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THE IMPORTANCE OF INTEGRATING NATURAL SCIENCES AND MATHEMATICS IN PRIMARY EDUCATION

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Abstract

This article analyzes the pedagogical significance of teaching Natural Sciences and Mathematics through an integrated approach in primary education. Interdisciplinary integration is presented as an important factor in developing students' logical thinking, scientific worldview, practical skills, and problem-solving competencies. Furthermore, the role of integrated lessons in enhancing educational effectiveness, their relationship with the STEAM approach, and their methodological opportunities in primary education are examined. The findings indicate that the integration of Natural Sciences and Mathematics contributes to students' acquisition of knowledge as a holistic system.

Keywords

integration, natural sciences, mathematics, primary education, STEAM, competency, logical thinking, observation skills, interdisciplinary connection.

Introduction

Today, the issue of interdisciplinary integration has become one of the most relevant pedagogical challenges in the educational system. The primary objective of modern education is not only to provide students with knowledge in separate subject areas but also to develop competencies that can be effectively applied in real-life situations. From this perspective, teaching Natural Sciences and Mathematics in an interconnected manner in primary education is of great importance.

Primary education represents the initial stage in which students' scientific worldview begins to develop. Through Natural Sciences, students gain knowledge about natural phenomena, living organisms, ecological processes, and the environment. Mathematics, on the other hand, enables them to analyze, measure, compare, and generalize these phenomena. As a result, students develop a holistic understanding of the world around them.

Main Part

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Theoretical Foundations of Integrating Natural Sciences and Mathematics

The term integration originates from the Latin word integratio, meaning the unification of separate parts into a whole. In the educational process, integration refers to the harmonization of the content of different subjects in order to develop a coherent system of knowledge among learners.

There is a close and inseparable relationship between Mathematics and Natural Sciences. For example, observing plant growth requires measuring length, recording temperature changes involves numerical data, determining precipitation levels relies on quantitative analysis, and representing experimental results often requires the use of charts and graphs. Therefore, teaching these subjects in an integrated rather than isolated manner promotes deeper understanding and more meaningful learning.

Research demonstrates that integrated education is highly effective in enhancing students' observation skills, logical reasoning, independent conclusion-making abilities, and creativity. The impact of integration on students' development can be viewed from several perspectives.

First, integration contributes significantly to the development of logical thinking. By observing natural phenomena and analyzing the results mathematically, students learn to understand cause-and-effect relationships.

Second, integration fosters the formation of a scientific worldview. Students become accustomed to explaining natural phenomena through numbers, measurements, and statistical data, which supports the development of scientific thinking.

Third, integration enhances practical skills. Through conducting experiments, organizing results in tables and diagrams, and performing measurements, students learn to apply theoretical knowledge in practical contexts.

Integration within the STEAM Approach

In recent years, the STEAM approach (Science, Technology, Engineering, Arts, and Mathematics) has gained widespread recognition in educational systems around the world. This approach emphasizes teaching subjects not as isolated disciplines but as interconnected fields of knowledge. The STEAM methodology promotes critical thinking, creativity, and problem-solving competencies among students.

The integration of Natural Sciences and Mathematics in primary education constitutes one of the key components of STEAM education. For example, within the topic "Weather Observation," students measure temperature, record data in tables, construct graphs, and present their conclusions. Such activities simultaneously develop scientific knowledge and mathematical competencies.

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Methodological Approaches to Integrated Teaching

To effectively organize integrated lessons in primary education, the following methods can be employed:

- observation and experimentation methods;
- project-based learning;
- problem-based learning situations;
- working with graphs and diagrams;
- interactive educational games;
- the use of digital technologies and multimedia resources.

For instance, in the topic "Plant Growth," students may measure the height of a seedling over the course of a week, record the results in a table, and illustrate growth dynamics using a graph. Such activities provide a natural integration of Natural Sciences and Mathematics content.

Advantages of Integration

The integration of Natural Sciences and Mathematics yields several important pedagogical outcomes:

- ensures the systematic and holistic acquisition of knowledge;
- increases students' learning motivation;
- develops logical and critical thinking skills;
- promotes practice-oriented education;
- contributes to the formation of a scientific worldview;
- enhances problem-solving competencies;
- strengthens preparation for STEAM-based learning.

Conclusion

The integration of Natural Sciences and Mathematics in primary education is one of the essential requirements of modern educational practice. Lessons organized on the basis of interdisciplinary connections enable students to acquire knowledge more deeply, develop logical thinking skills, and form a scientific worldview. Through an integrated approach, students gain opportunities to connect theoretical knowledge with practical applications.

Moreover, such an educational process supports the development of STEAM competencies, encourages creativity, and prepares students for future stages of education. Therefore, further improvement and implementation of Natural Sciences and Mathematics integration in primary education should be considered an important pedagogical priority.

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