

Steam Approach in General Secondary Education

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ABSTRACT

The article provides information on STEAM technology, which is gaining popularity today, and the role of technology in training thinking professionals.

KEY WORDS: *Steam, science, technology, engineering, math, economics, competence.*

Today, STEAM (science, technology, engineering, mathematics) educational technology is becoming more and more popular in the world. STEAM technology is a set of educational and professional sciences in natural, technological, engineering and mathematical sciences aimed at training specialists with a new type of thinking, without which the development of an innovative economy is impossible. STEAM education technology is said to be the most promising trend in education. According to a 2015 European School net survey conducted in 30 countries, 80% of countries have identified STEAM as their priority. The European School Network is a network of 31 European Ministries of Education to disseminate educational innovations among key stakeholders: ministries of education, schools, teachers, researchers and industry partners. Almost all partner countries in the European school network are implementing education reforms using STEAM technologies. The emergence of STEAM technologies is due to the problem of “fragmentation” of the subjects studied in school, the inability of school students to apply knowledge from different disciplines in a single project. The use of STEAM technology allows students to develop a high level of organizational thinking and teach them to apply the acquired knowledge effectively in life.

The main goal of STEAM education is to develop creative thinking, to use an engineering approach in solving real problems, to understand the role of technology in solving them. In addition, experts note that STEAM education can be considered as a universal model of high-quality preparation of schoolchildren and students for professional activities in the context of industrial economy.

Reforms and changes in general secondary education are aimed at improving the quality and effectiveness of education by developing and implementing standards, curricula that provide for the development of not only educational but also life skills in children. Finally, these areas are directly related to the development of methodological services, which are the link between the school community, the education management system and pedagogy.

Achieving and improving the quality of education requires continuous and continuous improvement of the professional skills of schoolchildren. It is important to create a methodological environment in educational institutions that fills the gaps in the professional skills and knowledge of teachers and develops a creative approach to their practical activities.

Today, this approach is called STEAM, which is the development of the well-known acronym STEM, with the exception of art.

S is education or science.

T - technology. Electronic engineering, which means engineering in English.

M is a mathematician, the queen of sciences is mathematics. Under the art The new component of the abbreviation

A can be used to understand completely different areas - painting, architecture, sculpture, music and poetry.

STEAM is a new learning technology that combines several disciplines as a means of developing critical thinking, research skills and teamwork skills. The inclusion of art allows for an expansion of the student body involved in the project, so that children who do not have specific skills in design and math can help the group implement the project aesthetically.

STEAM gives our children - the next generation of inventors, inventors, to conduct research as a scientist, to shape technology, to design as an engineer, to be creative as an artist, to think analytically as a mathematician through play. Today, STEAM education is evolving as one of the major trends in the world and is based on the integration of five areas into a single curriculum in the application of a practical approach. The conditions for such education are its continuity and the development of children's ability to communicate in groups, in which they gather ideas and exchange ideas. Therefore, the core curriculum includes modules for developing logical thinking, such as Lego technology and children's research.

Thanks to the STEAM approach, children understand nature and explore the world on a regular basis, thereby developing their interests, engineering thinking style, ability to cope with critical situations, teamwork skills and leadership, the basics of self-expression, respectively. provides a radically new level of child development. Build self-confidence. In this approach, children "launch" bridges and roads, planes and cars created by their own hands, "develop" and test underwater and aerial structures, and each time they get closer to the goal. A "product" that doesn't work well is constantly being tested and improved. As a result, solving all the problems on their own, achieving the goal will bring inspiration, victory, adrenaline and joy for children. Each victory gives more confidence in their abilities.

STEAM programs are also characterized by active communication and teamwork. During the discussion phase, they learn not to be afraid to comment. Most of the time, they don't sit around a table, they test and develop "products" based on their designs. They are always busy interacting with educators and their friends in a collaborative team. Develops interest in technical sciences. The task of STEAM education at school age is to create the preconditions for the development of interest. For children, the love of what they do in the natural and technical sciences is the basis for developing interest.

The STEAM curriculum is based on the idea of teaching students using an interdisciplinary and practical approach. Instead of studying each of the five subjects separately, STEAM combines them into a single curriculum. STEAM education provides access to scientific methods, technical manuals, mathematical modeling and engineering design. This leads to the formation of innovative thinking, skills and abilities of the student in the XXI century. According to teachers, integration allows you to succeed in many professions. Almost all experts say that advanced technology increases the motivation to learn and expands the basic knowledge in the field of design and programming.

STEAM teaching is an innovative way to take our children's skills to the next level. With its help, we can build an advanced human resources base that will allow us to become an economically independent and competitive country.

Advantages of STEAM training:

- Integrated lessons, not by topic;
- apply scientific and technical knowledge in real life;
- develop critical thinking skills and problem solving;
- building self-confidence;
- active communication and teamwork;
- development of interest in technical sciences;
- creative and innovative approaches to projects;
- Development of technical creative motivation through children's activities, taking into account the age and individual characteristics of each child;
- initial professional guidance.
- preparing children for technological innovations in life;
- STEAM, in addition to the mandatory part of the basic education program.

This means that the teacher must ask the student a correct and specific question (task) on the topic, and the question is discussed. This will help the student to consolidate their knowledge of the topic and get to the heart of the matter. Once the topic is clear, he will try to develop a model at the design stage. The next stage is construction, in which a model is created. The topic is reinforced, tests are given to replicate theoretical knowledge, and the topic is refined. As each student completes the task, he or she will get to the heart of the topic and learn how to apply it in practice.

STEAM helps children develop the following important traits and skills: Comprehensive understanding of problems;

Creative thinking;

Engineering approach;

Critical Thinking;

Understand and apply scientific methods;

Understand the basics of design.

This approach will help solve life problems in children in the future. One of the characteristics of our lives is that they are changing rapidly. We live in a world of rapid change. Today's schoolchildren need to work in professions that don't yet exist, use technologies that have not yet been created, and solve problems that we can predict. School education must meet the goals of rapid development. The integrated learning process, research and practical activities allow children to become better acquainted with inanimate objects in the natural sciences and to acquire basic skills in model design and programming. This will create a better foundation for the future of our children.

How does the STEAM approach affect learning outcomes?

The basic premise of the STEAM approach is that practice is as important as theoretical knowledge. That is, when we study, we have to work not only with our brains, but also with our hands. The basis of the STEAM approach is that children successfully study many subjects and develop their skills and abilities to apply them in practice. This will allow them to gain more in-depth knowledge in the future.

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