INTERNATIONAL CONFERENCE **Dehli, India, 2026**
https://eijmr.org/conferences/

DEVELOPMENT OF AN INERACTIVE METHOD FOR POLYHEDRA

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Annotation

This article describes the application of the interactive Venn diagram method to teaching the topic of polyhedrons, their properties, and analysis in engineering and computer graphics.

Key words

Didactic process, teaching methods, pedagogical theory, their effectiveness, interactive methods, polyhedral surfaces, intersection lines, Venn diagram, prism surface, pyramid surface, pedagogical technology, base of a polygon, forming straight lines, unfolding onto a plane.

First, we consider the classification of surfaces. If a line moves in space according to a certain rule, a surface is generated. In this case, the moving line is called a *generator*, and it can either remain fixed or change infinitely. Lines that determine the motion of the generator are called *directrices*.

Surfaces are divided into two types based on their generators: *ruled surfaces with straight lines* and *ruled surfaces with curved lines*.

The generators of straight-line surfaces are straight lines, and as a result of the motion of these straight lines, straight-line surfaces are formed. If the generators are parallel or intersecting, these surfaces are called *developable straight-line surfaces*, which include prisms and pyramids.

In higher education, it is necessary to present the didactic process in a certain sequence, organizing students' cognitive activity in accordance with the goals of the topic using appropriately selected teaching methods. Teaching methods, according to their nature and content, are based on specific pedagogical theories and can belong to different classifications. When evaluating their effectiveness, it is important to consider that they structure the teaching process, direct it purposefully, and ensure goal-oriented collaboration between the teacher and students.

This article aims to create a working design for applying interactive teaching methods to the course of *Engineering Graphics*. For a student to master a topic, it is essential to understand the theory and apply it coherently in practical lessons.

The intersections of multiple surfaces, especially the lines of intersection of polyhedra, are determined by the points where the edges of the polyhedra meet the planes. Such problems are typically solved using the intersection of a straight line with a plane, generally through three conditions,

or by using the intersection lines of two planes. When determining the intersection lines of polyhedral faces, auxiliary planes can be used, or these intersection lines consist of broken straight-line segments.

To achieve the above objectives and reinforce the topic of polyhedra in practical lessons, we propose the use of a *Venn diagram*.

The Venn diagram, as a graphic organizer, is intended to develop students' analytical approach to the topic and their ability to grasp the general essence of the subject based on its components. It is implemented by forming small groups (e.g., groups U and I), collecting and summarizing information within each group according to a specific scheme and task content to achieve the learning goals.

Below is a working design of a Venn diagram in the form of a GO (graphic organizer) chart, illustrating the characteristics of polyhedra. **Table 1.**

Prism surface	**Similarity**	**Pyramid surface**
Polygon	Polygon	Polygon
Base polygon	Base polygon	Base is polygonal
Has two bases	-	Has one base
Side edges quadrilaterals	-	Side edges are quadrilaterals
Straight lines are the builders	builders straight line	Straight lines are the builders
Edges perpendicular to the plane	-	Borders are curved
Intersects with straight lines.	spreads to the plane	Spreads to the plane.
Builders are equal Directrixes are broken lines	-	Intersects with straight lines. Builders are equal Directrixes are broken lines
Bases are regular.	intersects with straight line	Bases are regular.
	-	
	Directors broken line	
	Bases regular.	

In this case, the graphic organizer helps to analyze the closely related theoretical knowledge, information or evidence mastered by students. To use this interactive method, the blackboard is

divided into sections and a diagram is drawn on each section. The surface of a prism is included in the first section, the surface of a pyramid in the third section, and their similarities in the second section. Today, in developing countries, there is extensive experience in using pedagogical technologies that enhance the educational and creative activities of teachers and reflect the effectiveness of the educational process, and interactive methods form the basis of this experience.

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