*E-Chief Journal (Early Childhood and Family Parenting Journal)*
*ISSN: 2808-2664 E-ISSN: 2808-2656*
*Vol.6 No.1 2026 Page:26-39*

# DEVELOP THE ABILITY TO RECOGNIZE ABC-ABC PATTERNS USING PROBLEM-BASED LEARNING AND MAZE PATTERN GAMES IN CHILDREN AGED 4-5 YEARS

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**Abstract**
The ability to recognize patterns repeatedly is important for every child. This study aims to describe teacher activities, children's activities, and the results of children's cognitive development to recognize the ABC-ABC pattern using the Problem Based Learning model through Maze Pattern Games activities. This study uses a qualitative approach with the type of Class Action Research (PTK) which was carried out in four meetings. The subjects of the study were 14 children of group A of Bakti 1 Islamic Kindergarten 1 Banjarmasin. Data collection uses observation techniques and assessments of teacher activities, children's activities, and children's cognitive development outcomes. Data analysis uses qualitative descriptive analysis in the form of tables and percentage graphs presented with established success indicators. The results showed that the teacher's activity in meeting 4 reached a score of 28 with the criteria of Excellent, in the children's activity in meeting 4 reached 100% with the category of All Active Children, and the achievement of classical child development in meeting 4 reached 100% with the criterion of Very Good Development. Based on the results of the data analysis, it can be concluded that the PBL model through the maze pattern play can be used as an effective learning reference in getting to know the ABC-ABC poa in children.
**Keywords:** Pattern Maze, Problem-Based Learning, Cognitive Development; ABC-ABC pattern.

## INTRODUCTION

NAEYC (National Association for The Education of Young Children) states that early childhood is a child who is between the ages of 0-8 years who are undergoing a developmental process for the next life in various aspects, including educational programs in daycare, family childcare (Family Child Care Home), preschool education, both private and public, kindergarten, and elementary school (Watini, 2020).

This is a time when children are in a unique phase of life in the process of change in the form of growth, development, maturation, and physical and spiritual perfection that lasts a lifetime (Purwanti et al., 2021). Stimulation in children of this age is very important because it is the basis for development Human Capital Because children who are healthy and socially grow optimally will grow up to be productive adults (Ministry of Education and Culture, 2020).

Sigmund Freud revealed that "child is father of man", meaning that the child is the father of a man. The point is that childhood affects the development of a person's adult personality (Khairi, 2018).

The learning process as a form of treatment given to children must pay attention to the characteristics at each stage of child development. To be able to maximize all aspects of development, education is needed that can specifically

support its growth and development. Early Childhood Education (PAUD) is a Implementation of education that focuses on laying the foundation for growth and development (Fitriana & Novitawati, 2021). This is a holistic process of fostering the growth and development of children aged 0-6 years, covering aspects of physical, spiritual, motor, intellectual, emotional, and social development so that children can grow and develop optimally (Arnafama & Sari, 2023).

The implementation of PAUD plays an important role as an initial foundation to shape children's character from an early age. The absorption of the information conveyed will take place very quickly and the response from the child will also be fast. The Early Childhood Achievement Standards (STPPA) are focused on developmental aspects that include: (a) religious and moral values; (b) the value of Pancasila; (c) physical, motor; (d) cognitive: (e) language; and (f) social-emotional (Nurfadilah, 2021). Therefore, at an early age, it is necessary to make development efforts that involve aspects of nurturing, health, education, and protection.(Kemendikbud, 2020)

One of the important aspects that must be developed in Kindergarten education is the aspect of cognitive development or often called thinking power (Rani et al., 2020). The cognitive aspect is very necessary for a child's life later until he grows up (Iriyanti, D. & Maimunah, 2023). Cognitive ability is the ability of children to think more complex about what they see around them as well as to do reasoning and problem-solving. A person's cognitive development determines whether or not he is able to solve problems (K. Putri, 2020; Sarah & Darmiyati, 2023).

In developing cognitive aspects, educators need to refer to guidelines so that the provision of educational stimuli is appropriate for children according to their needs and age (Puspitaloka, 2021). The scope of cognitive development itself is divided into 3 (three), namely learning and problem solving, logical thinking, and symbolic thinking. Logical thinking skills are grouped into several indicators of achievement, namely the ability to know differences, classification, initiative, planning, knowing cause and effect and recognizing repetitive patterns (Nurfadilah, 2021). Introduction to the concept of this pattern is usually given to children through learning to recognize the AB-AB or ABC-ABC pattern.

Getting to know the pattern (Patterning) is the activity of arranging a series of colors, parts, objects, sounds and movements that can be repeated. The ability to formulate patterns is very important because it can help children expand their knowledge of similarities and differences (Sriyanti et al., 2021). Johnson explained that indicators of recognizing patterns for early childhood include duplicate, Complete, extend and Identify. Duplicate which means to imitate or trace the form, cSmashing Pumpkins means completing an empty or missing pattern item, extend means to extend means to extend the pattern and Identify means identifying items to create their own patterns (Rittle-Johnson et al., 2013).

In sequencing patterns is the ability to sequence a set of objects that are interconnected with each other (Hasanah & Fitrianti, 2019). The relationships that occur can be based on the order of color, shape, and size. While Wijns mentions several tasks used to operationalize patterns, the most common are copying (creating the same pattern), interpolation (filling in missing elements), expanding (continuing a given pattern), generalizing (creating the same pattern with different materials), and identifying patterns (finding

the same pattern (Arvy, 2023). The ABC-ABC pattern introduction activity can be divided into several indicators, namely repeating, compiling, and predicting existing patterns (Adisty et al., 2021).

The benefits of knowing patterns can help children learn to estimate a situation, event, and other important things. If the child is able to understand the concept of sorting or arranging objects in accordance with the pattern, then it will be very easy for the child to complete the activity of getting to know the ABC-ABC pattern (Pratiwi, 2017).

However, the reality in the field shows that the results of children's cognitive development are still relatively low. The results of the observations, and interviews conducted found that there were problems with children in the ability to recognize and sequence the ABC-ABC pattern. Of the 14 children in group A, there were about 8 children who did not develop as expected when learning to sequence patterns. This can be seen in the color sorting activity in finger painting playing. Some children are not yet able to sort out the next pattern. Children often ask the teacher about what colors should be used. There are some other children who are seen using only 1 (one) color completely from the pattern of the picture given, and there are those who pile up the color of the pattern in one place so that the picture becomes black without following the pattern that has been directed by the teacher.

This can be caused by many factors, including the factor of children's involvement in learning because learning activities are only centered on teachers, learning activities are less interesting and fun, learning is not carried out and does not give meaning to children. If this is left unchecked, the problems that occur in the future will not be skilled in thinking, observing, classifying, sorting and making graphs (Prakarsi et al., 2020). This will have an impact on the next development regarding children's problem-solving ability in composing patterns, imitating patterns and sequencing patterns.

One of the efforts that can be made to overcome these problems is by paying attention to the selection of appropriate models, play activities, and learning media and must be in accordance with the characteristics of the child's development stages and the principles of early childhood learning, namely: 1) children as active learners, 2) children learn through the five senses, 3) children build their knowledge, 4) children think through concrete objects, 5) Children learn from their environment (Wahyudi & Fathani, 2018).

The learning model serves as a guideline for educators in carrying out learning while helping students obtain information, ideas, skills, values, ways of thinking, and learning how to learn to achieve learning goals (Asyafah, 2019). The use of the right models and media can make children enthusiastic about learning because they feel interested and make children happy, so that children's imagination and creativity will increase (Hairunnisa & Cinantya, 2022).

In addition, play activities can also be applied to the learning model, so that teachers can be part of students in a unique and fun learning environment (Wulandari & Suparno, 2020). One of the learning models that is suitable for use in early childhood is problem-based learning, considering the characteristics of children who have great curiosity, like to repeat, like to investigate, like to challenge and like to learn many things (Poerwati et al., 2022).

The problem-based learning model is known as Problem Based Learning (PBL) is student-centered learning by placing teachers as facilitators and motivators,

where students are given the opportunity to use various thinking skills both individually and in groups as well as in the real environment to overcome problems so that they are meaningful, relevant, and contextual (Radiansyah et al., 2023; Sirait et al., 2022).

The Problem based learning model is seen as a collaborative approach that encourages students to work together to build on previous knowledge and concepts so as to form new concepts needed to overcome real-life scenarios (Arani et al., 2023; Wardianti & Rini, 2023).

Problem-based learning includes student-centered learning for problem-solving and students being confronted with complex problems (Boye & Agyei, 2023). This model provides students with the opportunity to take responsibility for their own learning, and teachers become facilitators in the learning process (Ulger, 2018).

On this occasion, children will learn various roles of adults through their involvement in real experiences or simulations to make children independent learners (Ulfa, 2020). Problem-based learning is also believed to be able to develop students' creativity skills, both individually and in groups, because almost every step requires student activeness (Wahyudi & Habibie, 2013).

In the use of the model above, combined with play activities as the fact that the children's world is a world of play. This means that children will fill their daily lives with play. Therefore, in this context, parents and educators must fill their children's daily learning with play activities, in addition to providing developmental stimulation (Purnamasari & Yusma, 2021). One of the games that can stimulate the ability to recognize ABC patterns in children is educational games Maze Pattern Games. Games This is a game activity of looking for or finding traces modified from the form of the game that is processed in such a way as to learn to recognize patterns. In groups, children will take turns arranging ABC pattern grains according to the provisions by having to find their way to the pattern box that has been provided. This maze pattern game can stimulate thinking intelligence (logic), develop children's imagination, train children's meticulousness in learning to solve problems, increase children's concentration, and develop children's thinking or reasoning (Hutagalung, 2021).

Several studies that have been conducted have explained that the learning model problem-based learning, provide a variety of learning experiences through problem-solving activities that can hone critical thinking skills that are able to support their developmental tasks (Aulia & Cinantya, 2023; Poerwati et al., 2022). This is in line with the opinion that in exploring new things, children are often faced with a certain problem. In this condition, problem-solving skills allow students to have analytical skills for a problem and then solve it through logical and rational solutions. Problem-solving skills are a series of procedures or strategies that allow a person to increase independence in thinking (Aulia & Cinantya, 2023; Fatimah, S., & Purwanti, R, 2024; Suriansyah et al., 2021).

In addition, the problem-based learning model is able to have a positive influence on the ability to recognize geometric pattern patterns which is one of the foundations of children to know mathematical patterns (A. A. P. Putri et al., 2023). While playing maze Namely being able to train patience, find solutions, learn colors and shapes, train classification (grouping) skills, train fine motor skills, train logical thinking flows, to train children's hands to be flexible (Afrianti et

al., 2023). In addition, the game maze patterns are able to stimulate the development of knowing geometric shapes (Safira, 2018). The purpose of the study is to describe teacher activities, analyze children's activities, and the results of children's cognitive development in recognizing the ABC-ABC pattern using the model Problem Based Learning through activities Maze Pattern Games in Group A of Bakti 1 Islamic Kindergarten Banjarmasin.

## METHODS

This study uses a qualitative research approach with the type of Classroom Action Research (CAR) spiral Kemmis-Mc.Taggart (1988) (Maliasih et al., 2017). CAR is an action research in the field of education that aims to improve the learning structure in the classroom (Aulia & Cinantya, 2023). This study divides one cycle of classroom action research procedures into four stages, namely the plan stage (Planning), actions (Acting), observation (Observing), and reflection (Reflection) that is done to improve oneself, one's own work experience of educational practices, which is carried out systematically and planned in each subsequent cycle (Saat & Mania, 2020)

This Class Action Research Setting was carried out at Bakti 1 Islamic Kindergarten. Meanwhile, the research data subjects were in group A aged 4-5 years.

In this study, the factors studied are teacher activities, children's activities, and children's development outcomes in recognizing the ABC-ABC pattern. The observation method was carried out to obtain data on the development results of 14 children of group A of Islamic Bakti 1 Kindergarten Banjarmasin. Meanwhile, the type of data is qualitative data. The data is in the form of data on teachers' activities, children and child development outcomes in recognizing the ABC-ABC pattern. The research instrument was used to collect results and analysis at each meeting using observation sheets, student worksheets, and documentation of each meeting. In addition, initial interviews were also conducted to make the data more valid obtained in the preliminary research, along with collecting documentation to obtain the right data results.

Overall, the success of children in recognizing the ABC-ABC pattern using the problem-based learning model through maze pattern games activities is said to be successful if the teacher's activity achieves a minimum score of 21 with Good assessment criteria. The results of individual children's activities obtained a minimum of 13 or a percentage of at least 81% with the Active category and classically obtained from activities ≥82% with the category of Almost All Active Children. Meanwhile, the results of individual child development at least got a score of 3 with a total score of at least 11 in the category of Developing According to Expectations (BSH) and classically getting ≥80% with the category of Developing According to Expectations (BSH).

## RESULTS AND DISCUSSION

The implementation of actions through 4 (four) meetings using a problem-based learning model through maze pattern games activities. The results of data analysis were obtained by calculating the results of observations of each meeting in a classical percentage to determine the increase in the results of teacher activities, children's activities, and the results of child development at each meeting.

The role of teachers is not limited to teaching, but as a supervisor, developer, facilitator, and manager of learning activities that can facilitate learning activities in achieving the goals that have been set, especially in learning to recognize

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the ABC-ABC pattern. The recapitulation of teachers' activities in meetings one to four can be seen in the table below:

Table 1. Recapitulation of Teacher Activities

| Meetings | Score | % | Criteria |
|---|---|---|---|
| 1 | 17 | 53% | Enough |
| 2 | 22 | 68% | Good |
| 3 | 26 | 81% | Good |
| 4 | 28 | 86% | Excellent |

The table above shows that teachers' activities in learning activities using the problem-based learning model through maze pattern games activities show an increase in each meeting. This increase occurs because teachers make continuous improvements at each meeting by analyzing the shortcomings that occurred in the previous meeting. During the next learning process, the teacher does more careful planning so that the teacher is able to achieve the expected results, even at the meeting of 4 teachers exceeding the expected results. This shows that teacher activities have increased rapidly.

The recapitulation of children's activities in meetings one to four can be seen in the table below:

Table 2. Recapitulation of Children's Activities

| Meetings | % | Criteria |
|---|---|---|
| 1 | 29% | A small number of children are active |
| 2 | 50% | Some children are active |
| 3 | 86% | Almost all children are active |
| 4 | 100% | All children are active |

Based on the table above, it can be concluded that children's activities in learning activities to get to know the ABC-ABC pattern pattern using the problem based learning model, through maze pattern games activities from meeting 1 to meeting 4 show that each meeting always increases and achieves success indicators. This is because each child becomes more active in learning activities so that they are able to achieve the criteria of being active or very active in every aspect. In this case, the increase in teacher activities will also affect the increase in children's learning activities.

The recapitulation of the results of the development of children's cognitive aspects in recognizing the ABC-ABC pattern can be seen in the table below:

Table 3. Recapitulation of Developmental Results of Children's Cognitive Aspects

| Meetings | % | Criteria |
|---|---|---|
| 1 | 43% | Not Yet Developed (BB) |
| 2 | 57% | Start Growing (MB) |
| 3 | 86% | Growing Up With Expectations (BSH) |
| 4 | 100% | Very Active Developing (BSB) |

The table above shows that there is an increase in children's cognitive aspects in learning activities to get to know the ABC-ABC pattern using the problem-based learning model through maze pattern games that occur at each meeting. It was explained that children are able to recognize the ABC-ABC pattern, make the same pattern, fill in the missing elements of a pattern, and continue an ABC-ABC pattern. The trends of the three factors studied above can be seen in the following graph:

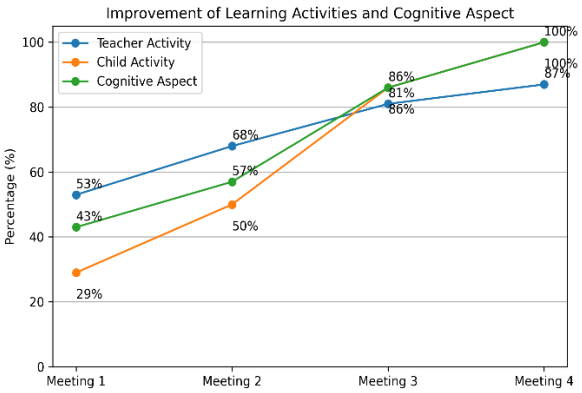


Figure 1. Trends in Improving Teacher Activities, Children's Activities, and Cognitive Development Outcomes

## DISCUSSION

Based on the results of the data analysis that has been carried out, it shows that the problem-based learning model combined through playing maze pattern games to develop the ability to recognize the ABC-ABC pattern in children aged 4-5 years has been successful, and has experienced an increase in learning outcomes at each meeting and can be used as a reference for teaching models and play activities in the classroom. The success of this research was influenced by several factors.

First, teacher activities that have increased with each meeting. Teachers have a huge contribution to the success of learning in the classroom (Meri & Mustika, 2022). The role of teachers will be more urgent in early childhood and primary education, because it corresponds to their very young age level and is easily influenced by the environment and various social media today that are developing very quickly which is even faster than the educational process itself (Suriansyah & Purwanti, 2022). The role of teachers is not limited to teaching, but as a supervisor, developer, facilitator, and manager of learning activities that can facilitate learning activities in achieving the goals that have been set for develop life values, by inheriting science and technology and developing students' skills (Hamid et al., 2019; Sanjani, 2020).

In addition, the teacher's readiness in planning learning greatly affects the final result. Learning activities are designed to provide a learning experience that involves mental and physical processes through interaction processes and other learning resources (Fatimah et al., 2021), both in the formulation of learning objectives, methods used, material to be presented, how to deliver them, preparation of tools or media used to take place effectively and efficiently. In learning activities, students can listen and receive well the material presented referring to the activities designed and carried out as well as the teaching tools of the learning process carried out by the teacher (Hairunnisa & Cinantya, 2022).

Tahkokallio stated that the professional development of PAUD teachers is possible through systematic observation of classroom learning. This encourages teachers to reflect to provide opportunities for change and development (Hanhikoski & Sevón, 2024). The existence of these improvements can improve and improve the results of research at the next meeting, in addition to supporting the development of the professionalism of teachers or prospective teachers in managing learning activities (Yuliyanto et al., 2018).

In this case, if the quality of teachers improves or improves, students' activities and critical thinking skills will also increase, accompanied by learning outcomes that will have a significant influence (Aulia & Cinantya, 2023; Hairunnisa & Cinantya, 2022).

Second, the increase in children's activities in the learning process at each meeting is inseparable from several factors, namely the teacher's activity improves, the teacher is able to condition the class, the teacher always makes learning reflections at each meeting so that learning runs smoothly, effectively and efficiently.

More child-centered learning will make learning more meaningful. Where learning activities are more child-involved, have a fun atmosphere, learn not in a stressful atmosphere, and make it easier for everyone to learn (Wahyudi & Fathani, 2018). This is in line with Wibowo that many factors can affect students' activities in the classroom, one of which is to make the learning experience interesting so that

students are motivated to participate and encourage students to be active in the learning process (Aulia & Cinantya, 2023). Suriansyah in Aulia (2023) It also explains that the most effective learning is learning that actively involves students in all learning activities and continues to learn throughout the learning process.

According to cognitive psychology, learning is seen as an effort to understand something with the activity of connecting new knowledge with existing thinking structures. These activities can be in the form of seeking experience, seeking information, solving problems, observing the environment, practicing something to achieve a certain goal (Rofiah et al., 2021). Novauli argues that the success of learning is supported by the role of teachers who are able to create and provide meaningful learning to their students, in the form of information from all sources, as well as the form of teachers' expertise in implementing learning with various kinds of interesting learning models (Wahyudi et al., 2022). In designing learning activities, a teacher is required to be able to choose and use the right model in carrying out the right learning in order to achieve success. In addition, the importance of creating active interaction between teacher and child is considered one of the main mechanisms to encourage the development of language, mathematics, social-emotional, self-regulation of children and play an important role in learning poses (Bartholo et al., 2022).

Third, the aspect of cognitive development that needs to be stimulated from an early age is an important aspect that is the basis of children's thinking ability (Rani et al., 2020). At the age of 4-5 years, the child absorbs and processes all the new information. Inquiry and concept construction skills in children are easily developed through play (Pewa & Mzimela, 2024). Therefore, the ability to solve a problem is one of the cognitive abilities that every child must have. In the book 'Early Childhood Development' it is stated that logical thinking skills are grouped into several achievement indicators, one of which is Recognizing repetitive patterns, generally given to children through learning to recognize the AB-AB or ABC-ABC pattern (Nurfadilah, 2021).

The understanding of pattern concepts is correlative with other concepts as the basis for mastering mathematical concepts, number concepts and so on (Sriyanti et al., 2021). The ability to form patterns is very important because it can help children expand their knowledge of similarities and differences and train memory and concentration (Sriyanti et al., 2021). Therefore, providing appropriate and appropriate stimulation in developing children's cognitive abilities in recognizing patterns is very important to be done by paying attention to the selection of models, activities, and teaching media used in learning.

Fourth, the selection of appropriate play models and activities must be in accordance with the characteristics and stages of child development (Nasution., 2021). Fun play activities also support the success of learning. Play must be done with a sense of pleasure, so as to produce a fun learning process for children (Utami & Pusari, 2018). Problem-based learning is focused on problems where students can construct their own knowledge, develop inquiry skills and think to a higher level (Anggraini, D. A., & Purwanti, R, 2025; Anggreani, C., & Purwanti, R., 2024; Darmiyati et al., 2023; ).

The problem-based learning model can be applied to early childhood, considering the characteristics of children who have a great curiosity, like to repeat, like to investigate, like to challenge and like

to learn many things (Poerwati et al., 2022). The results of the research conducted by Wulandari & Suparno learning model problem-based learning (problem-based learning) is a learning model with an active learning approach in solving daily problems and providing opportunities for teachers to be part of children in a unique and fun learning environment (Wulandari & Suparno, 2020) as well as giving children the opportunity to develop reason, understand relationships and concepts, and seek the development of their knowledge (Anggraini, D. A., & Purwanti, R, 2025; Anggreani, C., & Purwanti, R., 2024; Rocha & Babo, 2024).

In line with the findings, it was found that the PBL model facilitates better problem-solving, communication, group work and interpersonal skills because almost every step requires student activity (Wahyudi & Habibie, 2013). Problem-based learning models can improve children's development (Amelia, R., Suriansyah, A., & Purwanti, R., 2025; x Wisudawati, N. S., Purwanti, R., & Suriansyah, A., 2025).

Play activities that can be done to develop children's cognitive abilities include, role-playing, maze playing, playing blocks, puzzles, and playing maze (Lestari, 2020). Sapphire (2018) states that playing maze has a significant influence on developing children's cognitive abilities (Yulistari et al., 2018). Other research also states that maze games can have a positive influence on the ability to recognize geometric patterns in early childhood (A. A. P. Putri et al., 2023).

So based on the results of research supported by the results of previous research, it can be said that the use of the problem-based learning model through maze pattern games activities can have a positive influence on the improvement of cognitive ability, especially on the ability to think logically about recognizing the ABC-ABC pattern in children aged 4-5 years.

## CONCLUSION

Based on the results of the study, it was concluded that developing the ability to recognize ABC-ABC patterns in children aged 4-5 years using the problem-based learning (PBL) model through playing maze pattern games can have a positive influence on children's cognitive development. This can be seen from the results of the research on teachers' activities in the development of the ability to recognize the ABC-ABC pattern in children who get the highest percentage of 87% with the Very Good criterion, while children's activities classically increase with each meeting to obtain a maximum percentage of 100% with the category of All Active Children.

The results of children's cognitive development in recognizing the ABC-ABC pattern also increased to a maximum percentage of 100% with the criteria of Very Good Development. So that the results of this research can be used as reference material in choosing models and play activities to develop children's cognitive abilities in recognizing the ABC-ABC pattern so that the learning implementation process can meet the needs of children according to their developmental level.

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