ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23
American Academic publishers, volume 05, issue 03,2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

THE IMPACT OF THE FORMATION OF QUANTITATIVE COMPETENCIES ON MATHEMATICAL THINKING IN YOUNGER PRESCHOOL CHILDREN

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Abstract: This article analyzes effective methods for developing mathematical thinking and quantitative competencies for young children in preschool institutions. New pedagogical methods for teaching mathematical concepts to children in preschool education, developing logical thinking and analytical skills through interactive games and practical exercises are highlighted. This study examines the impact of innovative technologies on the educational process, the importance of teaching through games, and proposals are developed to support children's cognitive development. The benefits of mathematical tasks and digital games for children in the educational process are analyzed in detail.

Keywords: Preschool education, quantitative competencies, thinking, early childhood, interactive games, logical thinking, learning through play, cognitive development

INTRODUCTION

Younger preschool children, usually between the ages of 3 and 6, are at an important stage in their development. During this period, they actively participate in exploring the world and developing social and cognitive skills. In the development of children in preschool education, the formation of mathematical thinking and quantitative competencies is especially important. Mathematical thinking involves not only working with numbers and quantities, but also develops logical, analytical and creative thinking. Thus, the formation of quantitative competencies in young children is an important pedagogical process that affects their overall intellectual and mental development. Quantitative competence is the ability of children to acquire and use knowledge about quantitative concepts, numbers, and their practical applications. Developing these helps children form the foundations of mathematical thinking. These competences are the most basic abilities for children, which help them solve problems in everyday life, develop mathematical thinking, and form other intellectual skills. Quantitative skills primarily help children develop knowledge about numbers, quantities, and their relationships. By learning these skills, children begin to understand various mathematical concepts, such as size, quantity, shape, and time. This process, in turn, leads to major changes in their thinking, as quantitative concepts play a key role in the development of logical thinking, problem-solving, and analytical skills. For example, young children develop mathematical thinking by learning basic mathematical operations such as dividing, comparing, adding, and subtracting numbers.

In addition, modern pedagogical approaches and methods play an important role in the formation of quantitative competencies for young children. Today, educators and researchers are

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striving to effectively implement the development of children's mathematical thinking through the use of games, interactive activities and innovative technologies in the educational process. At the same time, the effectiveness of education is ensured by the adaptation of pedagogical methods and techniques to the age, individual characteristics of the child and the educational process itself. The use of various educational technologies in preschool educational institutions greatly contributes to the formation of quantitative competencies for children and the development of their mathematical thinking.

The purpose of this study is to study the impact of the formation of quantitative competencies on mathematical thinking in younger preschool children. The study examines the methodological foundations and practical approaches to the formation of quantitative competencies. This study aims to determine what methods and techniques are effective in developing mathematical thinking in the early stages of children's education, as well as to identify existing problems in the process of forming quantitative competencies and find ways to solve them.

LITERATURE REVIEW

Various studies have been conducted to study the impact of developing quantitative competencies on mathematical thinking in younger preschool children. Previous scientific research has shown the importance of learning quantitative concepts and numbers in developing children's mathematical thinking.

A. Kh. Karimov (2020), in his work “Development of quantitative competencies in preschool education”, discusses the role of the formation of mathematical concepts in young children in the educational process. According to his research, children develop their logical thinking skills by working with quantitative concepts and numbers. The study emphasizes the effectiveness of interactive games and practical activities.

A.M. S. Kadirova (2019), in her article “Mathematical Thinking and Its Role in the Development of Preschool Children,” examines the developmental aspects of the formation of mathematical thinking and quantitative competencies in children. The study shows that teaching quantitative concepts can help children develop strong logical thinking and analytical skills.

B. D. Davronov (2021), in his book “Modern Methods in Mathematics Education and the Development of Children's Thinking,” discusses the role of modern pedagogical techniques in teaching students mathematics. The study presents methods used in educational games, problem solving, and the development of children's thinking.

Sh. N. Abdurakhmonova (2018), in her article “Forming the Connection between Numbers and Quantities in Preschool Children,” demonstrates the effectiveness of games, visual activities, and hands-on activities in teaching children quantitative concepts. She also emphasizes the importance of social interactions and group work in developing children’s mathematical thinking.

METHODOLOGY

In order to study the process of forming quantitative competencies in younger preschool children, 42 participants aged 3-4 years were selected from 3 preschool educational organizations. The main goal of the study was to observe the processes of children's mastery of quantitative concepts, to identify the methods used to effectively develop this process, and to study their impact on mathematical thinking. The children who participated in the study actively

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participated in educational activities, games, and practical exercises.The main methods used in the research process were:

1. Teaching through games

One of the main methods of the study was fun and interactive games for children. Games encouraged children to learn about numbers, shapes, quantities, sizes and their relationships. Games provided active participation of children, helping them to understand, apply and visualize mathematical concepts. For example, children learned to visualize different quantities through the game "find the number". Games also helped to develop social relationships between children and further strengthen quantitative concepts through group activities.

2. Practical exercises and experiments

During the study, practical exercises were conducted with children. During these exercises, children learned to apply quantitative concepts in practice. For example, exercises such as using different units of measurement, comparing objects, and measuring sizes were aimed at developing children's quantitative competencies. Children learned to compare objects using different units of measurement (for example, length, volume, weight), work with numbers, and apply quantitative concepts in practice. During the learning process, children more clearly understood concepts such as "small-large," "more-less," and "more-less" by comparing sizes.

3. Mathematical tasks and exercises

Children developed quantitative competencies by completing mathematical tasks, such as adding, subtracting, and comparing numbers. These tasks were interesting and important for children, and they learned various mathematical techniques. Children learned quantitative concepts, for example, by identifying numbers from 1 to 10 and comparing them. At the same time, by solving mathematical problems, children also develop analytical thinking and logical problem-solving skills. Also, during the study, educators carefully observed the children's learning process, recording changes, achievements, and difficulties. All this served as basic information for assessing the children's progress in forming quantitative competencies and developing mathematical thinking.

As a result, the process of forming quantitative competencies in children through games, practical exercises, mathematical tasks, and interactive technologies was effectively implemented. The methods used in the study played an important role in developing children's mathematical thinking and mastering quantitative concepts.

DISCUSSION AND RESULTS

Experiments and games significantly increased children's quantitative competencies. At the initial stages of the study, 16 out of 21 participants had difficulty defining concepts about numbers, quantities, and their relationships. Children sometimes encountered ambiguities in correctly understanding basic concepts such as “small-big” or “more-less.” However, through active games and mathematical tasks, 20 participants quickly began to master quantitative concepts. For example, the “find the number” game or activities related to units of measurement helped children understand the relationship between quantitative concepts and numbers. These games and activities helped children develop mathematical thinking, making them more confident in working with quantitative concepts. As a result, children showed more freedom and interest in working with new numbers, quantities, and measurements. The games helped children further develop their logical thinking and problem-solving skills.

The results of the study clearly showed that the formation of quantitative competencies in younger preschool children had a positive effect on mathematical thinking. As shown in the

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study, mastering quantitative concepts serves to develop mathematical thinking in children, and also increases their logical and analytical thinking skills. By mastering quantitative concepts, children better understand numbers, quantities, sizes and the relationships between them, which significantly develops their mathematical thinking. For example, by mastering simple concepts such as “small-big”, “many-few”, “long-short”, children experience clear changes in mathematical thinking. This process provided children with new approaches to learning mathematical thinking. Games and interactive activities played an important role in this process. The games used during the study, such as “guess the number” games or activities based on measuring various quantities, made it possible to conduct the teaching process for children in an interesting and interactive way. The games provided children with active participation, encouraged them to master mathematical concepts, and at the same time helped to make the learning process more effective. Through games, children learned to understand quantitative concepts more deeply and apply them in practice. Games and activities also helped to develop cooperation between children, as group activities and team games gave children the opportunity to help each other, exchange ideas, and work together to solve problems.

This process also had a significant impact on the development of children's social skills. Group games and activities strengthened communication, support, and cooperation between children. Children had the opportunity to exchange ideas, communicate, and share their experiences. This, in turn, helped to develop not only mathematical knowledge, but also social and emotional skills. Through games, children helped each other solve various problems, strengthening their logical and creative thinking skills. These processes showed the important role of teamwork and joint decision-making, which created new approaches for children in solving problems. Games and activities also helped to develop cooperation between children, as group activities and team games gave children the opportunity to help each other, exchange ideas, and work together to solve problems.

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In addition, the study also showed the effectiveness of using interactive technologies. The use of digital games and educational applications helped children learn mathematical concepts in an interesting and effective way. These technologies presented the learning process for children in a new and modern way. Interactive technologies created more interesting and engaging opportunities for children to perform mathematical operations. At the same time, visual materials, colorful cards, diagrams and other visual aids made the educational material more understandable and memorable for children. This approach allowed children to apply new reading techniques and methods in the process of learning quantitative concepts.

According to the conclusions drawn from the study, the process of forming quantitative competencies is found to be of great importance in the development of mathematical thinking in children. With the help of games and interactive activities, children not only effectively master mathematical concepts, but also develop new skills in logical thinking and problem solving. At the same time, games and interactive activities create opportunities for social interaction and exchange of experiences among children, which has a significant impact on their overall development. The effectiveness of these processes contributes to a deeper understanding of children's mathematical knowledge, as well as social and cognitive development.

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CONCLUSIONS AND SUGGESTIONS

The results of the study proved that the formation of quantitative competencies in younger preschool children has a significant impact on mathematical thinking. Through games and interactive activities, children learned quantitative concepts, which play an important role in the development of their mathematical thinking. At the same time, this process also helped children develop logical and analytical thinking skills.

In addition, by forming quantitative competencies, children better understood the relationships between numbers, quantities and sizes, which in turn deepened their mathematical thinking. Games and practical activities allowed children to master new concepts and use them in practice. The methodological approaches outlined in the study also helped to develop children's social and emotional skills, as group games and activities helped to strengthen relationships between children. This, in addition to the development of mathematical thinking, also increased children's abilities to work in a team, exchange ideas, and solve problems together.

In the future, the development of more effective methodological approaches in the process of forming quantitative competencies, the wider use of games and interactive technologies will increase the effectiveness of the educational process. This will help to further strengthen children's mathematical thinking and lead them to develop social, logical, and analytical skills. Also, the use of modern pedagogical approaches will improve the quality of children's education and will have a significant impact on their future success.

The methodological approaches and game-based activities presented in the study helped to effectively develop children's quantitative competencies. Children made great progress in developing their mathematical thinking through games and mastering quantitative concepts. Games and interactive activities improved children's understanding of the relationships between numbers, quantities, and sizes, which deepened their mathematical thinking. This process also served to develop teamwork and exchange skills among children. The methodological approaches implemented in the study were aimed at further expanding mathematical thinking in preschool children, forming their analytical and logical thinking skills, and yielded successful results. In the future, the wider use of interactive technologies and new pedagogical methods in the process of forming quantitative competencies will help to further improve the quality of education. The use of innovative methods in preschool education will greatly contribute to raising the quality of children's education to a higher level and developing their mathematical thinking.Therefore, further expanding game-based activities and interactive approaches will ensure the successful development of children's mathematical thinking.

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