



**STEAM EDUCATION AS FUTURE EDUCATION: SCIENTIFIC
THEORETICAL BASIS OF USING STEAM TECHNOLOGY IN PRIMARY
EDUCATION**

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| ABSTRACT | KEYWORDS |
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| <p>This article steam education as the education of the future: the scientific theoretical basis of using steam technology in primary education is analyzed. In addition, the need to use STEAM educational technology in primary education, the importance of STEAM educational technology in primary education have been analyzed.</p> | <p>STEAM, science, technology, art, math, natural sciences, technology, engineering, mathematics, robotics, elementary education, steam technology, etc.</p> |

Introduction

For some, an outlandish trend is still taking long strides across the country, but for others it is already quite understandable. No educational conference, no serious event from the world of pedagogy can do without these five letters, intricately combined into a catchy "STEAM". And what a wide range of opportunities and potential for an intelligent teacher he hides in himself.

What is STEAM Education? It all started with the term STEM, which appeared in the USA. The difference between STEM and STEAM is only one letter A- Art, but the difference in approach is huge! Recently, STEAM education has become a real trend in the United States and Europe, and many experts call it the education of the future.

The introduction of Art. The need for a combination of science and art was also written by such thinkers as the Chinese mathematicians-enlighteners of the XI century.

Almost all inventors and scientists were also musicians, artists, writers or poets: Galileo was a poet and literary critic, Einstein played the violin, Morse was a portrait painter, etc. Thus, creativity was stimulated and strengthened through the practice of disciplines related to the right half of the brain.

You can't do without art at school. This is the creativity of children.

STEAM is a new educational technology that combines several subject areas as a tool for developing critical thinking, research competencies and group work skills.

STEAM is a development of the well-known abbreviation STEM, except that art is included. S - science, or science. T - technology, that is, technology. E - engineering, which means engineering in English. M - maths, the queen of sciences is mathematics. Art, a new component of the abbreviation A - art, can be understood as completely different directions – painting, architecture, sculpture, music and poetry. The addition of art makes it possible to expand the contingent of students involved in the

project, so children who do not have pronounced abilities in design and mathematics can help the group with the aesthetic implementation of the project.

The STEAM curriculum is based on the idea of teaching students using an interdisciplinary and applied approach. Instead of studying each of the five disciplines separately, STEAM integrates them into a single learning scheme.

STEM education allows you to use scientific methods, technical applications, mathematical modeling, and engineering design. Which leads to the formation of innovative thinking of the student, skills of the 21st century.

According to teachers, integration allows you to be successful in most professions. Almost all experts note that advanced technologies increase motivation to learn and expand basic knowledge in the field of design and programming.

STEM learning is an innovative technique that allows us to reach a new level of skill improvement in our children. With its help, we will be able to form a progressive human resource base that will allow us to become an economically independent and competitive country.

The advantages of STEM education: Integrated training on topics, not on subjects; Application of scientific and technical knowledge in real life; Development of critical thinking and problem solving skills; Building self-confidence; Active communication and teamwork; Development of interest in technical disciplines; Creative and innovative approaches to projects; Development of motivation to technical creativity through children's activities, taking into account the age and individual characteristics of each child; Early professional orientation; Preparing children for technological innovations in life; STEM, as an addition to the mandatory part of the basic educational program (OOP).

Scientific and technical orientation (STEM). The rapid development of technology leads to the fact that in the future the most popular professions will be related to high technologies: IT specialists, big data engineers, programmers. The education system responds to such a social demand with the emergence of a large number of robotics, programming, modeling (STEM) circles. However, the idea that scientific and technical knowledge is scarce is becoming more and more common. In the future, the skills of the 21st century, which are often called 4K, will be in demand.

Skills of the future (4K). The skills of the 21st century are a special area that is being actively discussed at various levels. The essence of the concept is as follows: the key skills that defined literacy in the industrial era were reading, writing and arithmetic. In the 21st century, the emphasis is shifting towards the ability to think critically, the ability to interact and communicate, and a creative approach to business. Thus, the basic skills of the future 4K have been formed: Communication; Cooperation; Critical thinking; Creativity.

These skills cannot be acquired only in laboratories or from knowledge of certain mathematical algorithms. That is why specialists have to study STEAM disciplines more and more often.

The program "Stem-education of preschool and primary school age children". The proposed program "STEM education for preschool and primary school children" is a partial modular program of preschool education aimed at developing intellectual abilities in the process of cognitive activity and involvement in scientific and technical creativity.

The program can also be successfully used in extracurricular activities within the framework of the basic educational program of primary general education, and each of its sections – the educational

module – can be independently applied both in the above-mentioned educational organizations and in the system of additional education.

The modern world poses difficult tasks for education: to prepare a child for life in a society of the future, which requires special intellectual abilities from him, primarily aimed at working with rapidly changing information. The development of skills to receive, process and practically use the information received is the basis of the STEM education program.

The STEM approach gives children the opportunity to explore the world systematically, delve into the logic of the phenomena happening around them, discover and understand their interrelation, discover new, unusual and very interesting things. The expectation of getting to know something new develops curiosity and cognitive activity; the need to determine an interesting task for themselves, choose ways and make an algorithm for solving it, the ability to critically evaluate results - develop an engineering style of thinking; collective activity develops teamwork skills. All this provides a radically new, higher level of child development and gives wider opportunities in the future when choosing a profession.

What is included in the program and what educational tasks are being solved:

Educational module "Didactic system of F. Froebel"

- Experimentation with objects of the surrounding world;
- Mastering mathematical reality through actions with geometric bodies and shapes;
- Mastering spatial relationships;
- Construction in various angles and projections.

Educational module "Experimentation with living and inanimate nature"

- formation of ideas about the world around us in experimental activities;
- awareness of the unity of all living things in the process of visual and sensory perception;
- formation of the ecological consciousness

of "LEGO construction".

- the ability to practice and mentally experiment, generalize, establish cause-and-effect relationships, speech planning and speech commenting on the process and result of one's own activity;
- ability to group items;
- the ability to show awareness in different areas of life;
- fluency in the native language (vocabulary, grammatical structure of speech, phonetic system, elementary ideas about the semantic structure);
- the ability to create new images, to fantasize, to use analogy and synthesis.

Educational module "Mathematical development":

- comprehensive solution of problems of mathematical development, taking into account the age and individual characteristics of children in the following areas: size, shape, space, time, quantity and counting.

Educational module "Robotics": development of logic and algorithmic thinking; formation of the basics of programming; development of abilities for planning, modeling; information processing; development of the ability to abstract and find patterns; ability to quickly solve practical problems; mastering the ability of accentuation, schematization, typing; knowledge and ability to use universal sign systems (symbols); development the ability to evaluate the process and the results of their own activities.

Educational module "I Create the World" Cartoon Studio: mastering ICT (information and communication technologies) and digital technologies; -mastering media technologies; organizing productive activities based on the synthesis of artistic and technical creativity.

Each module is aimed at solving specific tasks that, when comprehensively solved, ensure the realization of the goals of STEM education: the development of intellectual abilities in the process of cognitive research and involvement in scientific and technical creativity of young children.

Each separate module includes a thematic selection of manuals that provide an integrated approach to the implementation of educational tasks for the development of intellectual abilities in the process of cognitive research activities and the involvement of young children in scientific and technical creativity.

Such education can, of course, only be creative, creating conditions for the child to find his own path of development in accordance with what he is interested in.

STEAM technology in elementary school. What needs to be learned and taught in order to achieve the personal development of every child who will have to live in a highly technological world. It is important that every child understands in time which direction he is interested in, so that he gets carried away at school and continues to develop in this direction. Therefore, in the modern world, the teacher faces a responsible task: to teach children to develop intuition. Establish cause-and-effect relationships, look for patterns, solve open problems.

It is known that the flow of information is so great today, and the tools for entertainment are so diverse that a small child can get lost in the vast digital world. Therefore, the teacher needs to choose tools for the organization that will be understandable to children, which will allow them to develop various competencies. Such a tool can be a robotic set "Lego 2:0". The LEGO constructor allows children, regardless of their characteristics, to successfully

to master knowledge. For example: A segment is a part of a straight line bounded by points. The segment has a beginning and an end (the beginning and the end of the segment are shown with red bricks).

Ray. Has a beginning, but has no end. Straight. It can be extended in both directions (the teacher attaches the bricks of the "point") A straight line is a line along which the distance between two points is the shortest.

For first graders, it becomes clear that a straight line is a set of points that stand close to each other. Children clearly see this by building a straight line from Lego bricks (dots).

To demonstrate points lying and not lying on a straight line, you can use a manual. With the help of light bricks attached to the board, it can be clearly shown that many straight lines can be drawn through one point, and only one straight line can be drawn through two points.

In the 3rd grade, students get acquainted with the area of a rectangle, a square. They teach formulas for finding the perimeter and area of a square, rectangle.

In the 4th grade, students get acquainted with the diagonals of the rectangle.

As a kind of algorithm for using the LEGO Education WeDo first robot, we will give examples of its use in the lessons of the surrounding world. The topic of the lesson is "Animals of Africa". Children are offered a crossword puzzle, which is filled in as students make presentations on the animals of Africa (the names of animals are written in the cells of the crossword puzzle).

Following this, the teacher suggests that teams of 5-6 students or couples assemble any animal they like from the parts of the constructor on the African continent.

The next interesting stage of the work may be the use of robotics in literary reading lessons. Here is one example. Students study the work of K. Chukovsky "Stolen Sun". Lego figures are built based on the work, and then the film is shot and edited together. The resulting project is demonstrated to students of other classes, which stimulates interest in literature and reading.

A characteristic feature of our life is the increasing pace of change. We live in a world that is completely different from the one in which we were born. And the pace of change continues to increase.

Today's students will have to: work in professions that do not yet exist, use technologies that have not yet been created, solve problems that we can only guess at. School education should meet the goals of advanced development.

The integrated educational process, including research and subject-practical activities, allows children to become better acquainted with objects of inanimate nature in the field of natural science and contributes to the acquisition of the first skills of designing and programming models. This creates a better foundation for a promising future for our children.

Instead of a conclusion. This education should begin from the earliest preschool age, and therefore it is necessary to introduce programs in kindergartens.

The language of science is English. If you want to study science and be a scientist, you need to know this language.

Science is fun! Science should be a celebration, it should be exciting and interesting for students.

Thus, the future belongs to technology, and the future of technology belongs to teachers of a new format who are devoid of prejudice, do not accept a formal approach and can "blow up the brain" of students with their knowledge and expand their horizons indefinitely.

The future depends on the Great STEAM Teachers! "Your hands know a lot more than you think they know! Your hands know what your mind doesn't know, what it knows!"

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