

DEVELOPMENT OF 4K SKILLS IN PRIMARY EDUCATION WITH A MULTIDISCIPLINARY APPROACH (EXAMPLE OF STEAM)

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Abstract

This article examines the development of 4C skills critical thinking, creativity, collaboration and communication through a multidisciplinary STEAM (Science, Technology, Engineering, Arts, Mathematics) approach in primary education. The article analyzes how STEAM-based lessons and projects affect the formation of students' 4C skills. The results show that a multidisciplinary approach increases students' creative thinking and problem-solving skills, as well as their teamwork and communication skills. This study highlights the importance of multidisciplinary and STEAM approaches in building 21st-century skills.

Keywords: Elementary Education, 4C Skills, STEAM Education, Multidisciplinary Approach, Creativity, Critical Thinking, Collaboration, Communication.

Introduction

Today's education system requires students not only to gain knowledge, but also to develop critical 21st-century skills, critical thinking, creativity, collaboration, and communication. Traditional science-centered teaching styles do not provide sufficient opportunities for the formation of these skills, as they teach knowledge in separate subject circles. Therefore, multidisciplinary approaches based on STEAM (Science, Technology, Engineering, Arts, Mathematics) become important. STEAM education helps students understand interdisciplinary interdependence, problem-solving, and develop creative thinking. By combining several subjects in the classroom, the multidisciplinary approach allows students to solve real-life situations and encourages them to work collaboratively.



STEAM is an acronym derived from the words Science, Technology, Engineering, Arts, and Mathematics. STEAM education provides students with the opportunity to understand interdisciplinary interdependencies, analyze problems, develop creative solutions, and apply them in practical activities.

In a traditional science-centered approach, each subject is taught separately, limiting the opportunity for learners to consolidate knowledge and combine different subjects and apply them in practical situations. Therefore, the STEAM approach is regarded as an effective tool for multidisciplinary education.

The importance of STEAM in a multidisciplinary approach is evident in:

1. **Creates interdisciplinary connections:** STEAM projects bring together multiple disciplines. For example, by combining mathematics with art, and physics with technology, the student learns to apply different theoretical knowledge to real-life situations. It develops their critical thinking and problem-solving skills.
2. **Encourages creative thinking:** Combining art and creative activities with other disciplines allows students to generate new ideas and test them in practice. This is how they learn to come up with innovative and creative solutions.
3. **Provides Skills Reinforcement and Application:** In STEAM projects, students apply their knowledge in several subject areas. For example, science uses the laws of mathematics and physics to carry out an experiment, and art and technology to visually represent the results.
4. **Develops collaboration and communication:** Multidisciplinary STEAM projects are conducted in the form of group work. It strengthens students' skills to communicate with each other, exchange ideas, and solve problems together.
5. **Building 21st Century Skills:** The STEAM approach helps students develop 4C skills in creativity, critical thinking, collaboration, and communication. Therefore, STEAM is an important tool in not only providing knowledge, but also preparing students for global competition.

A multidisciplinary approach is a pedagogical approach that combines knowledge, methods and skills from several disciplines or industries in the educational process, allowing students to solve complex problems and apply this knowledge in practice. From a scientific point of view, the main features of the multidisciplinary approach are:

1. **Interdisciplinary interconnectedness:** A multidisciplinary approach allows students to understand the relationship between knowledge by combining them



rather than teaching several disciplines separately. This approach increases students' ability to apply theoretical knowledge in practical situations.

2. Solving complex problems: Real-life problems often require more than one discipline area. The multidisciplinary approach allows students to develop analytical and integrated thinking as they analyze the problem from multiple perspectives.

3. Encourage creative and critical thinking: Interdisciplinary connections and case projects develop creative solutions and critical thinking skills in students. In doing so, they learn not only to memorize knowledge, but also to create and improve it.

4. Collaboration and communication development: Multidisciplinary projects often take the form of group work. Students reinforce collaboration and communication skills by communicating with each other, exchanging ideas and making decisions together.

5. Ability to integrate with STEAM: A multidisciplinary approach blends naturally with STEAM education. For example, projects that combine physics and mathematics, arts and technology, biology and engineering allow students to put knowledge into practice and generate new ideas.

Research shows that a multidisciplinary approach increases students' ability to analyze complex situations, develop creative solutions, and communicate effectively. Therefore, this approach is an effective tool in the formation of 21st century skills 4C.

Multidisciplinary STEAM projects provide students with the opportunity to:

- Critical thinking: Analyze problems and develop logical solutions.
- Creativity: Combining different disciplines to generate new ideas.
- Collaboration: Through group work, students communicate with and help one another.
- Communication: Being able to express ideas and share them with others through presentations.

For example, solving a mathematical problem by combining art or using digital technology for a science project can develop creative and critical thinking in students. Also, group projects will increase their teamwork skills and communication skills.

The experience encourages students to actively participate in STEAM-based projects. Students develop their creativity and critical thinking skills by applying



new knowledge and sharing experiences with one another. At the same time, they strengthen collaboration and communication skills by working together and exchanging ideas. These skills can also be used in the students' everyday life, for example, solving a problem, pitching an idea in a group project, or getting an idea stated.

For the effective implementation of a multidisciplinary approach based on STEAM, it is necessary to take into account a number of issues. Above all, teacher training is important. They need to have not only knowledge of science, but also strategies for developing 21st century skills. Therefore, teachers are recommended to undergo special training on developing and implementing STEAM projects in the classroom.

It is also important to adapt educational resources and create the necessary technological infrastructure in schools. For example, laboratory devices, digital devices, art and technology materials support students' practical activities and boost their creative potential.

Future research may focus on examining the long-term impact of multidisciplinary STEAM projects. In particular, the impact of the development of 4C skills on social and academic outcomes, students' ability to self-govern, success and motivation in collaborative problem-solving can be analyzed.

In addition, education policy support mechanisms should be developed for the widespread introduction of STEAM approaches at the level of the education system. For example, measures such as adapting lesson plans, encouraging interdisciplinary integration, organizing the exchange of experience of teachers and introducing a system for evaluating the results of STEAM projects will be effective.

At the same time, awareness of parents and the public about the benefits of STEAM-based multidisciplinary education should be increased. Not only does this encourage students to actively participate in the classroom, but it also has a positive impact on their social development.

As a result, developing 4C skills through multidisciplinary STEAM approaches not only enhances students' individual potential, but also prepares them for the demands of the 21st century. This approach makes the learning process interactive, interesting and effective, forming the students' skills to think independently, develop creative solutions and communicate effectively.

Methodologically, it is advisable to give as a recommendation:



1. systematic training of teachers in STEAM and multidisciplinary methods.
2. Providing the necessary technological and creative resources in schools.
3. Creating interdisciplinary cohesion in the design of the course process.
4. Implementation of the 4C Skills Assessment and Development System.
5. To acquaint parents and the public with the benefits of STEAM education.

Multidisciplinary STEAM approaches are an effective way to develop 4C skills in primary education. This approach develops students skills for creative thinking, critical thinking, effective collaboration and communication. At the same time, STEAM projects make the learning process fun and interactive, which increases students' interest in learning. 21st century skills can be developed by applying this approach extensively in the education process, teacher training, and adapting lesson resources.

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