Improving Cognitive Abilities in Recognizing Geometric Shapes Material through the Index Card Match Method

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Abstract

This research aims to improve the cognitive ability of group B children at the AL-Ulya Rajabasa Kindergarten in Bandar Lampung to recognize geometric shapes through the index card match method. Due to the lack of learning media, children cannot focus or name geometric shapes. This research uses the classroom action research method with two cycles. The data-collecting techniques employed were observations, interviews, and documentation. The subject of this research was one classroom teacher and twelve AL-Ulya Kindergarten group B students. The analysis shows that the children's cognitive ability to recognize geometric shapes through the index card match method increases. Improvements can be seen after taking action in cycle 1. Two children (16.6%) experienced excellent development. In cycle 2, ten children developed very well (83.3%). This research was stopped in the second cycle because the predetermined standard was exceeded; children who developed very well reached 75%. The results of children's ability to recognize geometric shapes before and after using the index card match method have increased greatly. In the results of observations in research, implementing learning such as using the index card match method can improve cognitive abilities in recognizing geometric shapes.

INTRODUCTION

Children in their golden age easily accept, follow, see and hear everything that is exemplified and shown (Fatmawati, 2021; Mawaddah & Akbar, 2022; Nababan & Tesmanto, 2021). Children in the golden age must be given a lot of stimulation that can develop their aspects development, namely moral, religious, cognitive, language, social-emotional, physical motoric, and artistic values development (ASMORO et al., 2022; Pakpahan, 2020; Patiung et al., 2019; Sulaiman et al., 2019). Kindergartens, Raudatul Athfal (RA), Play Groups (KB), Child Care (TPA), and other similar early childhood education institutions with various names have emerged, which have increased the awareness of parents and teachers (Erifiani & Fauziah, 2014; Hasanah, 2018; Wijayanti et al., 2021).

One aspect of child development is the cognitive aspect (Khasanah et al., 2012; Latifah, 2017; Veronica, 2018). Cognitive development describes how a child's mind develops and functions so that he can think (Fitri, 2017; Khoiriyati & Saripah, 2018). Therefore, geometric shapes help children understand and describe the objects around them. The ability to recognize geometric shapes is the child's ability to recognize, show, name and collect objects around the child in geometric shapes in circles, squares and triangles. (Andriyani, 2015; Mochamad Surya et al., 2021; Nurjani & Jubaedah, 2020). Meanwhile, the introduction of geometric shapes itself is an introduction that must be carried out by children, which is the same as recognizing the shapes of objects in the surrounding environment because they are related to each other, such as the shape of windows, coins, tables and so on, aimed at fulfilling children's needs for play. (Anggraini et al., 2023; Hasanah & Deiniatur, 2019; Helfianti et al., 2021).

In the field of mathematics involving geometry in the form of shape, size, position, direction, and movement and describing and classifying objects around them (Nurapriani et al., 2021; Rukiyah et al., 2014; Yulianti et al., 2020). Historically, geometry is one of the first areas of mathematics taught to children. Geometry identifies shapes, investigates buildings, and separates figures such as quadrilaterals, circles, and triangles (. & Prasetyo, 2015; Nurapriani et al., 2021; Wahyuningsih, 2021). Based on the explanation above, it can be concluded that the introduction of geometry is part of mathematics in the classification of cognitive development to recognize, show, mention and collect geometric objects around children in the form of circles, squares and triangles such as windows, coins, table and so on.

Index card match learning method means a learning method for finding partners. It is one type of group work, namely Pairs Check. Pairs Check is a group work method involving children in pairs in behind-the-table activities focusing on problems with convergent answers (Halik et al., 2023; Kurniawati & Sartinah, 2016; Widiani, 2021). The steps taken in ICM are to make as many pieces of paper as there are children, divide the paper into two, write a question on one half, write the answer to the question on the other half, shuffle all the paper, give each child one paper, ask the children to find their partners and end this process by making clarifications and conclusions (Budiman, 2020; Ma'rifah et al., 2014; Soedarnadi, 2019).

According to Jawati's research, this research was conducted to improve children's cognitive abilities through the geometric ludo game in recognizing geometric shapes, numbers, and grouping colours (Jawati, 2013). According to Fardiah's research, improving cognitive abilities through science is important because it impacts logical and systematic thinking and can improve language skills (Fardiah et al., 2019). According to research by Lutfi Nur, Anne Hafina and Nandang Rusmana, applying a game-based aquatic learning model can develop cognitive development consisting of problem-solving, logical thinking and symbolic thinking. (Nur et al., 2020). According to research from Ery Khaeriyah, Aip Saripudin, and Riri Kartiyawati, in developing children's cognitive development, they are required to be able to carry out experiments independently and provide direct experience to children in the form of recognizing colours, recognizing plants, animals, and natural phenomena in the environment (Khaeriyah et al., 2018). From previous research, it can be distinguished that the innovation that researchers encountered during the research was in the form of cognitive development, not only developing through experiments and science learning and Lego games, but cognitive development can also develop through the index card match method in recognizing geometric shapes.

Teachers at the AL-Ulya Rajabasa Kindergarten in Bandar Lampung rarely use game techniques in learning. This is due to various reasons, including the fact that it costs a lot of money, requires a long preparation, and requires a lot of teacher creativity. Many parents find it strange that learning is delivered through play. There are many findings in applying the Index Card Match learning method, where finding pairs (Index Card Match) can improve children's cognitive abilities. This can be seen when the child gets a card that is held, namely a card with a geometric picture, and then the child matches and looks for pairs of cards. Shape according to the size, type and shape held by his friend. This game is achieved by the indicators, namely pairing objects according to their shape, size, and type, and the indicators mention, show, and group the shapes of circles, triangles, and quadrilaterals.

Based on the results of interviews with AL-Ulya Rajabasa Kindergarten class teachers in Bandar Lampung, it was stated that there was a lack of knowledge of cognitive development, a lack of learning media, and a lack of teacher creativity. Looking at the problems and some of the opinions expressed above are in accordance with what is happening currently, such as at the AL-Ulya Rajabasa Kindergarten in Bandar Lampung. In this way, the author is interested in researching directly regarding the application of the Index Card Match

learning method as a way to improve the ability of geometric shapes in children at the AL-Ulya Rajabasa Kindergarten in Bandar Lampung using the Classroom Action Research (PTK) method by taking Title Improving the Cognitive Abilities of Children Aged 5-6 Years on Material Recognizing Geometric Shapes Through the Index Card Match Learning Method at AL-Ulya Rajabasa Kindergarten Bandar Lampung.

METHODS

This research is classroom action research, which focuses on classroom situations. Stinger in Arikunto states that action research is a collaborative approach to finding or investigating problems that make it possible to obtain ways to carry out activities (action) systematically to solve problems. The duration of the research was two cycles, with four meetings in each Cycle from February 3, 2023, in the even semester. The numbers of respondents were 12 children. Thus, classroom action research was conducted to increase or improve learning practices that teachers should carry out. If there is more than one cycle, the second cycle repeats the previous stage. It's just that there is always improvement between the first and second cycles.

The implementation stages were carried out in two cycles, with four meetings. Initial or pre-research activities were carried out to determine what problems exist in the field. The stages carried out were planning, implementation, observation and reflection. Researchers used a data triangulation system to test the validity of the data.

The data analysis was conducted to determine whether index card match media can improve children's geometric abilities at the AL-ULya Rajabasa Kindergarten in Bandar Lampung. The data analysis results are presented as conclusions at the end of each cycle by calculating the percentage of success achieved previously formulated. The data collected was from observations and photographs during the ongoing learning process. They were sorted and then analyzed to determine any changes in students. The next was the implementation of the interpretation of the researcher's analysis results. The data results are presented in the form of percentages from each cycle. The success criteria are if children's cognitive abilities in recognizing geometric shapes through index card match media achieved 75%. If the first cycle has not reached the target, the second cycle will be carried out until the predetermined target is reached.

## RESULTS AND DISCUSSION
A. Result and Discussion

Data analysis was carried out to determine whether the index card match method could improve children's geometric abilities at the AL-Ulya Rajabasa Kindergarten in Bandar Lampung. The results of data analysis are presented in the form of conclusions at the end of each cycle by calculating the percentage of success achieved previously formulated, as well as documenting the learning implementation process. The data collected is in the form of observations and photographs during the ongoing learning process, sorted and then analyzed to determine student changes. The data results are presented as percentage results obtained from each cycle. Criteria for the success of cognitive abilities in recognizing geometric shapes through index card match media in researchers with an achievement of 75%.

Table 1. The Improvement Percentage of Cognitive Ability in Recognizing Geometric Shapes

Cycle	Meeting	The Improvement Cognitive Ability In Recognizing Geometric Shapes								Total
		BB	%	MB	%	BSH	%	BSB	%	
Pre-cycle		6	50%	3	25%	3	25%	0	0%	12
Cycle 1	I-IV	2	16,6%	4	33,3%	2	33,3%	2	16%	12
Cycle 2	I-IV	0	0%	0	0%	2	16,6%	10	83,3%	12
Percentage		100%		100%		100%		100%		100%

The results of classroom action research (PTK) on improving cognitive abilities to recognize geometric shapes through index card match media in group B children at AL-Ulya Rajabasa Kindergarten Bandar Lampung, based on the results of the implementation data consisting of two cycles, the researcher concluded that a) the process of improving cognitive abilities to recognize geometric shapes through index card match media was carried out in two cycles in this research by forming two groups and dividing them into two chairs. Then, the researcher explained that learning would occur in groups and pairs; they had to work together to complete the task. After being divided into groups to give a class presentation, the team groups complete the existing tasks. The tasks given are as follows: mentioning various geometric shapes, matching the geometric shapes, and looking for the same pairs. The children could distinguish geometric shapes and sizes and sort geometric shapes from largest to vice versa. Each group in pairs came forward to represent the activity in turn. After that, the researcher counted the scores from each group and announced the winners. A small prize was given to the children as an expression of appreciation. b) There was an increase in students' learning outcomes in each cycle Based on the achievement of learning outcomes for group B students at AL-Ulya Rajabasa Kindergarten Bandar Lampung. In cycle 1, out of 12 children, there were two children (16, 6%) in the not yet developed category (BB), four children (33.3%) were in the starting to develop category (MB), four children (33.3%) were in the developing according to expectations category. Two children (16.6%) were developing very well (BSB).

In Cycle II, most students in group B at AL-Ulya Rajabasa Kindergarten Bandar Lampung experienced a significant increase in student learning outcomes in each cycle. In Cycle II, no children belonged in the not yet developed category (BB) and were starting to develop the category (MB). However, two children (16.6%) were in the developing according to expectations category, and ten children (83.3%) were in the very well-developed category. To find out more clearly, see the following diagram:
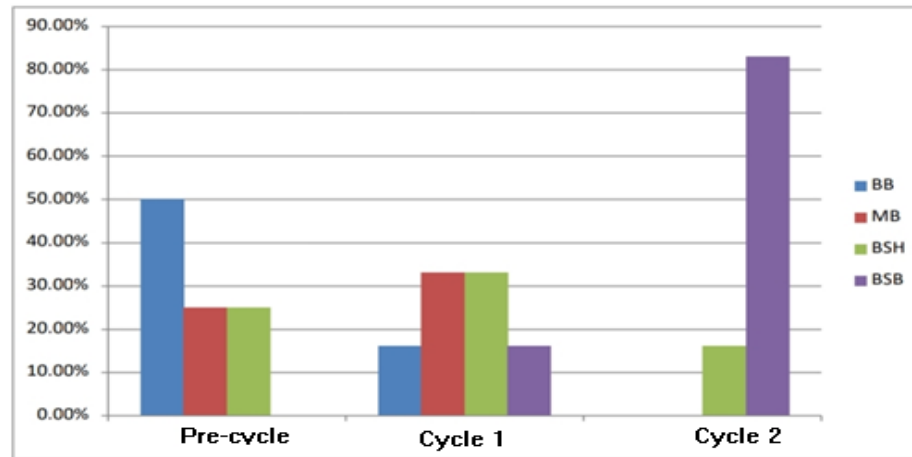
Figure 1. The Recapitulation of Cognitive Abilities to Recognize Geometric Shapes through Index Card Match Media in Group B at Rajabasa Kindergarten Bandar Lampung

Based on the research results, cognitive abilities can be improved in recognizing geometric shapes through the index card match media. Implementing the index card match media can improve the cognitive abilities of young children. Based on the results of the researcher's observations, there were several changes in the average value from Cycle I to Cycle II. In the first meeting of the first cycle, four children (33.3%) were in the not-yet-developed category (BB). They were not focused when the teacher was delivering the material. Five children (41.1%) were in the starting to develop category (MB). They began to develop when the index card match media was introduced. Three children (25%) were developing according to expectations, and no children were in the very well-developed category. During the first meeting, some children looked shy when mentioning various geometric shapes.

In the second meeting in the first cycle, three children (25%) in the not yet developed category (BB) began to focus on receiving the lesson. Six students (50%) in the starting to develop category (MB) started progressing gradually by paying attention when the teacher explained. Some children named geometric shapes correctly and precisely according to the picture. Three children (25%) were in the developing according to expectations category, and no children were in the developing very well category (BSB).

At the second meeting, some children could not differentiate geometric shapes. Some children were naughty and disrupted other activities. In the third meeting of the first cycle, two students (16.6%) were in the not-yet-developed category (BB). Seven children (58.8%) were in the starting to develop category (MB). Four children (33.3%) were in the developing according to expectations category (BSB), and there were none in the developing very well category (BSB). In the fourth meeting of the first cycle, two children were in the have not yet developed category (BB), and four children were starting to develop category (MB). The children could name geometric shapes correctly. They could also mention examples of geometric shapes around them. Based on the weaknesses in the first Cycle, Cycle II was improved in terms of planning, implementation, and evaluation.

Based on the results of the reflection of the two cycles, a significant increase in the percentage of development was found. There was a consistent increase from each meeting in Cycle I and II. In Cycle I, 12 students were in the not yet developed category (BB), and there were two children (16.6%) who were in the starting to develop category (MB). There were four children (33.3%) who were in the developing according to expectations category and two children (16.6%) in the developing very well category (BSB). Then, in the second cycle, most of the learning outcomes achieved by group B students at Rajabasa Kindergarten Bandar Lampung experienced a significant increase in learning outcomes in each cycle. In Cycle I,

many children have not developed their cognitive abilities to recognize geometric shapes through index card match media.

Every child's development as a complete unit has potential that will be lost if not guided and developed. Therefore, childhood is a fundamental stage for child development for the formation and development of children. (Firdayanti et al., 2021). This can be seen from the strategy design for recognizing geometric shapes, which is not yet optimal, so some students are not interested in the media used. Some children are still hesitant or afraid to look for pairs of cards and match them according to the geometric shapes obtained; their children still enjoy playing cards without caring what form they get; some children don't want to do the tasks given. The obstacles found in the fourth meeting of the first cycle were that some children could not focus, looked shy when playing matching pictures, and could not order geometric shapes from smallest to smallest to biggest. Some children were naughty, so they disturbed the activities of other friends. The researcher tried to be patient and gently warn the children because every child's character is different. Different characters also have different handlers. At the end of the activity, the researcher gave prizes to children who completed the task so they always felt happy and proud of their work.

In the second cycle's first meeting, no children were in the not-yet-developed category (BB). At this stage, there were no children who had not yet developed because they had begun to understand what the teacher was saying, and they could already name geometric shapes even though sometimes there were still mistakes. There were two children in the starting to develop category (MB), meaning that children's development was very good in improving cognitive abilities to recognize geometric shapes. There were six students in the developing according to expectations category. They could assemble geometric shapes according to their size and sort them. There were three children in the developing very well category (BSB).

In the second meeting of the second cycle, there were no children in the category (BB) that had not yet been developed. One child was in the starting to develop category (MB). Five children were in the developed very well category (BSB). The children were no longer shy. In the third meeting of the second cycle, there were no children in the not yet developing category (BB) and the starting to develop category (MB). Four students were in the developing according to expectations category (BSH), and eight were in the developing very well category (BSB). In the fourth meeting of the second cycle, there were no children in the not yet developed category (BB) and the starting to develop category (MB). Two children were in the developing according to expectations category, and ten students were in the developing very well category (BSB). It can be seen from Cycle I and Cycle II that children's ability to recognize geometric shapes before and after using index card match media has increased.

In Cycle II, the researcher almost did not find any obstacles because, before the game, the researcher had made rules when playing so that the children were used to following the rules. However, a child's development was late compared to his friends. The researcher had to be extra attentive and encourage the child to be more enthusiastic in his activities, like his friends. Especially for children who experience developmental delays in each activity, the researchers did not forget to include jokes so that the children did not feel tense with the activities and could make the atmosphere more cheerful. At the end of each activity, the researchers distributed prizes for children who completed their tasks so that the children were pleased.

CONCLUSIONS

Based on the analysis, the children's cognitive abilities to recognize geometry using the index card match method increased. The improvement can be seen in the pre-research data; none of the children were in the developed very well category. After taking action in

Cycle I, some children belonged to the category. In Cycle II, some children belonged to the developed very well category. This research was stopped in Cycle II because it had exceeded the previously established standards of success.

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