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Educational Quality Improvement Events Based on Exhibition Materials in Practical Training Lessons

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Abstract

The article talks about ways to improve the quality of education by using the Venn diagram in the organization of practical training. It is based on the fact that by using this method in all departments of theoretical mechanics, which are part of the group of technical sciences, it is possible to achieve the desired result based on demonstration in students' mastery of basic words and phrases related to science.

Keywords: Venn diagram, theoretical mechanics, statics, moment of force, moment vector, farm, calculation method, stern, stress, node, force polygon, equilibrium.

INTRODUCTION

Great things are being done in the field of education in our country in recent years. The status of professors and teachers improved, their salaries were significantly increased, and they were given material and moral benefits. At the same time, the material and technical base of higher educational institutions was strengthened, provided with modern laboratory equipment, the number of higher educational institutions was increased, and this work continues even today. Most importantly, the level of coverage of college, academic lyceum and school graduates to higher education institutions has been dramatically increased, and this work is planned to cover 50 percent of graduates in the coming years.

RESEARCH MATERIALS AND METHODOLOGY

The increase in the number of students raises the issue of their educational and methodological support and the quality of education. One of the main tasks should be to provide them with modern textbooks, training manuals, methodological manuals and instructions, as well as to organize the lessons using information and communication technologies and advanced pedagogical technologies. To accomplish this task, it is well known that the Venn diagram interactive method, which works well in the teaching of technical subjects, can be easily used. We have shown the advantages of using this method in our previous works [3,5]. The results of the pedagogical experiment on increasing student activity in lectures are described in detail in works [1,2,4]. Improving the quality of students' knowledge using the cluster method is presented in [6]. A method of applying the laws of theoretical mechanics in practice is described in [7]. In [8] studies, the dynamics of the increase in state spending on education, health care, industry and construction in the country in the last three years are presented in diagrams.

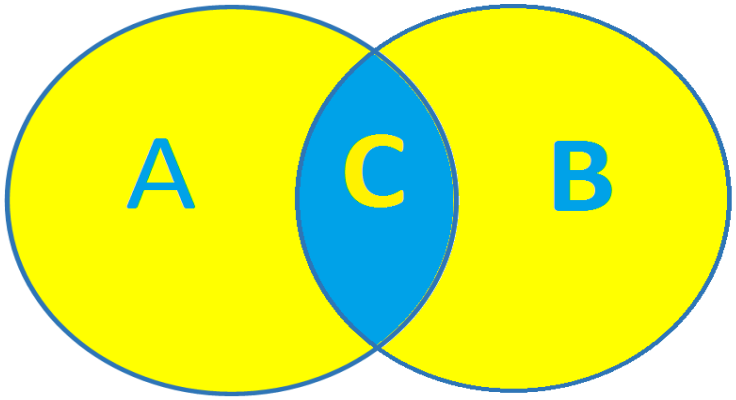
RESEARCH RESULTS

In order for a modern student to get quality education, the methodological support of subjects should be sufficient. Especially in the conditions of the coronavirus pandemic, it may not be possible to conduct traditional training. In this case, the lessons are transferred to the online

module system. Students face certain difficulties in mastering theoretical mechanics. The reason is that the foundations of this science are based on physics, and the method of solving is based on mathematical rules and equations. In addition, the fact that they encountered this subject for the first time (they studied such subjects as mathematics, physics, English, and history at school and college) also affects them psychologically. For this reason, it is necessary to pay attention to visualization in order to learn science more easily. In this case, interactive methods such as brainstorming, clustering, and Venn diagrams are useful. The following shows how students can improve their knowledge by applying the Venn diagram to the statics section of theoretical mechanics.

As a first diagram, we began by comparing the expressions of moments of forces about a point and an axis related to the statics section. In this case, the two circles intersect. Students will easily learn the moment expression, one of the basic concepts of statics, because it is presented in a visual way. They will be able to understand the general and specific aspects of the expressions of the moment of force about a point and an axis from the segments of the circles shown, and will be able to use them in the next practical training lessons.

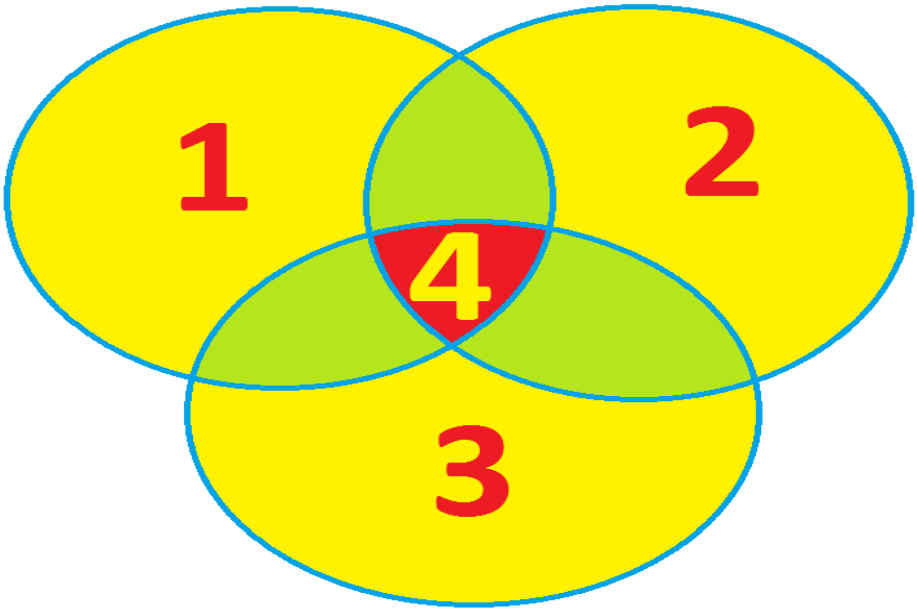
A	Moment of force about a point
C	Common aspects of A and V
B	Moment of force about the axis



A	**Moment of force about a point** - the multiplication of the power by the power shoulder is taken with the appropriate sign. - the force characterizes the rotation of the body relative to the point. - if there is no force shoulder, the moment is zero. - the amount of moment is equal to the double of the triangular surface, which is the result of connecting the moment center, the beginning and the end of the force. - the moment vector is perpendicular to the plane on which the force vector and the radius vector lie; - the force moment vector is equal to the vector product of the force vector and the point radius vector.
C	**Either way** - the force characterizes the rotation of the body relative to the point and the axis. - the body rotates under the influence of torque. - there are moment vectors. - the moment is zero when the force shoulder is zero. - the unit of measurement is n*m. - does not have an equal influencer.
B	**Moment of force about the axis** - the multiplication of the force module by the shortest distance to the arrow is obtained with a suitable sign. - torque is zero if

	– if the force is parallel to the axis, – if the force crosses the axis, – if the force and axis lie in the same plane; - the force characterizes the rotation of the body relative to the axis. - the moment vector is directed along the axis, and when viewed from the end of this vector, it tries to rotate the object in the counterclockwise direction. - the force moment vector is equal to the vector product of the force vector and the radius vector of the point relative to the reference head.

Now let's make it a little more difficult and compare the three expressions. For this, we aim to convey the topic of farm accounting of the statics section to students visually through a Venn diagram. In the theoretical study of the topic, the general and specific aspects of the three methods of farm accounting are compared in a diagram, which is presented to students in an understandable and demonstrative way. The fact that the general and specific aspects of each method are given in a diagram by means of circles makes it easier and faster for the student to master this topic.



1.	Knot cutting method	- base reaction forces are first found. - the main method for finding stresses in all the trusses of the farm; - the calculation starts from a node where one or two sterns are connected. - each knot is cut from the farm and its balance is checked; - equilibrium equations of the system of forces meeting in the plane are used; - if the tension of the stern is positive, it works for compression, if it comes out negative, it works for stretching. - if the stern voltage is zero, it is not working, that is, it can be removed. - all nodes are considered in sequence.
2.	Ritter (cutting) method	- used if you need to find the tension in some of the trusses. - the truss is divided into two parts by cutting through the three struts, where the tension of the truss should be found, and the balance of one piece is checked. - in order to find the stress, it is necessary to make an equation in such a way that only the desired stress is included among the unknown stresses in the equation;

		- this equation is a projection of all forces on an axis or a moment equation relative to a point.
3.	Graphic method	- graphic method of finding the tension in the rods; - a closed force polygon is constructed from the fact that the system of meeting forces at the node is in balance; - the magnitude of the unknown tension force in the stern is found by measuring it with a ruler; - a closed force polygon is constructed for the entire farm.
4.	General of methods 1,2,3 sides	in all ways - flat farm equilibrium is studied; - the amount and direction of tension in the sterns is found; - balance equations are used; - closed force polygon is used; - farm calculation methods; -

CONCLUSION

A Venn diagram can be seen as a convenient way of displaying the core words and phrases of the statics section. By using the above-mentioned demonstration method, the students will be able to divide the subject they are studying into chapters and subjects, to distinguish general and specific aspects between its parts, and to apply the acquired knowledge in problem solving. This situation leads to a qualitative increase in the knowledge of students.

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