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THE ROLE AND IMPORTANCE OF THE STEAM APPROACH IN PRIMARY EDUCATION

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Annotation: This article explores the growing significance of the STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach in primary education. The integration of STEAM into the early stages of learning equips students with critical 21st-century skills such as creativity, problem-solving, collaboration, and innovation. The study investigates how STEAM-based teaching strategies impact cognitive development, student motivation, and interdisciplinary thinking. Through classroom observations, teacher interviews, and analysis of student projects, the research emphasizes the effectiveness of STEAM in creating a dynamic, hands-on, and inquiry-driven learning environment for young learners.

Key words: STEAM education, primary school, interdisciplinary learning, creativity, critical thinking, active learning, 21st-century skills.

INTRODUCTION

In the contemporary world, education must not only deliver content knowledge but also foster the skills necessary for future innovation and global citizenship. The STEAM approach, which combines Science, Technology, Engineering, Arts, and Mathematics, has emerged as a holistic educational model designed to bridge disciplinary boundaries and prepare students for complex problem-solving tasks. Unlike traditional models that treat subjects in isolation, STEAM promotes integrated learning experiences where students apply knowledge in real-world contexts. In primary education, this model is particularly beneficial as it aligns with children's natural curiosity, promotes inquiry-based learning, and supports the development of higher-order thinking skills from an early age. This article examines the role and impact of the STEAM approach in enhancing teaching and learning processes in primary schools.

METHODOLOGY

A qualitative research design was employed to explore the effectiveness of STEAM in primary classrooms. The study was conducted in four primary schools where STEAM integration had been introduced into the curriculum for at least one academic year. Data were gathered through classroom observations, teacher interviews, and a review of student portfolios and project outcomes. Teachers were asked to describe their experiences implementing STEAM strategies, the challenges they encountered, and their perceptions of student engagement and learning. Observational data focused on student participation, creativity in problem-solving, and collaboration during STEAM activities, such as hands-on experiments, robotics projects, and art-integrated science lessons.

The continuity of the education system is one of the important factors that contribute to the development of students at each stage. In particular, ensuring continuity in the transition from

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preschool to primary school is crucial for the child厴 adaptation to the new environment, consolidation of knowledge and maintenance of interest in learning. Preschool education is an important stage for the personal, psychological and social development of a child, during which the following basic skills are formed in students:

- Development of speech and communication skills;
- Perception and analysis of the environment;
- Ability to think independently and solve problems;
- Teamwork and communication skills.

Primary education builds on these skills, builds the child's academic knowledge and prepares him for the next stages of education. Therefore, there should be a logical connection between preschool education and primary school. The main factors for ensuring continuity are directly related to the coordination of educational programs. There should be a connection between preschool education and primary school curricula. This can be done in the following ways: organizing preparatory courses for primary school in preschool education, introducing topics in primary school curricula aimed at consolidating knowledge learned in preschool education, and establishing cooperation between preschool institutions and school teachers. Ensuring continuity in the transition from preschool to primary school is important for children's development and future educational process. For this, it is necessary to coordinate curricula, establish cooperation between teachers and educators, pay attention to the process of psychological adaptation, and involve parents in the educational process. Only then can children successfully adapt to the new stage and achieve high results in education. The STEAM education system, unlike traditional approaches, is based on interdisciplinary integration.

RESULTS

The findings revealed that the implementation of the STEAM approach had a significantly positive effect on student engagement, creativity, and understanding of interdisciplinary concepts. Students demonstrated heightened enthusiasm for learning, particularly when participating in projects that allowed them to build, design, or experiment. Teachers observed improvements in students厴 ability to ask meaningful questions, work collaboratively, and apply knowledge across multiple subject areas. For example, a project on environmental sustainability combined science (climate change), mathematics (data collection), technology (presentations), and art (visual storytelling), leading to a deeper understanding of the topic. Furthermore, students who struggled with traditional learning methods became more active and confident when engaged in STEAM tasks, suggesting a more inclusive learning environment.

In primary education, the task of STEAM education is to develop students' interest in natural and technical sciences. Doing the work with love serves as the basis for developing their interests. The STEAM approach allows children to systematically study the world, logically observe the processes occurring around them, understand their interconnections, and discover new, unusual, and interesting things for themselves. STEAM education combines interdisciplinary

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communication and the design method, which is based on the integration of natural sciences with technology, engineering creativity, and mathematics. This provides preparation for engineering-related professions. This approach:

- Develops scientific research skills in children;
- Develops real-life problem-solving skills;
- Instills a culture of conscious use of technology;
- Instills interest in engineering and design;
- Strengthens creative thinking through art;
- Develops mathematical and analytical thinking.

Preschool children are very interested in observing nature, conducting experiments and making things with their own hands. If these interests are systematically supported, their interest in STEAM subjects will increase even more in the primary grades. In preschool educational organizations, children make their first acquaintance with natural sciences, mathematics and technology. At this stage, it is appropriate to introduce the following STEAM activities:

1. Observing nature - children acquire scientific knowledge by observing plants, animals and weather changes.

2. Simple science experiments - studying the states of water, the properties of magnets or the propagation of light.

3. Construction and engineering games - forming simple engineering concepts using Lego, constructions and other materials.

4. Art and design - developing creative thinking by studying colors, shapes and textures.

5. Math games strengthen math skills through counting, identifying shapes, understanding patterns, and solving problems.

The most important aspect at this stage is to interest children and create opportunities for independent experimentation. Ensuring continuity in the transition to primary school is based on the integration of the educational process, creating an integral connection between the school and preschool education systems. The following principles are important for the continuity of the STEAM approach in the transition from preschool to primary school:

1. Maintaining interdisciplinary connections STEAM elements should be maintained in the primary curriculum and different subjects should be taught in a way that is interconnected. For example, math lessons can be combined with practical counting and measuring exercises, while science or technology lessons can be taught.

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2. Using creative and interactive teaching methods experiential learning from the preschool stage should continue in the primary grades. Students should consolidate their knowledge through games, laboratory work and project-based work.

3. Effective use of technology modern digital technologies and programs can make the learning process of children more interesting. For example, STEAM subjects can be taught more effectively using virtual laboratories, interactive games and software tools.

4. Practical projects and problem solving children should be given real-life projects to develop their problem-solving and problem-solving skills. For example, the Build Your City project can teach the basics of engineering and design.

5. Teacher training To effectively implement the STEAM approach, teachers need to be well-versed in modern pedagogical technologies and interdisciplinary integration methods. Therefore, it is important to organize regular seminars and trainings for teachers.

DISCUSSION

The results affirm the transformative potential of the STEAM approach in primary education. By integrating disciplines, STEAM encourages students to think critically and creatively, linking abstract knowledge with tangible experiences. The inclusion of Arts within STEM not only fosters imagination but also enhances emotional expression, which is vital for young learners. STEAM殿 hands-on and project-based methods make learning more relevant and enjoyable, helping students connect school content to real-life applications. However, successful implementation depends on teacher training, curriculum flexibility, and resource availability. Educators must be equipped with the skills and mindset to design and deliver interdisciplinary lessons. Moreover, assessment strategies should move beyond rote memorization to include evaluations of creativity, collaboration, and innovation.

STEAM involves an integrative approach to education with the concepts of scientific research and technological progress in everyday life. The goal of this approach is to promote scientific literacy and competitiveness by involving schools and the public in ensuring sustainable development of the world economy and development through education. Ensuring a continuous STEAM approach in the transition from preschool to primary school is important for the development of children's scientific and creative abilities. Through the STEAM approach, children have the opportunity to think independently, solve problems and form innovative approaches. Therefore, one of the urgent tasks is the systematic and continuous introduction of the STEAM approach in the education system. The STEAM program is distinguished by active communication and teamwork. During the communication period, a free environment is created for expressing one's opinion and conducting discussions. They learn to speak and make presentations. Children remember the lesson better if they always participate with their teacher and classmates. STEAM programs increase the interest of students aged 7-14 in continuous activities. For example, if they study the 3 states of water in nature lessons, in STEAM circles they consolidate their knowledge by freezing water to a certain degree or changing its state at certain degrees. In STEAM classes, they can easily understand the terms while conducting

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interesting experiments.

CONCLUSION

To conclude, the STEAM approach offers a powerful framework for enhancing learning in primary education. It cultivates essential skills such as creativity, critical thinking, communication, and collaboration, which are crucial for students厥future success. When implemented effectively, STEAM makes learning more meaningful, inclusive, and connected to real-world challenges. To maximize its benefits, schools must invest in teacher training, resource development, and curriculum integration. With continued support and innovation, STEAM can play a central role in transforming primary education into a vibrant and future-ready learning environment. Children who are educated through STEAM are more likely to be successful in science and technology in the future. Therefore, it is necessary to focus on creating a STEAM education system that is continuous between preschool and primary school.

References:

1.Yakman, G. (2008). STEAM Education: An Overview of Creating a Model of Integrated Education. In Pupils Attainment Conference Proceedings.
2.Beers, S. Z. (2011). 21st Century Skills: Preparing Students for their Future. Kappa Delta Pi Record.
3.Henriksen, D. (2014). Full STEAM Ahead: Creativity in Excellent STEM Teaching Practices. The STEAM Journal, 1(2).
4. Land, M. H. (2013). Full STEAM Ahead: The Benefits of Integrating the Arts into STEM. Procedia Computer Science, 20, 547552.
5.Sousa, D. A., & Pilecki, T. (2013). From STEM to STEAM: Using Brain-Compatible Strategies to Integrate the Arts. Corwin Press.
6. Rakhmatov, F. O., & Nuriev, K. K. (2022). Study of melon fruits as an object of technical processing. Ilmiy maqolalar toplami, 330.
7. Nuriev, K. K., Rakhmatov, O., Kadirova, R. S., & Rakhmatov, O. O. (2015). Bioconversion of organic waste of plant origin in the conditions of Uzbekistan. In Problems of reclamation of household, industrial and agricultural waste (pp. 468-470).
8. Dzhuraev, A. Zh., Nuriev, K. K., & Yusufaliev, A. (2003). Development of high-resource paws for cultivators. Tractors and agricultural machinery, 2, 42-43.
9.Raxmatov, F. O., Raxmatov, O., Nuriev, K. K., & Nuriev, M. K. (2021, October). Combined dryer with high efficiency for drying high-moist agricultural products. In IOP Conference Series: Earth and Environmental Science (Vol. 868, No. 1, p. 012076). IOP Publishing.
10.Nuriev, K. K., Nuriev, M. K., Rakhmatov, O., & Rakhmatov, F. O. (2022, August). Comprehensive assessment of the degree of flooding of soil-cutting working bodies (on the example of plow shares). In IOP Conference Series: Earth and Environmental Science (Vol. 1076, No. 1, p. 012069). IOP Publishing.