

PAPER

EFFECTIVE WAYS TO ACTIVATE COGNITIVE ACTIVITY OF PREPARATORY GROUP CHILDREN BASED ON THE STEAM APPROACH

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Abstract

This article explores the methodology for activating cognitive activity of preparatory group children based on the STEAM (science, technology, engineering, art, mathematics) approach. The article is compiled on the basis of the IMRAD requirement, which covers both theoretical and practical aspects. The purpose of the study is to determine the methodology for the development of creative thinking, independent research and problem – solving skills of children using Steam activity. The study was conducted in the 2024-2025 academic year with the participation of 6 children aged 60-5 years. The results showed that the STEAM approach is effective in activating cognitive activity in children, significantly enhancing creative thinking, imagination, and problem-solving skills.

Key words: STEAM, cognitive activity, preparatory group, creative thinking, preschool education, pedagogical methodology.

1. Introduction

In the process of modern education, the development of creative thinking and problem-solving skills of children is an urgent issue. The stage of preschool education is the main period in the formation of the intellectual and creative potential of the Individual [1].

The STEAM approach (Science, Technology, Engineering, Arts, Mathematics) allows children to

develop multidisciplinary thinking skills, activate cognitive activity, and solve creative problems [2]. Applying this approach makes the pedagogical process interactive and fun, resulting in children being motivated to do independent research and experience [3].

In recent years, the Steam approach to preschool education has been recognized as an effective tool in shaping creative thinking and creativity in children [4]. In this regard, the following scientific problem

Compiled on: March 4, 2026.

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is relevant: how to effectively activate the cognitive activity of preparatory group children through the STEAM approach?

Purpose of the study

Development of a methodology for activating the cognitive activity of preparatory group children based on the STEAM approach and determining its effectiveness.

1. Research tasks
2. Analysis of the theoretical foundations of the concepts of the STEAM approach and cognitive activity.
3. Study of the psychological characteristics of children of the preparatory group.
4. Development of a pedagogical methodological system based on the STEAM approach.
5. Determination of the effectiveness of the methodology through experimental testing.

II. METHODOLOGY

The study was carried out on the basis of a comprehensive methodological approach.

1. Object and subject of research

Object: Educators of the preparatory group of preschool educational organizations.

2. Subject: The process of activating cognitive activity based on the STEAM approach.

3. Study participants

The study was conducted in the 2024-2025 school year with the participation of 60 children aged 5-6 years. Participants were separated into control and experimental groups (30 each).

3. Research techniques

Theoretical: analysis, comparison, generalization of scientific and pedagogical literature.

Empirical: observation, pedagogical experience, analysis of creative tasks, surveys.

Statistic: percentage and comparative analysis.

4. Diagnostic tools

Children's creative thinking and cognitive activity were evaluated on the basis of the following criteria:

1. Flexibility-to offer several solutions to one situation.
2. Identity (originality) is the uniqueness of an idea.
3. Speed is the speed at which a solution is offered.
4. The number of ideas is the abundance of thoughts that you create.

5. The ability to solve the problem – unconventional solutions [5].

5. Methodical approach

The STEAM approach was implemented through the following activities:

Problematic and project-based training.

Didactic and interactive games.

Fine Arts and musical creative training.

Creating Mini-projects (e.g. "My dream animal" or "my robot").

Heuristic question-answers and experiments.

Integrated training (Mathematics + Science + Art).

The methodology was applied 3 times a week for 16 weeks.

III. RESULTS

1.Initial diagnostics

At the beginning of the experiment, the levels of creative thinking were as follows:

1.Initial diagnostics

At the beginning of the experiment, the levels of creative thinking were as follows:

Level	Experimental group	control group
Low	38%	36%
Middle	42%	44%
High	20%	20%

2. The end of the experiment

As a result of the 16-week STEAM approach:

Level	Experimental group	Control group
Low	12%	32%
Middle	28%	44%
High	60%	24%

Figure 1. Initial diagnostics

1. Qualitative observation

Children began to conduct independent experiments.

Offered several options when solving the problem.

Imagination and Fantasy expanded.

Increased speech and comment activity.

Creative solutions were created during the project work [6]. The results confirmed that the STEAM approach has a significant impact on the activation of cognitive activity.

IV. Discussion

The results are consistent with previous scientific studies. For Example, Kim, K.H. (2016). as noted, the STEAM approach develops children's multidisciplinary thinking [7].

A study on the basis of Vygotsky's theory suggests that the organization of interactive activities with children in the "zone of near Development" significantly increases creativity [8].

The STEAM approach has established itself as an effective means of developing children's creative thinking and ability to solve a problem. At the same time, the active support of educators and interactive methods are the main factors of the approach [4].

V. Conclusion

Based on the study, it was concluded that:

1. The STEAM approach is effective in activating the cognitive activity of preparatory group children.
2. Problem situations, mini-projects and interactive games stimulate the development of creative thinking.
3. A systematic methodological approach significantly improves the results.
4. The creative approach and support of the educator is important.

Practical recommendations:

Regular application of STEAM elements in training.

To allow children to conduct independent thoughts and experiments.

Increase the number of interactive and project-based activities.

The use of open questions and the formation of a positive attitude towards mistakes.

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