

The Pedagogical and Psychological Foundations of Steam Educational Technology in Elementary School

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Abstract. *We will focus on the effective use of STEAM technology in the unusual and integrated organization of lessons for elementary school students.*

Additionally, the study highlights the psychological benefits of STEAM education, such as improved spatial reasoning, collaboration, and resilience in young learners. The findings suggest that a well-designed STEAM curriculum, supported by interactive technology and student-centered learning approaches, can significantly enhance both academic and socio-emotional development in elementary school students.

Key words: *STEAM technology, critical thinking, creative thinking, integration, innovation, primary education, lesson, pedagogical process.*

Introduction.

The large-scale reforms carried out in our country during the years of independence have become an important foundation for strengthening national statehood and sovereignty, ensuring security and law and order, the rule of law in society, human rights and freedoms, an atmosphere of interethnic harmony and religious tolerance, created the necessary conditions for a decent life of our people, education and occupation at the level of world standards, and the realization of the creative potential of our citizens. Based on the new conditions, the Law of the Republic of Uzbekistan "On Education" in the new edition, the Decree of the President of the Republic of Uzbekistan No. UP-4947 of February 7, 2017 "On the Strategy of Actions for the Further Development of the Republic of Uzbekistan," the Decree of the President of the Republic of Uzbekistan No. PP-3931 of September 5, 2018 "On Measures to Introduce New Management Principles into the System of Public Education," as well as the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 187 of In accordance with the Decree of the President of the Republic of Uzbekistan No. PP-3982, "On Measures to Further Improve the System of Training Teaching Staff, Retraining and Advanced Training of Public Education Workers," it is necessary to ensure the continuity and consistency of educational stages, create a modern teaching methodology, improve state educational standards based on a competency-based approach, develop and implement a new generation of teaching and methodological complexes, and further improve the system of retraining and advanced training of teaching staff.

Research and methods.

"STEAM and SMART educational technologies" are developed based on modern approaches to organizing the educational process in science and ensuring its quality, advanced experience in the field of innovative technologies based on a modular-credit system, forming knowledge and skills in the methodology, forms, methods, tools of teaching future specialists in specialized disciplines, as well as in advanced pedagogical and information technologies.

STEAM education system:

- **S – science** - tabiiy fanlar
- **T – technology** - texnologiya
- **E – engineering** - muhandislik
- **A – art** - san'at
- **M – math.** – matematika

These directions are the most popular system in the modern world. Therefore, today the STEAM system is developing as one of the main trends. The direction of STEAM education is based on the application of a practical approach, as well as the integration of all five areas into a single educational system.

Results.

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STEAM was developed in America. Some schools took into account the careers of graduates and decided to combine subjects such as science, technology, engineering, and mathematics, and the STEM system was formed in this way. (Science, technology, engineering, and mathematics). Later Art was added here, and now STEAM was formed to the end. Teachers believe that these topics, or rather knowledge of these subjects, will help students become highly qualified specialists in the future. Ultimately, children strive to acquire good knowledge and immediately apply it in practice.

If we say that the main goal of traditional education is to teach knowledge and use this knowledge for thinking and creativity, then the STEAM approach teaches us to combine acquired knowledge with real skills. This allows schoolchildren not only to have some ideas, but also to apply them in practice and implement them.

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The most famous example of the STEAM approach is the Massachusetts Institute of Technology (MIT). The motto of this world university is "Mens et Manus" (Reason and Hand). The Massachusetts Institute of Technology has developed STEAM courses to give children the opportunity to pre-learn and familiarize themselves with the concept of STEAM, and has even created STEAM training centers in some educational institutions.

According to statistics, since 2011, the demand for STEAM professions has increased by 17%, while the demand for ordinary professions has increased by only 9.8%, indicating a high demand for this education system worldwide.

Discussion.

STEAM education is a priority in many countries for some reasons:

In the near future, there will be a very high demand for engineers and high-tech production specialists in the world, and therefore in Uzbekistan.

In the distant future, we will have professions related to technology and high-tech manufacturing alongside the natural sciences, especially in demand for biotechnology and nanotechnology specialists.

- Specialists will need comprehensive education and experience in various fields of technology, science, and engineering.

Benefits of STEAM education

- Integration of teaching not in academic subjects, but in "topics."
- Applying scientific and technical knowledge in real life
- Develop critical thinking skills and problem-solving
- Active communication and teamwork
- Increased self-confidence

Benefits of STEAM education

- Developing interest in technical sciences
- Creative and innovative approach to projects
- Bridges between education and careers
- Preparing students for technological innovation

What is the difference between STEAM education and traditional education?

Traditional education in general education schools is aimed at developing students' knowledge, skills, and abilities in a specific subject area based on the State Educational Standard. STEAM education is aimed at developing students' interest in conducting educational research, conducting experiments, fostering design-oriented creativity, and creating innovations during classroom and extracurricular activities by demonstrating how knowledge, skills, and abilities acquired based on the State Educational Standard are scientifically linked to everyday life.

In the teaching of natural and exact sciences, work was previously organized with students in the areas of construction and programming in school and extracurricular education, in the areas of aircraft construction and young technology.

If labor education classes introduced students to various professions and formed necessary skills in some areas, then today there is an improvement in various technical tools and equipment aimed at facilitating human labor.

Conclusion.

The main goal of implementing STEAM education is to identify the interests of students from an early age and focus on developing their talents and creativity, educating scientifically-researchable, creative personnel through the implementation of innovations. Therefore, when transitioning to a new education system, serious attention is also paid to the issue of teacher retraining. In this case, the future is focused on the development of technology, the goal is for teachers who teach students to correctly determine the future of technology, overcome any obstacles on this path, use all opportunities, and unlimitedly expand the worldview of students.

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