



Literary study of playing activities to increase the mathematical geometric shapes concept understanding for early childhood students

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Abstract

The background of this study is that learning mathematics in terms of geometry is crucial to introduce to early childhood, and many teachers are still unaware of what activities might boost knowledge of geometric shapes. So, this study aimed to learn about playing activities that can develop an understanding of the concept of mathematical geometric shapes in early childhood. The method employed is a qualitative approach with library research where the data source is secondary data from published research journals. Using labyrinth geometry playing activities, finger painting playing activities, and dakon playing activities, the results for developing knowledge of the notion of geometric shapes in early childhood mathematics may be acquired. The result of this study is based on prior research, namely employing maze geometry playing activities, finger painting playing activities, and dakon playing activities to develop knowledge of mathematical geometry. The point is that playing using geometric shapes provides an understanding of mathematics for early childhood.

INTRODUCTION

Early childhood education is said to be when children easily absorb knowledge more quickly and will remember this knowledge for a long time (Purnomo, 2013; Dewi, 2015). Therefore, this period is a period of introduction to basic knowledge given to those who later, from the basic knowledge or initial concepts, will become a continuous provision to obtain advanced knowledge from fundamental knowledge (Fitriasari, 2017). However, in essence, early childhood, namely children who are in the age range of 0-6 years, are not required to study (Khairi, 2018; Hasanah et al., 2019; Novitasari, 2018; Nurrahman, 2019) so to create the slogan of learning while playing for early childhood. So that providing knowledge to children is done by carrying out playing activities to increase children's knowledge (Publik et al., 2021). Initial knowledge, usually in the form of basic concepts, is included in cognitive development. Early childhood development comprises six developments (Yafie, Evania & Sutama, 2019; Talango, 2020; Sulaiman et al., 2019). One of the developments is cognitive development where this development refers to the process of thinking, remembering,

responding to objects in the environment, reflecting on them, and being able to solve problems (Khadijah, 2016). Mathematics is included in cognitive development. Mathematics is divided into several concentrations, including algebra, geometry, and so on (Rozana et al., 2020; Fauzziyah et al., 2021).

Mathematical geometry is not only studied during high school (SMA) or studied when they are already in their teens, but even at an early age, children can learn geometry. (Hewi & Shaleh, 2020; Anggria Novita, 2021). Knowledge of geometry for early childhood only needs to recognize the concept of basic mathematical geometric shapes such as circles, squares, and triangles (Dewi, 2019; Elan et al., 2017; Azhima et al., 2021). In line with this opinion, the development of understanding of knowledge of geometric shapes in early childhood mathematics based on age is classified as 3-4 years old children can recognize geometric shapes (triangles, squares, and circles), 4-5 years old children can classify geometric shapes (Dewi, 2019), and 5-6 years old children can sort geometric shapes based on size (Purnamasari & Nurhayati, 2019). However, based on the problems in the studies carried out by many researchers, research on increasing knowledge of geometric shapes in early childhood is still lacking. Based on the same problem in several published studies, the researcher tried to find a solution by conducting a literature study research to answer the problems. This study looks for any playing activities that can increase geometric shapes understanding in mathematics for early childhood learners. The novelty of this research lies in the use of library research since previous studies used quantitative research. A literature study was conducted to analyze which playing activities are most widely used in improving the initial knowledge of geometric shapes in early childhood mathematics lessons.

Where is the novelty of this research because it uses library research to look for any play activities that can improve the initial knowledge of geometric shapes in early childhood. Previous studies conducted by other researchers usually use CAR, quantitative research, and literature studies but only focus on one game activity. For example, previous research conducted by (Azhima et al., 2021) research on literature studies to introduce beginning mathematics to early childhood by using play activities using only flashcards. As for research from (Elan et al., 2017) and (Jumiati, 2021) CAR was carried out using play activities using puzzles. As for quantitative research conducted by (Fitria, 2021) and (Nugrahani, 2019) play activities using tangram educational games. Where all the previous study was able to improve understanding of the concept of geometry in early childhood, another difference is the

research being conducted by current researchers using library research to look for studies that have been carried out previously which resulted in research on which play activities were able to increase the initial knowledge of early childhood geometric shapes that are most often used and produce success in introducing early knowledge of geometry to children. early age.

METHODS

This research employed the qualitative method with a literature study approach. According to (Nazir, 2013), a literature study is a research in which data information is obtained from previous research or studies that have been carried out beforehand regardless of the research using primary or secondary data and any research method. The data sources used in this study are secondary data from published journals. These journals meet the criteria for obtaining relevant data, such as 1) there is the author's name, 2) there is a research title, 3) it is relevant to the research being conducted (Royani & L, 2020), and 4) there is a journal name. The location of research can be carried out anywhere because it was a library study research where the time of implementation of the research was carried out during August 2022. This research did not use respondents because it was a library study research.

The data analysis used in this study surveyed analysis techniques where existing data was examined either in collecting data or analyzing data of previous researchers to obtain a broader orientation in the selected problem and to avoid unnecessary duplications (Nazir, 2013). The results of the research analysis obtained are described narratively.



Figure 1. The Research Procedure

RESULTS AND DISCUSSION

A. Result

The research results were obtained based on a search of research journals related to the research objectives. The obtained journals were used to describe and analyze playing activities that can improve the concept of geometric shapes for early childhood. The results obtained are: Early Childhood Mathematics Concepts, The concept of mathematics for early

childhood, according to the *National Council of Teachers of Mathematics* NCTM (Fitria, 2021) among others, namely 1) Numbers include understanding numbers, 2) Algebra includes sorting, classifying, and comparing objects, 3) Geometry includes recognizing geometric shapes, namely triangles, quadrilaterals, squares and circles, 4) Measurement includes measuring, weighing and comparing the size of objects -thing. As for other opinions related to the concept of mathematics for early childhood, according to the principles and standards for school mathematics Lisa (2018) states that the concept of early childhood mathematics consists of eight basic concepts where four of which are the same as the opinion of NCTM and four mathematical concepts for young children other early, namely: 1) Classification includes the process of developing the concept of numbers in which children are expected to be able to sort objects that have similarities and differences, 2) Comparing includes building a relationship from the two objects being compared, 3) Arranging which has a higher level rather than comparing because children compare more things that need to be compared, and 4) Patterns include identifying patterns by classifying and sorting.

Geometry for Early Childhood, According to Gerjard and Melander, geometry is a field of science related to size, spatiality, nature, and shape of space (Akemad Wahyudi & Aulina, 2021). According to Sa'ida (2021), the definition related to geometry) is building forms that begin with identifying shapes, observing buildings, and separating shapes or images of squares, rectangles, triangles, and circles. This definition is very suitable for understanding geometry in early childhood. Understanding the concept of geometric shapes in early childhood teaches children to think systematically, so they can think critically from previous knowledge (Sa'ida, 2021). Children can associate geometric shapes with concrete forms in the real world that are in their surroundings. According to Van Hiele, there are five stages in learning geometric concepts for early childhood Sa'ida (2021) and Royani & L (2020), namely: 1) the stage of introducing basic geometric shapes to early childhood, 2) the investigation stage that produces an analysis of the characteristics of the geometric shapes they observe, 3) the preparation stage where children can classify shapes based on the types of geometric shapes, 4) the deduction stage the children can conclude the results of observations, 5) the accuracy stage the children can learn geometric shapes from concrete objects.

Playing activities to Increase Knowledge of the Concept of Mathematical Geometry in Early Childhood Learners, Activities to improve the mathematical ability to recognize

geometric shapes based on literature studies of several journals which are considered to meet the criteria for the need to describe the data obtained by several playing: Geometry Maze Playing activities, The maze game is a game that is similar to a twisty puzzle, and you have to find a way out (Safira & Fidesrinur, 2021). According to Kuswanto (2020), the maze game is a playing activity in the form of a winding maze where players have to find a suitable way to solve the problem. The maze geometry game activity is a maze game activity that has been modified for children so they can get to know the concept of geometric shapes in early childhood. The concept is about matching, grouping, mentioning, and describing geometric shapes. Finger Painting Activities, Finger painting or drawing using your fingers is a painting technique with your fingers directly without using any tools (Hastutik, Y.T., Wahyuningsih, S. & Mulyono, 2018). Finger painting is a technique directly without using tools where the brush used for painting is replaced by using the fingers of the children who paint (Hastutik, Y.T., Wahyuningsih, S. & Mulyono, 2018). This activity can show children's ability to distinguish geometric shapes, group, and mention geometric shapes. Dakon Playing Activities, Geometry dakon is a modification of a game tool consisting of punched dakon boards, where the holes on the dakon board are punched into geometric shapes and filled with geometric-shaped grains that aim to introduce geometric shapes (Roisah, 2018). The geometric dakon consists of eight holes, while the seeds to fill the holes use miniature geometric shapes such as circles, rectangles, and triangles (Ningrum & Chusna, 2020; Sari et al., 2020). This activity can be done by two people who are played alternately. The goals and activities of playing dakon will provide knowledge in terms of naming geometric shapes, being able to give examples of the shape of objects that are the same as geometric shapes, and being able to describe geometric shapes (Dengah et al., 2021).

B. Discussion

The findings in this study are activities that can increase the understanding of mathematical concepts of geometric shapes. Three activities are obtained: playing maze geometry, playing finger painting, and playing dakon. These three playing activities can enable children to name geometric shapes for early childhood, following the purpose of this study to find out early childhood understanding related to mathematical geometric shapes. The indicators of understanding knowledge are classified based on age. Children three to four years old can recognize geometric shapes (triangles, squares, and circles). Four to five years old children can group geometric shapes. Children five to six years old can sort geometric

shapes based on size. However, children aged 0-2 are not in the cognitive development of shapes understanding. Therefore, the previous studies were between 3 and 5 years old. In line with the Minister of Education and Culture, NCTM states that early childhood geometry knowledge includes recognizing geometric shapes such as triangles, rectangles, squares, and circles. In other words, geometric shapes for early childhood are knowledge of plane shapes that are very simple and very often found in everyday life, with the hope that children will be able to associate these geometric shapes with objects around them. Therefore, playing activities that can increase early childhood knowledge related to mathematical geometric shapes is necessary.

Based on the findings, several playing activities can be carried out, including maze-playing activities based on research from [Safira & Fidesrinur \(2021\)](#) using action research. Class maze-playing activities can increase knowledge of geometric shapes. The study results showed an increase in children's mention of geometric shapes according to indicators of understanding of children aged 4-5 years in terms of matching, grouping, naming, and describing geometric shapes, following the indicators of Permendikbud number 146. Other research that supports research from Sfira and Fidesrinur is based on research from [\(Lestari, 2016\)](#). The analysis stated that maze games influence knowledge of early childhood geometric shapes.

Using classroom action research, other playing activities that can be applied are finger painting activities based on research [\(Hastutik, Y.T., Wahyuningsih, S. & Mulyono, 2018\)](#). It was found that finger painting playing activities increased knowledge of geometric shapes in early childhood. The knowledge of early childhood geometric shapes in this study can improve the indicators of children aged 4-5 years in distinguishing geometric shapes, grouping, and mentioning geometric shapes. And the last is the activity of playing dakon based on research results from [\(Dengah et al., 2021\)](#). Based on classroom action research, it is said to increase knowledge of geometric shapes in terms of knowing and mentioning geometric shapes. In line with research [Roisah \(2018\)](#), there was a significant influence of dakon playing activities in introducing knowledge of geometric shapes to early childhood. Because of this influence, playing dakon activities makes other researchers innovate dakon geometry games like what was done [Ningrum & Chusna \(2020\)](#) for children aged 4-5 years. The research also obtained results that the modified dakon playing activities were also able to increase knowledge of geometric shapes. According to [Roisah \(2018\)](#), this game can provide

knowledge in naming geometric shapes, able to give examples of shapes of objects that are the same as geometric shapes, and able to describe geometric shapes.

The findings obtained by researchers are that these three playing activities can be used for children aged 3-6 years when seen from the indicators of Permendikbud number 146 and the achievement indicators obtained based on previous studies. So the impact of this research is that other researchers can try to research the three playing activities that have been described for different ages. There are limitations in this study because there are still very few studies related to these three playing activities.

CONCLUSIONS

Playing activities to increase knowledge of mathematical geometry can be done by using maze geometry, finger painting, and dakon playing activities. These activities can provide increased knowledge of early childhood mathematical geometric shapes in the age range of 3-6 years.

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