



## Didactic principles of guiding preschool children to inventiveness

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### ABSTRACT

This article is devoted to the use of TRIZ technology techniques in teaching and upbringing preschool children. TRIZ technology allows us to teach and train a creative child. The purpose of using this technology in kindergarten is, on the one hand, the development of such qualities of thinking as flexibility, mobility, consistency; on the other hand, search activity, the desire for innovation; the development of speech and creative imagination. The article notes that TRIZ significantly contributes to the formation of mathematical imagination, allows children to develop their thinking, mathematical abilities by solving creative problems. Today, TRIZ pedagogy is already widely used in practice in the education system of developed countries of the world.

### Keywords:

Preschool education, preschool age, personality, TRIZ pedagogy, theory of inventive problem solving, level of preparation for school, creativity, creativity, mathematical education

**Introduction.** Preschool age is special, because with the formation of the child, his life is like this. Therefore, this period should not be missed in order to reveal the creative potential of every child. Children's minds are not limited by the "deep way of life" and traditional notions of how things should be. This allows them to invent, to be spontaneous and unpredictable, to notice things that we adults have ignored for a long time. Perhaps by introducing new, more effective technologies, methods and various forms to develop the mathematical abilities of preschool children. One of the promising technologies contributing to solving this problem is the TRIZ technology.

**Object of the research and used methodologies.** As the object of the research, the role of TRIZ technology in the process of forming the elementary mathematical concepts of preschool children was determined. The methods of observation, analysis and summarization of materials, collective and individual interviews, surveys (oral) were used

to cover the research topic.

**Obtained results and their analysis.** A preschooler is a seeker according to his age characteristics. His attention is always focused on what interests him. Effective development of the child's intellectual and creative abilities is a characteristic feature of the modern methodology of mathematical development. It is necessary to teach a preschool child to count, measure and solve arithmetic problems. Also, non-standard thinking is the development of the ability to discover features, relationships, connections in the world around us, to "design" them with objects, symbols and words.

Mathematical development in preschool children is the most important component of forming a child's "image of the world". Mathematical development of preschool children refers to qualitative changes in the child's cognitive activity resulting from mathematical development and related logical operations. Developing interest in mathematics in preschool children is one of the important

tasks of pedagogues.

TRIZ greatly contributes to the formation of mathematical concepts, allows children to develop their thinking and mathematical abilities in the form of a game. The game is a starting point for further development, modification and creation of many interesting options.

Teaching mathematics to preschool children cannot be imagined without the use of interesting materials. The role of this material is determined taking into account the age capabilities of children and comprehensive development and educational tasks. The main task is to activate mental activity, to interest children in mathematical material, to attract children to themselves, at the same time to develop consciousness, to expand and deepen mathematical imagination, to strengthen acquired knowledge and skills, to teach them to use in other activities, in a new environment.

TRIZ was previously only used by engineers, but now it is helping to develop children's creative abilities. TRIZ teaches children creative, non-standard thinking and helps them quickly and successfully adapt to the modern world.

1. TRIZ develops systemic thinking - this is the ability to see a particular object as a whole, that is, in relation to other objects of its environment. So, the child sees not only the flower, but also the place where it grows, what it consists of, what is necessary for its life, what it can give to nature and man. This skill allows you to be more flexible in your thinking.

2. TRIZ develops thinking focused on results and success in preschool children. In classical pedagogy, the formula of educational content is in the form of commands such as "do as I do" or "do as I say", while in developmental pedagogy we present a problem to the child and look for a solution together with him.

The purpose of TRIZ pedagogy is to develop imagination and flexible thinking, to educate a creative person ready to solve complex problems in effective ways. The idea of TRIZ pedagogy is that creativity can be taught like any other activity. Creativity is creating something new. Various methods are used to solve TRIZ problems, including:

- brainstorming method
- synectics (comparing and finding similarities in things and events)
- morphological analysis (identification of all possible solutions)
- the method of focal objects (establishing associative relationships with various objects)
- Robinson's method (finding necessary information on a topic that seems unnecessary in general) and others.

in preschool educational organizations, pedagogues can explain by comparison the developing divergent (creative) thinking and convergent thinking, when they propose problems and tasks that usually have the correct answer in the mind of students. Children's responses with such a comparison evaluated according to the following main criteria:

- degree of accuracy of the answer;
- level of detail;
- speed;
- accuracy and degree of compliance with the prescribed form of the answer (for written assignments, graphic dictations);
- the scope of the search for solutions;
- number of solution options;

The results of the tasks assigned to preschool children were assessed in individual and group performances (here the assessment is for the naturalist himself). The traditional system of teaching children reduces internal motivation, natural interest. It is especially important to interest children in the process of forming elementary mathematical concepts. Management of human development is primarily management of his motivation. There is an important feature for understanding motivation: - the more difficult the work, the more ineffective the external influences. And strong stimulation (for example, physical impact) does not work at all for the result.

Reading is real learning. How to ignite the fire of inner curiosity? What and how to teach children in the modern world? Why TRIZ - the theory of inventive problem solving - can be the basis of a new pedagogy? How to teach a child to be successful and demanding? We will try to find answers to these and other questions.

We can't make everyone a genius. But we

can teach many people how to solve complex problems. Achieving the goal implies the development of a pedagogical system, which we now call TRIZ pedagogy.

How to form elementary mathematical knowledge based on TRIZ technology?

Rule 1: Curiosity precedes knowledge. According to the psychology of children, they believe that interesting things are right. Children learn new knowledge faster if training is conducted using interesting games in the process of forming number, time and spatial concepts, and quantitative imagination.

Rule 2: knowledge becomes a tool when it occurs as a result of activity rather than as a result of simple memorization. In order to use knowledge, children must have consciously mastered it. For example, a 4-5-year-old child can mechanically count up to 20 or 30, but can consciously perform operations only up to 5.

In TRIZ pedagogy, we believe that all knowledge, ideally, should arise as a result of solving open problems. We will clarify how this happened in the course of our dissertation.

The ideal of the 21st century educational system can be expressed clearly and briefly as follows: "Teaching teaches to think." The most important stage of this educational process is the transition of thinking techniques and practice to conscious skills.

TRIZ is a functional systems approach. To develop creative thinking, teachers-educators should first follow the five principles based on TRIZ pedagogy:

1. Attention to unusual matters;
2. Treat unusual ideas with respect;
3. Show children that their ideas are valuable;
4. Provide adequate opportunities for self-research and praise;
5. Set aside time for practice or training.

**Conclusion.** In modern education, there is an urgent task of educating a creative person, preparing for the stable solution of non-standard tasks in various fields of activity. That's why we set the formation of children's creative potential and elementary mathematical ideas as one of the priorities in preschool educational organizations. TRIZ technology

adapted to preschool age makes the child "Creativity in everything!" creates an opportunity to teach under the motto.

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