Creative ways how to incorporate STEAM in the classroom

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Abstract. *In this study, we argue that pedagogical technology plays a critical role in modern education, particularly in the context of STEAM (Science, Technology, Engineering, Arts, and Mathematics) education. By seamlessly integrating technology into pedagogical practice, educators can increase student engagement, foster creativity, and facilitate deeper learning experiences. This article examines the importance of pedagogical technology in STEAM, its impact on student outcomes, and the different approaches used to effectively integrate technology.*

Key words. *STEAM education, technology, innovation, robotics, interdisciplinary learning, hands-on activities, digital tools, creativity, critical thinking, problem solving.*

Developmental centers serve to effectively organize the content of children's activities. Developmental centers reflect areas that integrate STEAM. For example, the center of science and nature - with S-Science, the center of art and role-playing games and staging - with A-Art, the center of construction, construction and mathematics - E- Engineering. and in sync with M Mathematics (Mathematics). There are 10 advantages of a STEAM education.

Integrating education not by subjects, but by subjects. STEAM education combines interdisciplinary communication and design method, which is based on the integration of natural sciences with technology, engineering creativity and mathematics. It provides training for engineering-related professions.

Retention of scientific and technical knowledge in real life. In STEAM education, the use of scientific and technical knowledge in real life is shown to

children with the help of practical exercises. In each lesson, students design, build, and develop models of modern industry.

Develop critical thinking skills and problem solving. The STEAM program develops the critical thinking and problem-solving skills that children need to overcome the challenges they face in their daily lives. For example, children build a model of a speeding car, then put it to the test. After the first test, if the expected result is not achieved, they think about and find the reasons. Maybe the size of the wheels or the aerodynamics are not right. After each test, they eliminate the shortcomings.

If we expand this acronym, we get: STEAM is S science, T technology, E engineering, A art and M math. In English it goes like this: science, technology, engineering, art and mathematics. Do not forget that these directions are becoming the most popular in the modern world. Therefore, today the STEAM system is developing as one of the main trends. STEAM education is based on the application of a practical approach and the integration of all five areas into a single educational system.

This is the logical result of combining theory and practice. The STEAM approach was originally developed in the USA. Some schools have focused on developing the careers of their graduates and have decided to combine subjects such as science, technology, engineering and mathematics, that is, STEM has been established. (Natural Sciences, Technology, Engineering and Mathematics). Later, Art (art) was added to it and STEAM was established. The most famous example of the STEAM approach was developed at the Massachusetts Institute of Technology (MIT). The motto of this famous university is Mind and hand. The Massachusetts Institute of Technology has developed STEAM courses, and some schools have even created STEAM learning centers.

How does the STEAM approach affect academic performance?

His main idea is that practice is as important as theoretical knowledge. That is, during learning, we need to work not only with our brain, but also with our hands. Learning only within the walls of the classroom does not keep pace with the

rapidly changing world. The main difference in the STEAM approach is that children use both their brains and their hands to successfully learn a variety of subjects. They "read" the knowledge they received.

STEAM education is not only a way of teaching, but also a way of thinking.

In a STEAM learning environment, children acquire knowledge and immediately put it to use. Therefore, when they grow up and face life's problems, whether it is environmental pollution or global climate change, they understand that such complex issues can only be solved by relying on knowledge from different fields and working together. Here it is not enough to rely on knowledge of only one subject.

STEAM education is based on the technology design method, based on knowledge and artistic inquiry. Such a search is carried out in the research works of obtaining knowledge in the process of practical activity, then reusing them in practice, i.e. creating constructions in games, leaving the elements of technical creativity.

STEAM education directly connects the development of students with the outside world. It is known that the technology directly related to the world around us in natural sciences is constantly used in our daily life, while engineering is reflected in houses, roads, bridges and machine mechanisms.

The approach based on STEAM education allows young students to systematically organize the world, to logically observe the processes taking place around them, to understand their interrelation, to discover new, unusual and interesting things for them. By waiting for something new, the reader develops curiosity in young people, it leads to the identification of an interesting problem for him, the development of an algorithm for finding a solution, a critical evaluation of the results, and the formation of engineering aspects of thinking.

The advantages of STEAM education are as follows:

1. Education should be integrated by subjects, not by academic subjects. STEAM education combines interdisciplinary communication and design, which is based on the integration of natural sciences with technology, engineering and

mathematics. In this, preparation for professions related to engineering is carried out.

2. Application of scientific and technical knowledge in real life. In STEAM education, practical activities show children how to use their scientific and technical knowledge in real life. In each lesson, students design, build, and develop models of modern industry. They organize a specific project, as a result of which they create a prototype of a real product.

3. Development of critical thinking skills and problem solving. The STEAM program develops the critical thinking and problem-solving skills that children need to overcome the challenges they face in their daily lives. For example, children assemble a model of a fast moving car, and then test it.

4. Increased feeling of trust in one's power. Kids get closer to their goal each time they build a bridge, operate a car, and operate a model. Each test improves the song model. In the end, he overcomes all problems with his little strength and achieves his goal.

5. Active communication and teamwork. The STEAM program is distinguished by active communication and teamwork. During the dialogue, a free environment is created to express one's opinion and conduct a debate. They arrange to speak and give presentations. Children are always in communication with the teacher and classmates. Children will remember the training better if they actively participate in the process.

6. To develop their interest in technical sciences. The mission of STEAM education in primary education is to develop students' interest in natural and technical sciences.

7. Creative and innovative approach to projects. STEAM education consists of six stages: question (assignment), discussion, design, construction, testing and development. These steps are the basis of a systematic design approach. The co-existence or joint use of various possibilities is, in turn, the basis of creativity and innovation. Thus, the joint organization of science and technology leads to the creation of many new innovative projects.

8. Bridge between education and career. According to various estimates, 9 of the 10 most in-demand specialists require STEAM knowledge. Such professions include: technical engineer, power engineer, computer system analyst, robot technician.

9. Preparing young students for a technologically innovative life. STEAM education prepares young people to live in a technologically advanced world. Over the next 60 years, technology developed rapidly: from the discovery of the Internet (1960), GPS technology (1978) to DNA scanning, and of course the iPod (2001). Technologies will continue to evolve, and STEAM skills will be at the core of that evolution.

10. As a supplement to STEAM school programs, STEAM programs increase the interest of students aged 7-14 in independent activities. For example, in informatics and information technology classes, when a device is modeled or its operation algorithm is organized, an algorithmic ship-sequence software model is written on the board, and rockets, airplanes, parachutes are built and launched in STEAM classes, and they strengthen their knowledge. Students are not always quick to understand terms they have not seen or heard. In STEAM classes, they can easily understand these terms as they do fun experiments.

In conclusion, I would like to say that the STEAM approach in high school encourages children to conduct experiments, create design models, create independent music and films, turn their ideas into reality and create a final product. This learning approach allows children to effectively combine theoretical and practical skills and makes it easier to progress in higher education.

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