

STEM APPROACH TO EDUCATION AND ITS PERSPECTIVES

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ABSTRACT

The article reports on STEM technologies, which are rapidly developing in the education system today. Opinions are expressed on the methods and advantages of making the most of this technology in a free education system.

Keywords: STEAM, STEM, science, technology, engineering, art, math, natural sciences, technology, engineering, art, mathematics.

INTRODUCTION

Now technological approaches to the educational process are growing rapidly. High-tech products and innovative technologies are becoming an integral part of modern society. Robotics, engineering, modeling and design play a leading role in preschool education organizations, school and higher education. Introducing STEM education in a continuous education system will help teachers quickly manage the flow of information and learn how to apply the acquired knowledge in practice.

So what is STEM education itself, why is it promising?

STEM is an abbreviation consisting of the first letters of English words: science (science), technology (technology), engineering (engineering), and mathematics (mathematics). The term "STEM education" originated in the United States in the early 2000s. This is a model that integrates engineering and science into a single system. Professionals with such knowledge are able to look at the problem in general, not in the context of a single technology or science field. Integrative training enables modern tech companies to prepare valuable personnel that can work effectively. The term STEM is first introduced to the school program in the United States, aimed at developing competencies in students' scientific and technological fields. Later, this direction was expanded, and additional letters were added to the term. For example, adding "R" – robotics – robotics to it, adding "A" - art as STREM - art, it began to be called STEAM.

There are two main reasons for the emergence of STEM technology in education. First - an increase in the need for all-round staff. It required the development of nanotechnology, biotechnology, digitalization, robotics.

The second - The crisis of natural-scientific and generally fundamental preparation at American universities.

The focus in this direction is on hard skills, but the soft skills also gradually get stuck with it. The application of data analysis and the use of digital technology benefits any business, so professionals who currently receive STEM training are the most slewed-up employees in different countries of the world.

LITERATURE ANALYSIS AND METHODS

Analysts at the US Bureau of Labor Statistics predict that the need for STEM cadres will increase by 10% over the next 76 years. In the United States alone, about 10 million people are needed. At the same time, the pace of training is growing and staffing definitance remains. To understand what is the essence of STEM education, you can get acquainted with the basic facts about this learning model through the following Pivot table:

Pivot jadvali

Interdisciplinary nature of education	STEP's mission is to overcome the separation from solving practical problems typical of traditional learning and to create understandable relationships between several subjects for students.
Creativity and innovation	Studying one theory is not enough. It is important to constantly look for new ways, ideas and ways to implement them in practice.
Design form of the learning process	Students are united in groups to solve learning problems together. By working in the team on the project, they will have as close experience as possible to their future profession.
Practical orientation	Training involves internships in technological companies. The knowledge and skills gained can be used for the needs of the family, educational institution, enterprise, city.
Ability to choose fans	The main academic subjects are selected to prepare an expert in applied scientific research. These are the subjects of modern technologies, engineering sciences and natural sciences — chemistry, physics and biology.
Critical thinking	What has been studied requires understanding and validation through experimentation. This is the logic of learning.

RESULTS

STEM Education Programs

Because STEM is based on pedagogical philosophy, this model is not limited to any age, but encompasses all levels of education - from preschool to secondary school. Stem education programs for children and adults are available, taking into account the age and psychological characteristics.

STEM education for preschool-age children

The idea of priority areas of the future profession is formed at a very early age. How to introduce THM into preschool? STEM elements in the kindergarten include educational activities with LEGO building kits, robotics, environmental travel and communication skills and gaming activities for the development of teamwork.

An integrated approach and engaging activities in the form of a game develop curiosity, cognitive activity and creativity. STEM education teaches preschool-age children to quickly manage the flow of data, put the acquired knowledge into practice, take initiative and skillfully use technology. By studying the basics of exact science, children begin to understand the interrelationship of current events and discover a lot of new things.

Limi STEM maktabda

STEM training methods have long been used in the best educational institutions. In primary school, such education is aimed at exploring and understanding the world around us, the core trends and professions of STEM. Its goal is to stimulate children's interest in knowledge and science.

High school students will learn what skills and skills are required in different fields. In adolescence, they begin to identify their preferences and priorities for a future career.

STEM programs for high school students are aimed at practical application of acquired skills. Children try to solve complex problems by participating in more complex experiences and projects: the search for alternative energy sources, issues of planet pollution, the rational use of resources, etc.

Modern schools are equipped with special classrooms for STEM laboratories. These are the rooms where there are wide crossings between student workstations. For project work, it is recommended to use single tables that can be easily grouped into modules. Classrooms are intended to have modern visualization tools, learning robots, mechanical systems, 3D technologies and programming capabilities.

STEM Education in Higher Education

On the same day, STEM education can be obtained at leading universities in the United States, Great Britain, Australia, Korea, China, Germany, Japan, Switzerland, Singapore, and other countries. Russia also does not deviation from the STEM approach.

Since 2017, the first "Pedagogical STEM Park" in our country has been operating at the Institute of Mathematics, Informatics and Natural Sciences at the Moscow City University of Pedagogy. Members of the teaching staff here communicate with enterprises that supply modern equipment to educational institutions.

For 5 years, the Moscow State Pedagogical University institute of Business Administration in Zelenograd has been receiving students for a master's degree in physics and STEM education. In the graduate program of the Faculty of Chemistry at Southern Federal University, they study "STEM Education Theory and Technology", and in the undergraduate program "STEAM practice in education" at Kant Baltic Federal University.

STEM education programs are also proposed at Moscow State University named after Lomonosov. As part of the pre-university preparation, STEM program training is carried out by the University of Innopolis in Tatarstan.

DISCUSSION

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Is there a future for the new education paradigm? Yes of course. Training of STEM personnel is developing in three main areas.

First of all this is the personalization of education. Currently, leading universities in the world are actively personalizing their educational programs. There are several disciplines left for compulsory health, and students choose everything else on their own. The personal training plan allows each student to open up the potential and get an education that meets the needs of future employers.

Secondly, The development of STEM education focuses on design thinking and teamwork. Modern business is interested in engineers with team management skills and experience working in the team. To meet such expectations, STEM training will introduce soft skills into the training.

Third, it has become clear lately (due to the current epidemiological situation) how important it is to develop mixed educational formats that the STEM approach provides. The remote format allows educational institutions to attract qualified teachers who cannot conduct classes in person, and allows students to plan their schedules more freely and not depend on hostels and rental housing.

In the future STEM will not only become part of university education, but will also find its place in schools, extra and preschool. Thanks to this, it is possible to increase the efficiency of the local education system and the competitiveness of the Russian science and industry.

CONCLUSION

STEM education is a special technology that represents radically new approaches to learning. They are based on a comprehensive approach to the study of events and problems. The acronym was first proposed by American bacteriologist Rita Colwell. It was in the 1990s. Active use of STEM began in 2011. It was then that biologist Judith A. Ramali developed new educational programs.

Replied Alexander Neverov, director of the Institute for Psychological and Economic Research. STEAM is an extension of STEM. Technically, the difference is in the addition of a single letter A (art - art, humanities, creativity). In terms of content, STEAM is the integration of NM with technologies for the development of soft skills, i.e. the integration of natural science and engineering interdisciplinary education with an interdisciplinary education block in the field of humanities and the development of a non-engineering industry, creativity.

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