСКИМ ДИСЦИПЛИНАМ**

*Аннотация: В статье рассматриваются инновационные технологии в преподавании технических дисциплин.*

*Ключевые слова: инженерия, технические науки, метод, интерактивный метод, обучение*

Innovative technologies are those that involve not so much the development of 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 informatics in the study of technical disciplines), personality-oriented technologies (developing the 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 the problematic, research nature of training, motivating future graduates to acquire the required competencies. It is customary to highlight several basic methods of organizing

classes used by teachers in their field. The passive method is a form of interaction between the teacher and the student, in which the teacher is the main character who controls the course of the lesson, and students act as passive listeners.

We do not believe that we should completely abandon the passive method. The question is in the ratio, in the proportion of passive methods in the entire process of cognition. This method should not prevail. An active teaching method is the organization of the educational process, which contributes to more active, than with the 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 reconsider the traditional teaching methodology, when the audience has only the usual blackboard and chalk”.

Today it's not enough to be competent only in your 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, and even more - interactive teaching methods. It is known that students are easier to understand and remember material that they studied through active involvement in the educational process. The interactive method is a “closure” of students on themselves. The main thing is the communication of students among themselves 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, let us recall only some of them: creative tasks, lectures with an error, brainstorming, conferences with the presentation of reports and discussion, educational discussion, computer-based training, case study method. The case study method can be represented as a complex system, in which other, simpler methods of cognition

are included. It includes modeling, system analysis, problematic method, thought experiment, simulation, classification methods, game methods, which performs its roles in the case method. Acquisition of competencies is based on activity. So, the very possibility of assimilating knowledge, skills, and abilities depends on the activity of students. Correctly organizing this activity is the task of a teacher of a higher educational institution. 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 order of solving problems.

In the course of technical mechanics at the first meeting with Assur groups, it was proposed to calculate the class of a given Assur group, to simulate a 4th class group with a subsequent performance in front of the entire audience, in which it was necessary to justify their choice. After explaining the classification of types of modeling, in a lecture on the discipline “Modeling in Technique”, it was proposed to characterize the CFD simulation program (computational fluid dynamics), which reproduces on a computer the process of an object being circulated by a liquid or gas (as demonstrated by a slide show). It was necessary to answer the questions: real or mental model, dynamic or static, discrete or continuous, etc. The “creative task” method helped to develop students' research skills. Students received such tasks after getting acquainted with the basic approaches to formalizing and modeling the equilibrium and movement of material bodies. For example, in theoretical mechanics, in the tasks of the Statics section, freshmen were asked not only to calculate the reactions of bonds, but also to find their dependence on the type of bonds. After a little research, they should conclude about the advantages of certain supports. In the sections “Kinematics” and “Dynamics”, students use different methods to

solve the same problem, which broadens their horizons, helps to repeat the material, and builds skills for solving problems.

In technical mechanics, it was necessary to conduct a comparative analysis of methods for solving statically indeterminate problems. Beam-rod structures were proposed for consideration, the solution should be carried out by the energy method and the method of comparing deformations and justify the advantages of a particular method. The case study method is a proposal to a group of a specific situation with the aim of finding a solution, substantiating a given solution with a detailed analysis of the solution search. It seemed possible to use the case study method in teaching technical disciplines to work in small groups. Activity in small groups is one of the most effective strategies, as it gives all students the opportunity to participate in work, practice cooperation skills, interpersonal communication (in particular, the ability to actively listen, develop a common opinion, and resolve disagreements). For example, freshmen who began to study theoretical mechanics were offered tasks of the type - "Two loads with masses  $m_1 = m$  kg and  $m_2 = 3m$  kg, connected by a weightless inextensible thread, must be lifted and transferred. One worker offered to lift the load, taking on the first load, the second worker offered to hold on to the second load when lifting, and the third said that it does not matter which load to hold on to, this will not lead to a break in the thread between the loads. Who is right? In what situation is the probability of a rupture of the thread less, if in any case the same force  $F$  is applied to the corresponding load for lifting?" At the beginning of the lesson, the principles of working in a group were discussed: a lesson is not a lecture, it is assumed that the general work with the participation of each student in the group is assumed; all participants are equal regardless of age, social status, experience; each participant has the right to his own opinion on any issue; there is no room for direct criticism of the personality (only an idea can be criticized). The discussion time for the assignment and solution was limited to 30–40 minutes. After that, the representative of each group made a

short message in accordance with the listing of issues that needed to be addressed. The questions included not only the result of the solution, but also an analysis of the solution search process. After the performance of all the groups, the teacher summed up with an indication of common mistakes, conclusions were drawn.

#### **Literature:**

1. Раевская Л.Т., Карякин А.Л. ИННОВАЦИОННЫЕ ТЕХНОЛОГИИ В ПРЕПОДАВАНИИ ТЕХНИЧЕСКИХ ДИСЦИПЛИН // Современные проблемы науки и образования. – 2017. – № 5.;
2. Решетникова З.А. Психологическая теория деятельности и деятельностный подход к обучению [Текст] / З.А. Решетова // Психологическая теория деятельности: вчера, сегодня, завтра / Под ред. А.А. Леонтьева. – М.: Смысл, 2006. – С. 242-250.
3. Сычев, И.А. Формирование системного мышления в обучении средствами информационно-коммуникационных технологий: монография / И.А. Сычев, О.А. Сычев– Бийск: АГАО им. В.М. Шукшина, 2011. – 163 с.
4. Мамонтова, С.В. современные ориентиры инноваций в образовательном процессе: // Инновационные технологии в образовательном процессе XIII Международная научно-методическая конференция: посвящается 250-летию ВЭО России. 2016. С. 145-151.