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APPLICATION AND EFFECTIVENESS OF STEM EDUCATIONAL METHODOLOGY IN PRESCHOOL ORGANIZATIONS

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Annotation: This article analyzes the application of STEM (Science, Technology, Engineering, Mathematics – Science, Technology, Engineering and mathematics) educational methodology in preschool educational organizations and its effectiveness. It is noted that through the STEM approach, children from an early age develop cognitive development, creativity, logical thinking, problem solving, and professional-oriented initial visions are formed. This methodology deepens children's perception of the environment through scientific observation, creating a solid foundation for them to master the sciences well in the future. Because STEM education is based on practical aspects, the child associates the knowledge they are learning with real life, which develops his ability to think independently and take an innovative approach.

Keywords: STEM education, preschool education, cognitive development, creativity, vocational guidance, science integration, educational effectiveness, child development, innovative methodology, early age education.

STEM is an acronym formed from the initials of the English words "Science, Technology, Engineering, Mathematics" (i.e., Science, Technology, Engineering, and Mathematics), a term that represents an integrated learning approach in the modern education system preparing for high-tech-based field-specific professions. The STEM approach shapes not only theoretical knowledge but real-life problem-solving skills in students. This type of education develops modern competencies such as practice-oriented, systematic thinking, critical and creative approach, collaborative work, creating an inextricable connection between different disciplines.

The concept of STEM was first formed in the United States in the early 2000s as an official term. The formation of this approach was caused by the sharp growth of technological progress in the late 20th century, the need for digital transformation and highly qualified technical specialists. Due to the special emphasis on STEM education in the United States, Innovation, Industrial Development and economic competitiveness have increased in the country through this sector. STEM education is seen as the main tool for modern development not only in developed countries, but also in developing countries. At the Global level, the STEM sector forms the basis of innovation, new technologies, startups and the digital economy. It is for this reason that many international universities, grants, scholarships and projects support young people who work precisely in the STEM direction.

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In Uzbekistan, the concept of STEM and the approach to education have actively entered since 2017-2018. In particular, the creation of the" Ministry of innovation development "in 2018, the support of innovative projects under the" Youth – Our Future "program, the launch of the" one million programmers " project, as well as the emphasis on robotics, Informatics, programming and interdisciplinary projects in schools based on international experience, means that the STEM approach is actively introduced into the educational system of Uzbekistan.

Currently, STEM laboratories, technoparks, academies, incubation centers operate in some schools in our country. New modern programs in technical, information technology and engineering areas are also being introduced in many higher education institutions in our republic. Competitions and competitions in digital literacy, mathematics, programming, design are held among young people.

STEM education methodology is a teaching style that combines science (science), Technology (technology), Engineering (engineering), and Mathematics (mathematics) in a single system to give students knowledge through a practice-based, analytical, and innovative approach. This methodology refers to the harmonizing teaching of different disciplines in solving real-life problems, in contrast to the teaching of traditional subjects individually.

STEM education methodology is an innovative and integrated teaching system that meets the requirements of the modern world, prepares the student for all-round thinking, practical activities. This methodology serves as an important tool for preparing for digital transformation in the educational system of Uzbekistan, increasing technological potential and in the future for the cultivation of competitive personnel. The use of STEM educational methodology in preschool organizations is one of the important areas of modern pedagogy. Since preschool children have a high natural need for observation, creativity, interest in experimentation, the study of the environment, the STEM methodology gives a successful result at this very age. This approach helps to develop the scientific thinking of children from an early age, expand their circle of thinking and form their inner need for knowledge.

The process of introducing the STEM methodology at the preschool stage is carried out through play, experience, project and practical training. For example, children learn about their physical and chemical properties by playing with elements of nature such as water, sand, soil and conducting experiments on them. Through this, they not only master new concepts, but also acquire the skills of asking questions, researching, guessing and observing the result.

In the STEM approach, it is important to arouse children's interest and encourage the child to think, seek, rather than give them rigid theoretical concepts. For this reason, the STEM approach in preschool education is based more on the principle of "learning through play". This forms in children a fondness for nature, an interest in technical devices and their operation. For example, by playing with simple building blocks, a child develops engineering thinking, forms mathematical skills by differentiating shapes from familiar and size, sees through experience the reaction of various substances, and forms an early scientific worldview.

STEM methodology in preschool education has a positive effect not only on the cognitive development of children, but also on their socio-emotional state. Children develop social skills such as group work, finding solutions to the issue together, communication through problem

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discussion, collaboration, and teamwork. This increases their psychological readiness for school, strengthening their self-confidence.

In Uzbekistan's education system, there has also been an increase in projects and practices aimed at introducing STEM methodology from an early age in recent years. To effectively carry out this process, special educational programs have been developed for educators, preschool educational institutions are provided with modern educational and methodological tools. A national model is being formed by the Ministry of education and other partner organizations by creating experimental sites and testing innovative approaches.

The use of STEM methodology in preschool education has a positive effect on the intellectual, social and emotional development of children. They are formed as individuals who are more prepared for future educational stages, independent thinkers, capable of understanding the technological world. Therefore, it is not for nothing that STEM is becoming an important and integral part of not only the school, but also the early education process.

The use of STEM education methodology in preschool organizations has a great influence on the cognitive, creative and professional development of children from an early age. Through this approach, children are more deeply involved in the process of studying the world, their initial interests in various disciplines are formed, and this directly affects their potential for assimilation in the future.

The application of STEM methodology in preschool education accelerates the cognitive development of children. That is, they are actively involved in mental processes such as understanding, guessing, observing, comparing, generalizing causal relationships. For example, through experiments in ordinary physics or biology, they begin to understand the laws in nature. This not only increases mental capacity, but also forms an ability to think independently, analyze and solve a problem. The STEM approach arouses a child's interest in science and technology through early formation of questioning, observation, and inference skills.

In addition, STEM education serves to shape children's initial perceptions of career choice. Although a preschool child does not yet see himself in a specific field, in the STEM environment he is given information in a simple, interesting and easily understandable form about such areas as engineering, medicine, biology, computer technology or ecology. For example, by working with building blocks, the child feels an interest in engineering, by caring for plants, he will not be indifferent to biological processes. Such experiences are an important stage in the formation of a child's professional worldview.

The effective introduction of STEM methodology also provides a solid foundation for children to master the sciences well afterwards. During the course of the lesson, the child not only remembers information through experience, practical training and observation, but also realizes, feels and forms his personal attitude towards it. This ensures that during their school days they enter with a positive attitude towards subjects such as natural sciences, mathematics, Informatics. The child develops inner motivation to study, the need to enjoy learning and gain knowledge. As such, STEM methodology serves to enable the child to have the skills to quickly understand and approach complex topics creatively when they enter school.

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STEM educational methodology also plays a very important role in the development of creativity. The fact that children are presented with problem situations, encouraging them to find solutions in different ways, motivates them to independent thinking and unusual approaches. For example, making something new using simple materials, achieving a certain result through experience – all this stimulates the creative thinking of the child. Also, in STEM training, each child acts according to his own interest, talent and way of thinking, which sets the stage for the development of his personal identity.

In general, the use of STEM methodology in preschool education deeply affects the attitude of children to life, their aspirations for learning and their future personal and professional formations. This approach serves to educate a child as a person who is in accordance with the requirements of modern society, is based on science, has thinking and is able to develop a creative approach.

In conclusion, the introduction of STEM educational methodology in the preschool education system meets the requirements of modern pedagogy. It develops in children the skills of harmonizing scientific and practical knowledge, independent thinking and finding creative solutions. The STEM approach not only increases the quality of the educational process, but also positively affects the attitude of children to the sciences in the later stages, their decisions on choosing a profession. Therefore, the systematic application of the STEM methodology in preschool educational organizations is considered as an important factor in improving the quality of education, preparing the younger generation for the future competitive environment.

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