

Fostering STEAM Education Competency for Preschool Teachers

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Annotation: The variability of education is one of the fundamental principles and directions for the development of the modern education system in our country. It is the variable part of the program that ensures the quality of the educational process and creates optimal conditions for the social and personal development of preschool children, taking into account their physical and mental health, individual creative development trajectory, for the implementation of psychological and pedagogical readiness to study at school and adapt to the surrounding society. In this article by focusing on the educational needs of pupils and their parents (legal representatives), we focused on peculiarities of using STEAM education at preschool education system.

Keywords: preschool, new technologies, modern education, STEAM education, preschool teachers.

We live in an era of technological revolution. New technologies, new professions are emerging around us, crowding out the old and familiar ones. As a teacher, one has to think about whether this is what we teach children, whether such knowledge will be useful in a new life, how should the content and technologies of education be adjusted to meet the needs of today's preschoolers? The age of 3-7 years is a strategically important stage in development. Teachers working with preschoolers understand how important it is during preschool childhood to instill in children an interest in knowledge, to teach them to perceive from different sources and use information, to independently find answers to questions of interest in the surrounding reality. It is important to cultivate the ability to act independently and in cooperation with peers and adults. Thus, parents and teachers face a problem: what methods and techniques to use? What technologies to apply?

The most promising today is the STEAM technology. STEAM education is one of the main global trends.

For the first time, STEAM technology was used in the United States to organize the activities of children in a meta-subject environment, aimed at preparing children for life in a highly technologically developed space.

This discipline is becoming the most demanded in the modern world. Therefore, today STEAM technology is developing as one of the main trends, combining the natural sciences with technology, engineering and mathematics. As in life, all objects are integrated and interconnected into a single whole - and in understanding this very harmonious wholeness there is strength.

Young professionals will need skills and abilities from various technological fields, both in engineering and in the natural sciences. STEM education technology is based on the project method. It is based on the situation of artistic and cognitive search, both in one's own experience of practical activity, and in the subsequent application of the acquired knowledge in the main types of children's activities: playing, designing, cognitive research activities with elements of technical creativity.

What is STEAM? If you decipher, you get the following: S - science, T -technology, E - engineering, A - art, M - mathematics (natural sciences, technology, engineering art, creativity, mathematics).

STEAM education is one of the most basic global trends based on the use of an applied and interdisciplinary approach, as well as on the merging of all five areas into a single development scheme. STEAM allows preschoolers to use science and art in everyday life.

The STEM approach provides preschool children with the opportunity to explore the world systematically, to delve into the logic of surrounding phenomena, to discover and understand their relationship, to discover many new and interesting things. The opportunity to get acquainted with something new develops curiosity in children and their cognitive activity; the need to independently set an interesting task, choose ways to solve it, the ability to objectively evaluate the results. All this contributes to the development of an engineering style of thinking; provides a completely new, higher level of development of the child, which implies greater opportunities in the future when choosing a profession. Collective activity develops the skill of teamwork.

Through the organization of experimental research and project activities, it seems possible to implement STEAM education in a preschool organization. For successful work, it is considered necessary to create a subject-spatial environment that meets the target settings. The unifying factors may be the integration of the content of various activities of preschool children, the intersection of game aids and materials in space, the availability of equipment for independent activities, and the possibility of demonstrating results.

It should be noted that in the context of the renewal of education, the issue of developing the material and technical base of distance learning, software and methodological support, and improving the skills of preschool specialists on this issue is acute.

We believe that acquaintance with the STEAM environment should begin with construction, during which children use various materials (wood, paper, metal, plastic), acquire elementary technical skills and abilities, and get acquainted with the basic principles of engineering. Various types of constructors help the teacher develop creativity and spatial thinking in children. The line of solutions should include special kits for studying mathematics, outdoor activities, simple engineering projects.

STEM education is a modular area of education, the purpose of which is to develop the intellectual abilities of the child with the possibility of involving him in scientific and technical creativity.

It is important to note that STEAM competencies can be formed in children from an early age using games that parents can organize at home. These can be: crafts made from salt dough - toys, in the manufacture of which, for the first time, the child encounters three dimensions: height, width and length; plasticine modeling, which will demonstrate how art is combined with modeling; The cardboard constructor will help the child learn to recognize various sensory standards, and also design. Geokont promotes the development of creative imagination and helps preschoolers to better navigate in space. With the help of a geoboard, children get acquainted with the concepts of area and perimeter in practice. LEGO sets allow children to create completely different structures from the same elements. And when you combine the assembly of a Lego structure and a chemical experiment, you can get a project within the framework of STEAM education. Flexagon is considered the union of mathematics and origami. Spirographs help create complex shapes in an incredibly easy and fun way. Robotics kits introduce kids to creativity using cutting-edge technology.

STEM education of preschool children is guided by the Federal State Educational Standard. This allows children to form cognitive interests in different types of work.

In a preschool organization, STEM education can be implemented through the organization of project and experimental research activities. A prerequisite for successful work is the creation of an actual subject-spatial environment that meets the target settings. At the same time, the unifying factors can be the integration of the content of various activities of preschoolers, the intersection of gaming aids and materials in space, the availability of equipment for independent activities, and the possibility of demonstrating results.

Immersion in the STEAM environment can begin with construction, in which pupils, using elements from various materials (wood, paper, metal, plastic), will acquire elementary technical skills and abilities, get acquainted with the principles of engineering. Various designers will help teachers develop creativity and spatial thinking.

STEAM competencies can be formed in children from an early age, using games that parents can easily organize at home. Salt dough crafts are toys, creating which, for the first time, the baby encounters three dimensions: height, width and length. Plasticine modeling will demonstrate how art is combined with modeling. The cardboard constructor will help the child learn to recognize various sensory standards, and also design.

It is this property of STEAM technology that creates an effective environment for organizing work to develop the intellectual abilities of preschool children.

Meta-objectivity in the subject-spatial developing environment helps to create a holistic picture of the world in the mind of the child. Technical mock-ups, Lego constructors, wooden constructors, flexagons, agamographs, STEAM toys simulate reality, concentrate the attention of children, include them in a productive combined practical activity, including research work-design, mathematics and creativity.

STEM education consists of six modules. Each module is aimed at solving specific problems that, when integrated, ensure the implementation of the goals of STEM education: the development of intellectual abilities in the process of cognitive research activities and the involvement of preschool children in scientific and technical creativity.

1. Educational module "Didactic system of F. Fröbel" - Experimenting with objects of the surrounding world - Mastering mathematical reality through actions with geometric bodies and figures - Mastering spatial relationships - Designing from different angles and projections.
2. "LEGO - design" - the ability for practical and mental experimentation, generalization, speech planning and speech commenting on the process and result of one's own activity; - fluency in the native language (vocabulary, grammatical structure of speech, phonetic system, elementary ideas about the semantic structure) - the ability to create new images, fantasize, use an analogy.
3. Educational module "Mathematical development" - a comprehensive solution of problems of mathematical development, taking into account the age and individual characteristics of children in the areas: size, shape, space, time, quantity and count.
4. Educational module "Robotics" - the development of logic and algorithmic thinking; - formation of the basics of programming; - development of abilities for planning, modeling; - data processing; - development of the ability to abstract and find patterns.

5. Educational module "Multstudiya" I create the world "- the development of ICT (information and communication technologies) and digital technologies; - development of media technologies; - organization of productive activity based on the synthesis of artistic and technical creativity.

6. Educational module "Experimenting with animate and inanimate nature" - the formation of ideas about the world around in experimental activities; - awareness of the unity of all living things in the process of visual sensory perception; - formation of ecological consciousness.

Objective advantages of "STEAM" technology:

1. An integrated approach to solving modern problems based on the interpenetration of various areas of natural sciences, engineering creativity, mathematics, digital technologies, etc. This integration is based on the project method based on cognitive and artistic search and having a specific real product as the result of the activity.

2. Timely adaptation of preschool children to the modern educational environment of the further educational system. The content, technologies, subject-spatial content, material and technical support are successive in terms of age capabilities and complication of content.

3. The development of intellectual abilities in the process of cognitive research activities and involvement in scientific and technical creativity is aimed at building competencies and comfortable self-awareness in the modern world, creating conditions for a high quality of life in the future.

4. The development of critical thinking is considered as a process aimed at developing the skills to obtain the necessary information, analyze, apply the information received in practical activities.

5. The formation of teamwork skills in synthesis with an individual approach is the ability to combine individual intellects to achieve common goals, negotiate, ask questions, and argue. The overall positive result forms self-confidence and a sense of teamwork efficiency, a value attitude to the process and to the results of general and personal work is brought up.

6. Initial acquaintance with a number of professions and specialties of the XXI century in the field of information technology, associated with the ability to work with a large amount of diverse information.

7. Development of interest in technical creativity. It is important to note that STEAM competencies can be formed in children from an early age using games that parents can organize at home. These can be: crafts made from salt dough - toys, in the manufacture of which, for the first time, the child encounters three dimensions: height, width and length; plasticine modeling, which will demonstrate how art is combined with modeling; The cardboard constructor will help the child learn to recognize various sensory standards, and also design. Geokont promotes the development of creative imagination and helps preschoolers to better navigate in space. With the help of a geoboard, children get acquainted with the concepts of area and perimeter in practice. LEGO sets allow children to create completely different structures from the same elements. And when you combine the assembly of a Lego structure and a chemical experiment, you can get a project within the framework of STEAM education. Flexagon is considered the union of mathematics and origami. Spirographs help create complex shapes in an incredibly easy and fun way. Robotics kits introduce kids to creativity using cutting-edge technology.

Thus, STEM education is designed to revive the system of sections and circles of "young technicians", based on the natural interest of children in technical design and modeling. It is important that these types of activities are based on the research experience of the child acquired in

kindergarten, so that the natural-science picture of the world is formed on the basis of a system-activity approach, and based on knowledge gained experimentally. The world around is studied by the child through the game and experimentation with objects of animate and inanimate nature. This can become a motivation until graduation and getting your favorite specialty. STEAM, thus, becomes an addition to the mandatory part of the main educational program (where demanded content is mobile and dynamically implemented that meets the interests and priorities of the modern preschooler.

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