

Application of Advanced Pedagogical Technologies in Teaching the Science of the Resistance of Materials

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Abstract: In the process of teaching engineering subjects, including when teaching the science of “strength of materials,” methods are used to form and develop technical thinking among students.

Keywords: the meaning of cognition, memory, the role of thinking, intuition, perception.

Introduction Nowadays, the idea of a new approach to conducting lectures, seminars and practical trainings in higher educational institutions, to ensure the student's interest in each training, to create an opportunity for independent and free thinking, to support the diversity of points of view of discussion and scientific debate in the educational process is being put forward.

During the lesson, it is necessary to create a basis for the teacher to restore information on the newly studied topic and master it. Especially when starting a new topic, asking questions that interest students, and creating problem situations, interest increases. The student will need to use methods of work that will bring him maximum benefit during the course of the subject.

In the process of teaching technical sciences, including teaching the science of “strength of materials,” it is necessary to form and develop technical thinking among students. Please note the following

- active process of acquiring knowledge
- the role of previous knowledge and experience in the acquisition of knowledge
- the role of perception, memory, thinking in cognition
- critical thinking is a quality necessary for a modern specialist
- during the lesson, during independent work, the student learns to think
- a student with increased thinking abilities learns independently and actively solves problems

Knowledge and concepts that need to be formed on the topic being studied in science:

- recalling previous knowledge and experience in mastering the subject.
- active process of mastering the subject.
- understand the role of intuition, perception and thinking in understanding the essence of the subject being studied.
- critical understanding of the essence and results of the subject.
- independent thinking and work in class.
- be active in solving problems on the subject.

The purpose of using advanced pedagogical technologies in science is to demonstrate new analytical methods of thinking and learning, teach students to actively express their opinions in communication, and ensure a good understanding of topics. During the training, the teacher changes the usual form of lecture in order to fully develop and stimulate students' thinking. That is, he organizes lectures for students in a non-standard way.

The application of this advanced pedagogical technology includes several stages:

In preparation, he prepares students in advance for Strength of Materials subjects such as Scratch and Compression. First, the purpose of this topic is explained. The teacher introduces the lecture plan to students.

Topic" corresponds to the curriculum of the science of strength of materials, 2 hours are allocated for its study. The lecture is aimed at teaching 2 objectives, firstly, the tensile and compressive strength of rods, and secondly, the calculation of deformations. When studying this material, the teacher divides students into groups and recommends step-by-step brushes of different structures and sizes to each group. This process takes 5 minutes.

In the first part of the lecture (10...15 minutes), the teacher explains the importance of studying this topic, emphasizes the place of calculating the strength and deformation of rigid systems in industry and agriculture and gives an understanding of this.

At the next stage of the lecture, "Summarizing preliminary results," the teacher will give the groups 5 minutes to compare the ideas you presented and the basics of studying the topic given by me, what is consistent with your proposals? What's new? What satisfied you? What is your objection? What do you think about the information I provided? asking questions.

After 10 minutes, the teacher invites several groups of students to discuss with the audience the answers to the strength and deformation test of structural elements.

Then, during the lecture (15 minutes), the teacher once again gives students an idea of continuity and displacement (deformation). It also provides information about cross sections and step sections. At the next stage of the lecture, "Summing up preliminary results," the teacher will test students' knowledge of determining the strength and deformation of hands using express diagnostics. Students perform a diagnostic test.

For example: 1. Determine the magnitude of the longitudinal force arising in the cross section of the brush when an external force R acts on the brush.

a) equal to R , b) equal to $-R$, c) equal to $2R$, g) equal to $R/2$ (correct answer: a) equal to R) [1,2]

2. How is the absolute deformation R proportional to the external force in the brushes?

a) disproportionate, b) directly proportional, c) inversely proportional, d) independent. (correct answer b) correctly proportional).

3. Does the normal stress due to the self-weight of a beam depend on the cross-sectional area?

a) depends, b) depends on 0, c) does not depend, d) depends on its size, (correct answer is c) does not depend).

The teacher determines the correct answer by conducting an oral test (by raising his hand) and marks the student who gave the correct answer.

During the lecture (15 minutes), the teacher moves on to consider the second question of the lecture plan and gives students an understanding of the conditions of stability under tension and compression, the conditions of uniformity, regardless of the text of the lecture (or book). in the "Insert" method

In this case, the student understands the meaning of the educational material in each plan during the reading process and notes the results with a pencil in the margins of the text [1]

For example: sign (+) - if the student knows and understands what he read, or if the student thinks he knows it; (-) sign - if the student knows what he has read, but does not understand it and thinks that he does not know it; (?) sign – if what the student has read is not clear or if the student wants to learn more about this issue.

Thus, in the process of reading, the student carries out mental activity, that is, evaluates information on the basis of known or new, unclear or unwanted information. The “Insert” method of book marking requires thinking about each paragraph. As a result, the student assimilates information consciously.

For perfect mastery of the topic, the teacher gives students 1-2 tasks and they have 2-3 minutes to solve them[3]

Task 1. Determine the normal stress in the cross section of the beam:

Task 2. Determine the absolute elongation for an arbitrary section of the stem.

The teacher quickly evaluates students who have completed the task.

Conclusions At the final stage of the lecture (5...7 minutes), the teacher explains to students in general terms how to calculate and check the types of pipes and towers used in thermal energy and their durability.

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