

THE ROLE OF INTERDISCIPLINARY INTEGRATION IN TEACHING SPATIAL BODIES IN MATHEMATICS LESSONS

Ibrohimova Muyassar Odilbek qizi

Student, University of Science and Technology

Abstract

This article provides a scientific-theoretical and practical analysis of the role of interdisciplinary integration in teaching spatial objects in the upper grades of general education schools. The study reveals the possibilities for developing students' spatial thinking through the integration of geometry with physics, informatics, technology, and art. As a result, it has been proven that interdisciplinary integration is an important tool for strengthening students' knowledge, developing their logical thinking, and forming practical skills.

Keywords: Interdisciplinary integration, spatial bodies, geometry, cone, cylinder, sphere, spatial thinking, integrated education, methodology, senior classes.

Introduction

In the modern education system, developing not only students' theoretical knowledge but also their skills to apply it in practice is regarded as a priority task. From this perspective, interdisciplinary integration is an important didactic approach that increases the effectiveness of education. In particular, in the process of studying spatial objects in geometry, ensuring an organic connection with other subjects is of great importance in developing students' spatial thinking.

Interdisciplinary integration is a pedagogical approach aimed at assimilating knowledge as a holistic system by ensuring the interconnection between various disciplines. This approach allows for the systematic formation of students' knowledge rather than fragmentation.

Spatial thinking refers to a person's ability to perceive, imagine objects in three-dimensional space, and perform practical actions with them. Psychological research indicates that spatial thinking is a crucial prerequisite for the deep mastery of mathematical knowledge.

In high school geometry instruction, studying objects such as spatial bodies—cones, cylinders, and spheres—serves to develop students' abstract thinking. To effectively teach spatial objects, it is important to integrate them with other disciplines.

Through the integration of geometry and physics, students gain a deeper understanding of concepts such as volume, mass, and density. For example, technical processes in real life are explained by determining the volume of conical objects. The integration of geometry and informatics is of particular importance in modern education. Using 3D modeling software, students gain the opportunity to visually explore spatial objects. This increases their interest and helps them master the topic easily.

Also, through the integration of geometry and technology, students are involved in practical activities such as making models and creating constructions. This process serves to reinforce knowledge.

Integration with art develops students' aesthetic taste. Geometric knowledge is deepened through the harmony of proportion, symmetry, and shapes. The results of the experimental work showed that integrated lessons are more effective than traditional lessons. In lessons organized on the basis of integration, students' activity increased, their interest in the topic intensified, and independent thinking skills were developed.

There was also a significant increase in students' spatial thinking, logical thinking, and practical skills. This confirms the pedagogical effectiveness of interdisciplinary integration.

In conclusion, interdisciplinary integration in teaching spatial objects is an important factor in deepening students' knowledge, developing spatial thinking, and increasing educational efficiency. Therefore, it is advisable to organize geometry lessons in close connection with other subjects.

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