ABOUT A METHOD OF EVALUATING STUDENTS' KNOWLEDGE IN THEORETICAL MECHANICS LECTURES

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Abstract: One of the main tasks of today is to use modern evaluation systems along with traditional methods in assessing the level of students' knowledge. It is shown that the method of confused logical chain, which is proposed to be used to increase the activity of students in the training of theoretical mechanics taught in higher educational institutions, can be applied to science.

Key words: theoretical mechanics, statics, couple force, equivalent couple, balance, equation, motion, trajectory, center of gravity, pedagogical technology, tangled logical chain, compatibility.

Today, the main problem in the field of education for young people is the problem of improving the educational process. In its solution, the educational content, teaching methods, tools, and forms, which are the components of the educational process, as well as the teacher's pedagogic and students' educational activities, Analysis and development of coherence in communication has an important place.

Pedagogical scientists have conducted many studies on the teaching of theoretical mechanics with modern pedagogical technologies. The organization of lectures and practical exercises using the Venn diagram in the lessons is presented in works [1,4,7,8,12,19,20,24]. Practical solutions are given in the work [4] on increasing visualization by applying the interactive cluster method to the teaching process. Research [2,11,14,15,16] mentions methods of increasing student activity in class activities. An unconventional method based on the production of electricity using wind energy is described in works [5,22,23]. [9,10,13,17,21,25-29] works to determine the level of students' knowledge using the method of confused logical chain.

The skill of the pedagogue is of great importance in achieving the effectiveness of the lesson. A pedagogue must be a master of his work, an in-depth knowledge of his subject, well-acquainted with relevant fields of science and art, well-versed in general and youth psychology, well-versed in teaching and upbringing methods, and a highly cultured specialist. In order to accomplish these tasks, the pedagogue must know how to skillfully use advanced pedagogical technologies. A new application method for teaching theoretical mechanics and assessing student knowledge is discussed below.

Confused logical chain method is used to study cause-effect relationships of a phenomenon. When using this method, the student learns to combine concepts related to the studied topic, such as formula, expression, definition, theorem, when the information on several studied topics is confused together, and to match the correct ones from among them.

Procedure: the set of facts being studied is presented to the attention of students in a case where the chronological order of cause and effect is confused (broken). Students are required to put them in the correct order, and to connect the facts, students can create a text using additional words to those provided.

We will see the application of the method in the teaching process of the topic "Theory of Coupled Forces" in the statics department of theoretical mechanics. All information on couple force,

couple moment, equivalent couple and addition of couple forces by scramble logic chain method is given. Distributes to students a copy of the schedule corresponding to the number of students in the auditorium. Students study this table in detail and write down the corresponding answer number on the right for each question listed on the left. The teacher collects the answers from all students, checks them and announces the results. Below is a table corresponding to the above topics:

Determine compatibility:

1	Give the definition of a force pair	1	A pair of forces perpendicular to the plane of the torque, when viewed from the end of the vector, rotates the pair in a counter-clockwise direction
2	Write the conditions of analytical equilibrium of a system of coupled forces	2	$M=F_1 \cdot d = F_2 \cdot d$
3	Write the formula for the torque of the couple	3	$\sum m_x\left(\vec{F_k}\right) = 0$, $\sum m_y\left(\vec{F_k}\right) = 0$, $\sum m_z\left(\vec{F_k}\right) = 0$
4	What is the direction of the torque vector of the couple?	4	Two forces lying in the same plane, opposite to each other and parallel, the lines of action of which do not lie in a straight line, are called double forces.
5	Find the magnitude of the force if the couple force shoulder is 4 with a magnitude of 20 cm	5	Yes, because their moments are equal
6	The first pair of forces has a magnitude of 10 kn and a shoulder of 3 m, the second pair of forces has a magnitude of 15 kn and a shoulder of 2 m. Can these pairs be called equivalent pairs?		5 кн

Correct answers (4,3,2,1,6,5).

We will now use the proposed method for a branch of science. In this case, students' knowledge can be used for the purpose of the level of mastery of the subject and conducting midterm evaluation. The table covering all the topics of the statics section of theoretical mechanics will look like this:

Determine compatibility:

1	Show the definition of equivalent pairs	1	As a result of moving a given force parallel to itself, there is a force equal to the given force at the point of

			displacement and the added double product
2	State the parallelogram axiom	2	Symmetry, division, filling, integration, traction
3	A load of 10 kn was first hung on the rope, and then a load of 5 kn was added to it. Find the tension in the rope for the two points.	3	A) if the force is parallel to the axis B) if the force crosses the axis
4	Write down the conditions of analytical equilibrium of a system of space-reciprocating forces	4	$\sum F_{kx} = 0, \sum F_{ky} = 0,$ $\sum m_0\left(\vec{F_k}\right) = 0$
5	What is the direction of the base reaction force with the moving hinge	5	$x_c = \frac{\sum s_k \cdot x_k}{\sum s_k}$, $y_c = \frac{\sum s_k \cdot y_k}{\sum s_k}$
6	Show the formula for finding the coordinates of the center of gravity of the section	6	Perpendicular to the supporting plane
7	When is the moment of force about the axis equal to zero	7	10 кн, 15 кн
8	State Poinceau's lemma	8	Couples with equal moments and the same direction of rotation
9	Show the conditions of analytical equilibrium of a system of forces located arbitrarily in a plane	9	$\sum F_{kx} = 0$, $\sum F_{ky} = 0$, $\sum F_{kz} = 0$
10	Show the methods of determining the center of gravity	10	The equal effector of two forces in different directions placed on a body at one point is equal to the diagonal of the parallelogram constructed to these forces and is directed along this diagonal.

Correct answers (8,10,7,9,6,5,3,1,4,2).

The method can be compiled for the entire course of theoretical mechanics. In this case, materials are selected from the question bank from the departments of statics, kinematics and dynamics of science. Below is a table covering all sections of theoretical mechanics:

Determine compatibility:

1	1 Show the differential equation of free oscillating motion	1	$m\vec{a} = \vec{F}$
	2 Show the formula for finding the linear velocity of an arbitrary point of a rotating body	2	$\varphi = \varphi_0 + \omega t$
	3 Find the row that correctly states the trigonometric theorem	3	The balance of one part is seen by dividing the truss into two parts with a section passing through the 3-steering wheel
	4 A body with a mass of 4 kg is moving at a speed of 5 m/s. Find its kinetic energy	4	$X^2+Y^2=9$, circle
	5 Find the law of plane circular motion	5	$v = h\omega$
	6 Where is the center of gravity of a homogeneous right parallelepiped	6	A circular motion
	7 Show the basic equation of dynamics	7	$\ddot{x} + k^2 x = 0$
	8 What is the instantaneous center of velocity	8	Stationary, geometric, differential, holonomic, non-stationary, releasing
	9 State the essence of the Ritter method in farm accounting	9	If a body is in equilibrium under the action of three forces lying in the same plane and not parallel to each other, the lines of action of these forces intersect at one point
	10 List the types of connections	10	At a given point, the velocity of the body is zero
	11 A material point moves in the plane according to the law x=3 cos2t, y=3sin2t. Find its trajectory equation		50
	12 How an object moves under the influence of a pair of forces		At the intersection of the symmetry planes

Correct answers (7,5,9,11,2,12,1,10,3,8,4,6).

As a result of using the method of confused logical chain, students develop skills such as organizing the subjects they have studied in science, dividing them into components, comparing them with other parts of the subject, understanding information about the newly studied subject. Regular use of this method in lectures gives students the opportunity to systematically study science materials,

organize, divide and differentiate what they have learned. As a result, the level of knowledge and activity of students during training, the level of mastery of science subjects will increase significantly. The teacher will have the opportunity to objectively determine the level of students' knowledge, conduct intermediate evaluation and final evaluation in a new way, different from the existing evaluation systems.

When evaluating students' knowledge using the above method, the following should be paid attention to:

1. The bank of questions about science is expanded by topics.

2. A bank of logical, easy-to-solve examples and problems related to science topics is created.

3. In order to determine the level of mastery of the subject during the training, a table of 5-10 questions will be prepared, at least equal to the number of students in the group.

4. To evaluate the mid-term control, students will be asked to prepare tables with 15-20 questions from the department's question bank.

5. At the end of the semester, students are advised to prepare tables of 20-25 questions for the final control assessment.

6. Samples of the bank of questions and example-problems and the order of their execution are regularly published on the website of the department during the semester.

7. Every academic year, the bank of questions and the bank of example problems compiled by subjects are updated.

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