

Application Of Venn Diagrams In Lectures On Theoretical Mechanics

Zokirjon Mahmudov

Associate Professor Namangan Engineering Construction Institute

Namangan, Uzbekistan



Abstract –This article describes the use of Venn diagrams in lectures on theoretical mechanics and the use of interactive methods in the organization and implementation of training sessions.

Keywords – Venn diagram, education and upbringing, pedagogical technology, interactive method, pedagogical method.

I. INTRODUCTION

The main goal of education and upbringing in the country is to train highly qualified specialists, equipped with highly qualified modern knowledge, politically refined, able to defend the interests of the state. The implementation of these tasks requires the use of interactive methods in the organization and implementation of training sessions for professors and teachers of the institute.

Fundamentals of Theoretical Mechanics are detailed in [2]. The basics of the application of advanced pedagogical technologies in the educational process are given in [1]. One of the ways to increase the activity of students in the conduct of lectures on theoretical mechanics is given in the literature [3,4]. The application of the cluster and Venn diagram in the lectures of direct theoretical mechanics is described in the works [5,6].

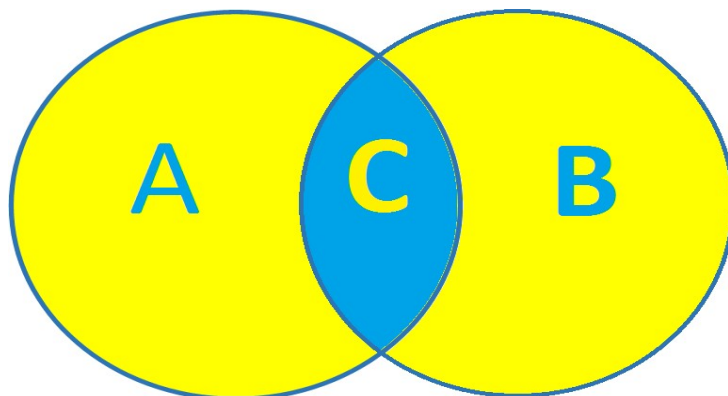
Consider the use of Venn diagrams in lecture sessions on theoretical mechanics. This interactive method requires the analysis and generalization of the specific and general aspects of two or more concepts in the context of a science lecture or hands-on session.

II. MAIN PART

The Venn diagram interactive method is used in the departments of theoretical mechanics in the technical fields of higher education. is a convenient pedagogical method for the application of material point and mechanical systems, differential equations of motion, comparing the three types of oscillating motion) in the dynamics section.

The following example shows a Venn diagram from the Department of Kinematics of Theoretical Mechanics on the topic of “Planar Parallel Motion of a Solid”. In it, a straight parallel motion and a rotational motion around a fixed axis are compared with each other.

A	Smooth parallel movement
C	Common aspects of A and B as a result of comparison
B	Rotational motion around a fixed axis

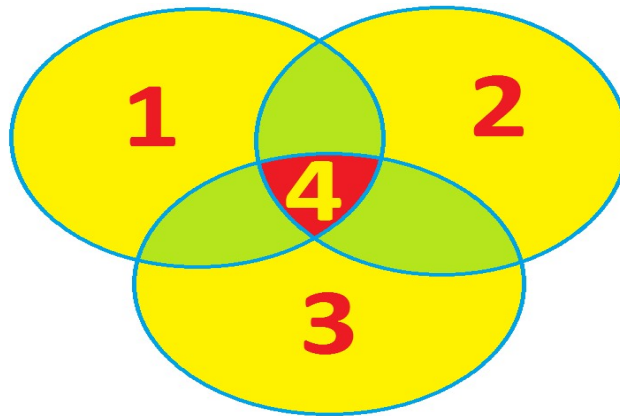


A	In smooth parallel motion - all points of the body move, - The degree of freedom is determined. - body points can move in a straight line and a curved line; -trajector is found. - the equation of motion is three; - the angular velocity and angular accelerations of the body are found; - The velocities and accelerations of body points are determined
C	In both movements - both types of movement; - the equation of motion is formed. - The degree of freedom is determined. - find the trajectory. - refers to a solid body. - points of the body move, - there is a turning angle. - the angular velocity of the object is determined. - the angular acceleration of the body is determined. - the velocity of the body is determined. - the acceleration of the body is determined
B	The rotation around the fixed axis is in motion - There are fixed points, - the degree of freedom is determined; - the equation of motion is one. - solid body points move only in a curved line. - the angular velocity of the body is found; - the angular acceleration of the object is found; - The velocity of body points is determined. - The acceleration of body points is determined.

Completion of the above diagram by students will allow them to expand their understanding of the two main movements of the kinematics department, to have a clear idea, to understand its peculiarities, to understand the laws of generality and to be able to solve similar problems in the future.

The following is a second diagram of the Venn diagram. In this case, the three methods of determining the velocity of an arbitrary point of a body in a plane parallel motion in the kinematics section of theoretical mechanics are compared with each other.

In this example, the essence of the matter is determined by three circles intersecting each other. The table below details the specifics and general features of each circle, as well as the similarities.



1.	Velocity detection in the polar method	- a point of flat shape with known frequency is selected as "pole"; -polar velocity is defined as the forward velocity of a flat shape; - the rotational speed of the selected point around the "pole" is determined; The velocity of a point on a plane shape is determined by the "pole" method.
2.	Determining velocity in the projection method	- a point is obtained in a flat form where the amount and direction of velocity are known; -The point at which the velocity of the plane must be found is obtained. - a straight line passing through these points is drawn; -Determines the projections of a straight line on the velocities of the points obtained in a flat form.
3.	Instantaneous center of velocities speed determination in the method	-points with known directions of velocities in a flat form are selected; - using them to determine the instantaneous center of velocities of points of a flat shape; - the distances from this point to the selected points are determined; The quantities of the velocities of the selected points are determined in the plane
4.	Common aspects between methods 1,2,3.	in all ways - study of the motion of a flat form; - the velocity of an arbitrary point of a flat shape is determined; - the point belongs to a flat shape; - the velocity modulus is determined; - the direction of speed is determined;

As a result of the application of this method in the teaching of theoretical mechanics, the following requirements are set for the level of knowledge of students:

- students need to know the topic well enough;
- have the ability to distinguish between the basic concepts that make up the topic;
- must be able to compare the specific and general aspects of each concept;

III. CONCLUSIONS

As a result, by using Venn diagrams in lectures on theoretical mechanics, students' level of knowledge increases qualitatively, the ability to observe increases, a sense of comparison and fragmentation is formed, first the subject, then the chapter, then the science as a whole and parts. All of these factors will eventually lead to an increase in a student's level of knowledge.

It was observed that the level of knowledge of students increased by 15-20% as a result of teaching students the subject of theoretical mechanics, practical training. Hence, it has been proven that it is possible to increase students' knowledge by applying Venn diagram in the course process.

REFERENCES

- [1] L.V.Golish, D.M.Fayzullaeva. "Design and planning of pedagogical technologies". Tashkent. 2011 y. "Economy"
- [2] M.M.Mirsaidov, A.U.Boymurodova, N.T.Ilyosova. Theoretical Mechanics. T. Cholpon, 2009.
- [3] dots. Z.Mahmudov, cat. bullet KM Ahmadaliev "On a way to increase the activity of students in the organization of lectures on theoretical mechanics." Proceedings of the International Scientific and Technical Conference "Modern Problems of Mechanics", Tashkent, September 23-24, 2009, Volume II, pages 381-383.
- [4] dots. Z.Maxmudov, M.M. Toshmirzaev. "On the issue of improving the quality of lectures for future power engineers." Internet portal "Online Electrician". 2014 www. Online-electric.ru.
- [5] dots. Z.Maxmudov. The use of the cluster method in lectures on theoretical mechanics. Materials of the Republican scientific-practical conference "Issues of structural strength, reliability and seismic safety of buildings and structures." Namangan. April 27-28, 2018, pages 48-50
- [6] dots. Z.Maxmudov. "Application of Venn diagram in lectures on theoretical mechanics". Materials of the Republican scientific-practical conference "Issues of structural strength, reliability and seismic safety of buildings and structures." Namangan. April 27-28, 2018, pages 54-56.
- [7] Xidirberdiyevich, A. E., Ilkhomovich, S. E., Azizbek, K., & Dostonbek, R. (2020). Investment activities of insurance companies: The role of insurance companies in the financial market. *Journal of Advanced Research in Dynamical and Control Systems*, 12(6), 719-725.
- [8] Sodikov, Z. (2017). Peculiarities of the development of international service export in globalization. *International Relations: Politics, Economics, Law*, 2017(1), 50-58.