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STEAM TECHNOLOGY IN EARLY CHILDHOOD EDUCATION ORGANIZATIONS AS A FACTOR FOR EARLY DEVELOPMENT

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Annotation: The STEAM technology in preschool education organizations plays a crucial role in the development of children's intellectual and creative potential. Through this technology, children develop an interest in learning about science, technology, engineering, arts, and mathematics. It also fosters problem-solving skills and the ability to think independently.

Keywords:STEAM technology, preschool education, early development, creative thinking, problem-solving, integrative approach, development, educational modules, experimentation.

Introduction:

Supporting early development through the application of STEAM (Science, Technology, Engineering, Art, and Mathematics) technology in preschool education is crucial for fostering creative thinking, problem-solving, and an interest in sciences among children. The STEAM approach, which integrates science, technology, engineering, art, and mathematics, is gaining increasing importance in structuring the education process. Notably, the founder of the STEAM educational approach is American educator Georgette Yakman.

S - While preschool children may not have specific knowledge of science and technology, the initial stages of teaching these fields are effectively carried out through STEAM. Children begin to acquire scientific concepts through various hands-on experiences.

T - Through technology and engineering, children attempt to solve real-world problems. They begin to apply what they have learned in practice, which inherently develops innovative thinking.

E - Engineering fosters teamwork skills among children. Many STEAM activities involve tasks that require group work, teaching children how to collaborate, exchange ideas, respect each other's opinions, and solve problems as a team.

A - Arts promote creativity and problem-solving abilities in children. Art elements play a critical role in this process. Engaging in artistic activities enhances children's aesthetic sense and their ability to express their ideas creatively.

M - Mathematics is an essential part of the STEAM technology. Through the study of basic mathematical concepts, children develop their mathematical thinking and apply these concepts to problem-solving, which strengthens their analytical skills.

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It is well-known that in preschool education, the leading activity is considered to be play, but according to researchers, the dominant activity type for children is experimentation. In preschool institutions, the importance of STEAM teaching technology cannot be overstated. This system focuses on developing the intellectual and creative abilities of children, considering several critical factors.

Materials and Methods:

In this research, we used the "Project" method, interactive technologies, and an integrative approach. Accordingly, problematic situations were explored, and practical skills were developed through their resolution. The educational process was organized by integrating science, technology, engineering, art, and mathematics using an integrative approach.

Results and Discussion:

The implementation of STEAM technology in preschool education organizations positively influences the mental, creative, and technical abilities of children. Research indicates that this approach increases children's interest in science and technology, fostering logical thinking, problem-solving, and teamwork skills. As a result, children are better prepared for school, and a solid foundation is established for their future development.

STEAM technology helps children develop essential qualities and skills, including:

- A comprehensive understanding of problems;
- Creative thinking;
- Engineering approach;
- Critical thinking;
- Understanding and applying scientific methods;
- Learning the fundamentals of design.

These skills will aid children in solving life's problems in the future.

In preschool institutions, the following educational modules are used to apply STEAM technology:

- "F. Froebel's Didactic System" educational module;
- "Experiments with Living and Non-living Nature" educational module;
- "Lego Construction" educational module;
- "Mathematical Development" educational module;

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- "Robotics" educational module;
- "Multimedia – I Create the World" educational module.

Each module is designed to address specific tasks that ensure the realization of the goals of STEAM education. The process is based on developing intellectual abilities and involving young children in scientific and technical creativity.

STEAM technology is one of the key approaches in modern education systems, aiming to stimulate children's interest in science, technology, engineering, art, and mathematics while providing a solid foundation for learning these subjects. For preschool children, this approach is of great importance, as it ignites their curiosity about the world, enables them to acquire essential skills through various activities, and fosters creative thinking.Certainly! Here's a more formal and academic translation of the Uzbek text:

Stimulating Interest in Science:

The STEAM approach fosters children's initial understanding of scientific concepts through simple and engaging experiments. For instance, experiments involving the movement of water and air, the propagation of light, or basic chemical reactions stimulate children's curiosity and motivate them to explore the realm of science. Additionally, these experiments teach children how to observe, pose questions, and search for answers.

Stimulating Interest in Engineering:

Activities related to engineering contribute to the development of children's logical thinking. For example, constructing buildings using basic construction sets or creating robotics models allows children to grasp engineering processes in a practical context.

Stimulating Interest in Technology**:**

Engaging with technology enhances children's ability to use technical tools and equips them with the skills necessary to adapt to future technological advancements.

Developing Creativity through Art:

Art is an integral component of STEAM education, aimed at fostering the creative potential of children. Activities such as working with colors, molding shapes from clay, or cutting various forms from paper enhance children's creative abilities. By integrating art with science and technology, children learn to propose innovative ideas and solve creative problems.

Fostering Interest in Mathematics:

An additional significant aspect of STEAM technology is the cultivation of mathematical thinking. Mathematical games, working with geometric shapes, counting, and classifying numbers help children develop both mathematical knowledge and skills. These activities teach children how to apply mathematical principles in real-life contexts, preparing them to address complex mathematical problems in the future.

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Since STEAM education is structured as an interactive, game-based approach, it ensures that children remain engaged throughout the learning process. Moreover, as STEAM is taught as an integrated discipline, it enhances the ability of children to combine knowledge across various fields.

STEAM technology proves to be an exceptionally effective method for developing problem-solving skills and nurturing independent thinking in preschool-aged children. The aim of this approach is to introduce children to various disciplines through hands-on activities, thereby enhancing their intellectual and creative potential. The STEAM approach to problem-solving consists of several essential stages:

- Understanding and Analyzing the Problem: Through STEAM methods, children learn to comprehend and analyze the tasks presented to them. For example, when assembling a basic construction project, children encounter challenges and search for potential solutions. This process cultivates their creative problem-solving skills.

- Generating Ideas: STEAM activities foster children's ability to develop creative approaches to solving problems. For instance, when engaged in engineering tasks, children experiment with different materials to discover innovative solutions.

- Practical Testing and Learning from Mistakes: Experiments and trials are vital components of problem-solving. Children may make mistakes in the process of addressing a problem, but through these experiences, they acquire new skills and learn how to correct errors.

- Collaborative Work**:** STEAM projects often require teamwork, where children learn to listen to each other's ideas and collaborate to find solutions. This collaborative approach prepares them for future social interactions.

The development of independent thinking is one of the core goals of STEAM education. This process is implemented across several dimensions:

- Making Independent Decisions: STEAM technology encourages children to make their own decisions. For instance, during project execution, children make independent choices about materials and technical solutions.

- Supporting Creativity: STEAM activities promote independent thinking and creativity. By incorporating elements of art, children are encouraged to express themselves freely and to generate original ideas.

- Experimentation and Analysis of Results: Independent thinking is fostered through discovery. Experiments and trials enhance children's observational skills and enable them to independently evaluate whether their ideas are accurate or incorrect.

- Reflection and Drawing Conclusions**:** After each activity, children reflect on the outcomes, analyze their work, and make conclusions about how they can improve in the future.

Conclusion:

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Applying STEAM technology in preschool education institutions represents an innovative and effective approach for early childhood development. This technology nurtures creative and critical thinking, problem-solving skills, collaboration, and logical reasoning abilities in children.

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