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Improving the Ability to Recognize Number Symbols 1–10 Through the Fishing Numbers Game for Children Aged 4–5 Years

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ABSTRACT

The background of this study is the low ability of children aged 4–5 years in recognizing number symbols at TK Al Amin Kebanaran. This ability plays an important role in early cognitive development, which serves as the foundation for children's numeracy readiness. The purpose of this study is to improve the ability to recognize number symbols through the fishing numbers game. This research applied the Classroom Action Research (CAR) method and was conducted in two cycles. The study involved 21 children aged 4–5 years as research subjects. Data were collected through observation using instruments that included the ability to sequence, mention, imitate, and match number symbols with the quantity of objects. The results showed that the average percentage of children's ability to recognize number symbols increased from 50.25% in the pre-cycle to 69.75% in Cycle I, and further increased to 81.75% in Cycle II. Improvements occurred across all ability indicators. Based on

these findings, it can be concluded that the fishing numbers game is effective in improving the ability to recognize number symbols in children aged 4–5 years.

Introduction

Early childhood refers to individuals who are in the golden age period, which is an important stage within the age range of 0–6 years (Azmiya et al., 2025). The age of 0–6 years is viewed as a decisive period in accelerating the development of thinking abilities, including basic abilities in understanding symbols and concepts (Hasanah & Fajri, 2022). Early childhood can also be interpreted as the initial stage of life characterized by rapid growth and development that serves as the foundation for subsequent abilities (Agustin et al., 2025).

At this stage, children have high sensitivity to environmental stimulation; therefore, the quality of experiences obtained by children greatly influences their cognitive development in the future (Amelia & Sumarni, 2022). The learning process of early childhood takes place through play activities, exploration, and direct interaction with their surrounding environment (Wahyuni & Azizah, 2020).

Early Childhood Education (ECE) is a form of educational service aimed at supporting children's holistic and sustainable development, covering cognitive, language, socio-emotional, motor, and moral aspects as preparation for entering the next level of education (Zahra et al., 2024). ECE plays a strategic role in providing structured developmental stimulation so that all aspects of child development can

grow optimally, particularly cognitive aspects as the foundation of children's thinking abilities (Selvia & Nurachadijat, 2023). The implementation of learning at the ECE level emphasizes a play-based approach so that children are actively involved according to their developmental characteristics (Maghfiroh & Suryana, 2021).

Cognitive development is a gradual process that describes children's ability to think, understand, remember, and solve problems through active interaction with the environment and learning experiences (Agustin et al., 2025). According to Piaget, early childhood children are in the preoperational stage, where they begin to use symbols to represent objects or events, although their thinking patterns are still intuitive and dependent on concrete experiences (Syabana, 2023). Symbolic ability at this stage becomes the foundation for children in understanding early concepts, including those related to numbers and number symbols.

The ability to recognize number symbols is an essential part of early childhood cognitive development related to early numeracy readiness (Agustina, 2023). Numeracy is a child's initial ability to understand or use number concepts and symbols in daily life (Maulida et al., 2025). This ability includes children's readiness, confidence, and skills in recognizing, sequencing, and associating number symbols with quantities of objects, enabling them to solve simple problems and make basic decisions according to their developmental stage.

Mastery of the ability to recognize number symbols from an early

age helps children build simple logical understanding that serves as the foundation for mathematics learning at the next educational level (Nasution, 2024). The development of the ability to recognize number symbols needs to be provided through activities that are in accordance with children's learning characteristics, such as play activities (Kristina & Sari, 2021). Educational play tools play an important role as a means of cognitive stimulation that allows children to build understanding through structured play activities (Agustina, 2023).

One form of educational play tool (EPT) relevant to developing the ability to recognize number symbols is the fishing numbers game. This game is designed as a number-fishing activity that allows children to interact directly with number symbols through concrete and enjoyable play activities (Lidiawati et al., 2024).

Through play activities, children undergo assimilation and accommodation processes when connecting the experience of fishing numbers with the number concepts being learned (Solihin, 2019). The fishing numbers game also trains concentration, hand-eye coordination, and children's logical thinking skills through structured activities that remain aligned with the nature of children's play (Yusuf et al., 2022).

Various previous studies have proven that the use of educational play tools is effective in improving the ability to recognize number symbols in early childhood. Research by Mudawwamah (2022) entitled "Improving the Ability to Recognize Number Symbols 1–10 through Playing Illustrated Number Cards" demonstrated that educational play

tools can optimally facilitate children in understanding number symbols.

Similar results were also shown in the study by Mulyaningsih and Palangngan (2021) through the journal article "The Effect of Puzzle Games on the Ability to Recognize Number Symbols in Early Childhood." Another relevant study conducted by Sari (2023) entitled "The Effect of the Number Fishing Game on the Ability to Recognize Number Symbols in Children Aged 4–5 Years" showed that the game had a positive impact on children's ability to recognize number symbols.

Research by Nur'Aini et al. (2025) entitled "Improving Cognitive Development in Recognizing Number Symbols through the Number Fishing Game," as well as research by Pasaribu et al. (2023) entitled "The Effect of the Fishing Game on the Ability to Recognize Number Symbols in Early Childhood," both concluded that fishing games are educational play tools that can improve early childhood numeracy skills.

Initial observations at TK Al Amin Kebanaran revealed that the ability of children aged 4–5 years to recognize number symbols 1–10 was still low. Children still experienced difficulties in recognizing number forms, mentioning, imitating, and sequencing numbers sequentially, as well as matching number symbols with the correct number of objects.

Based on these problems, it is necessary to develop learning strategies oriented toward play activities by utilizing educational play tools appropriate to children's development. This study focuses on

implementing the fishing numbers game as an effort to improve the ability to recognize number symbols 1–10 in children aged 4–5 years at TK Al Amin Kebanaran.

Methods

This study employed Classroom Action Research (CAR). According to Kemmis and McTaggart, CAR is reflective research conducted collaboratively within a social situation with the aim of improving participants' understanding of the practices being implemented (Purba et al., 2021).

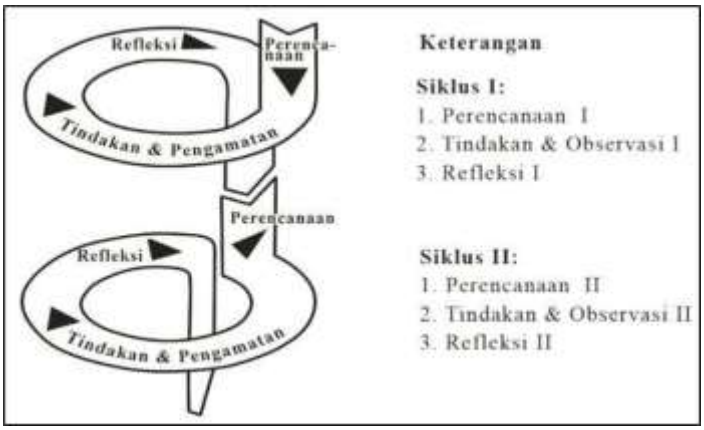

Figure 1. PTK Kemmis dan McTaggart

(Rahmayanti & Koeswanti, 2017)

The Kemmis and McTaggart CAR model consists of main stages, including planning, action implementation accompanied by observation, and reflection. These stages are carried out repeatedly in cycles until the success indicators are achieved, as cited from Kemmis in Machali (2022). Kemmis also states, as cited in Sagita et al. (2023), that

if the percentage of research success has not been achieved in Cycle I, the study should be continued to the next cycle.

The research was conducted at TK Al Amin Kebanaran, Mandiraja District, Banjarnegara Regency, in the first semester of the 2025/2026 academic year. The study involved 21 children aged 4–5 years as research subjects, consisting of 7 boys and 14 girls with diverse developmental backgrounds. The actions were implemented in two cycles. Each cycle was designed based on the reflection results from the previous cycle.

Research data were collected through observation and documentation techniques. The research instruments were arranged in the form of assessment sheets developed based on early childhood cognitive development achievement indicators and adjusted to the learning objectives designed in the study. The assessment instrument consisted of four indicators of the ability to recognize number symbols. Each indicator had four assessment items with a score range of 1–4, so that the results reflected children's developmental levels comprehensively.

Table 1

Instrument Blueprint for the Ability to Recognize Number Symbols

Variable	Indicators
Ability to Recognize Number Symbols	Sequencing number symbols 1–10
	Mentioning number symbols 1–10
	Imitating number symbols 1–10
	Associating number symbols with the quantity of objects

Data analysis was conducted by calculating the percentage of achievement according to the observation results. The scores obtained by the children were calculated by comparing the actual score with the maximum score, then converted into percentage form using the formula:

$$NP = \frac{Skor}{SM} \times 100\%$$

Description:

NP : The value sought

Score : The score obtained

SM : Maximum score

The success of the research was determined based on the percentage of children who achieved the expected developmental criteria. The research was declared successful if 80% of the children were categorized as developing as expected and developing very well. The higher the percentage of achievement obtained, the more optimal the results of the actions implemented in the research.

Result and Discussions

The ability to recognize number symbols in children aged 4–5 years showed consistent development in each indicator from the pre-cycle stage to Cycle II. In the pre-research stage, the average achievement was still in the low category with an overall percentage of 50%. The indicator of writing number symbols became the aspect with the lowest achievement, while the indicator of matching number symbols with the

quantity of objects showed relatively better results, although it had not yet reached the expected level of development.

Table 1.

Average Research Results

No	Indicator	Pre-Research	Cycle I	Cycle II
1	Sequencing number symbols 1–10	52%	71%	84%
2	Mentioning number symbols 1–10	51%	69%	83%
3	Imitating number symbols 1–10	44%	65%	78%
4	Associating number symbols with the quantity of objects	54%	74%	82%
Average		50,25%	69,75%	81,75%

Based on the data above, there was a gradual improvement in children's ability to recognize number symbols in each action cycle. This improvement can also be illustrated through a graph showing an upward trend from the pre-cycle to Cycle II.

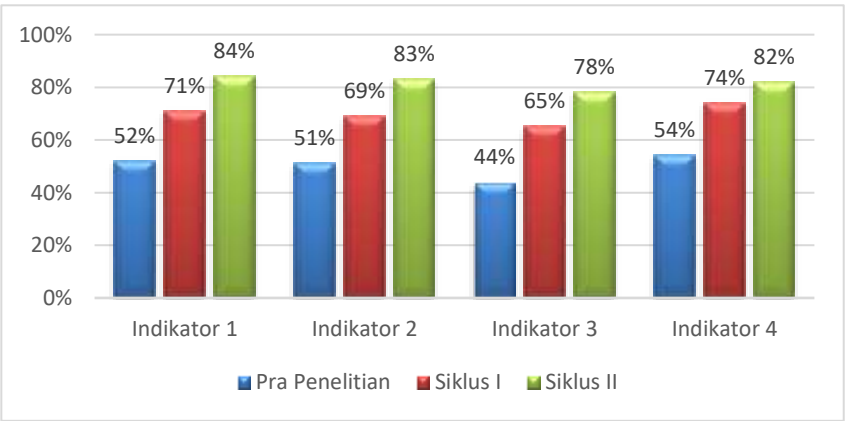

Figure 2. Increased Research Results

In the implementation of Cycle I, there was an increase with the average achievement reaching 69.75%. A notable improvement was

observed in the indicators of sequencing and associating number symbols with the quantity of objects. Children began to show a better understanding of number order and the relationship between number symbols and the quantity of objects. The indicator of imitating number symbols was still in the moderate category, so the implementation of learning actions needed to continue to the next cycle.

The learning actions in Cycle I were carried out by applying the fishing numbers game gradually, starting with the introduction of the media and game rules, followed by number-fishing activities, and activities of matching the obtained numbers with the appropriate quantity of objects. During the learning process, children appeared more interested and actively involved, although some children still needed guidance in correctly imitating the writing of number symbols.

The observation results of Cycle I showed an improvement in children's abilities compared to the initial condition. The average achievement of the indicators increased from 50.25% in the pre-cycle to 69.75% in Cycle I. Children began to recognize and mention number symbols more fluently and showed greater interest in participating in learning activities through games. However, this achievement had not yet met the research success percentage of 80%.

Reflection on the implementation of Cycle I revealed several obstacles, including children who were still hesitant in writing number forms, limited playtime, and differences in motor skill levels among children. Based on these problems, improvements in learning strategies

were needed in Cycle II, such as providing more intensive examples of writing numbers, reinforcement through repeated activities, and giving motivation and appreciation to increase children's self-confidence.

The actions in Cycle II were carried out through improvements in learning strategies based on the reflection results of Cycle I. These improvements included variations in the fishing numbers game, more intensive assistance when children wrote number symbols, and more balanced grouping of children so that each child obtained optimal learning opportunities.

The observation results in Cycle II showed a significant improvement. The average achievement of children's ability to recognize number symbols increased to 81.75% and met the research success indicators. All indicators experienced optimal improvement, although the indicator of imitating number symbols remained the lowest compared to the other indicators. Children were not only able to mention and sequence number symbols but were also able to associate number symbols with the correct quantity of objects.

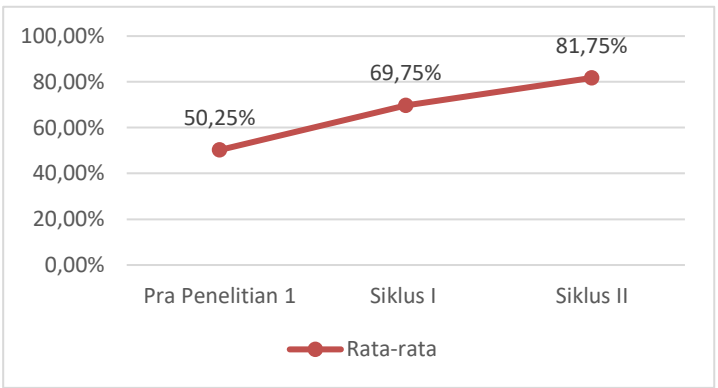

Figure 3. Average Increase in Research Results

The success in Cycle II shows that the implementation of the fishing numbers game is effective in improving the ability to recognize number symbols in children aged 4–5 years. Game-based learning is able to make the learning process more enjoyable and interactive, making it easier for children to understand number concepts.

Conclusion

Based on the research results and discussion presented, it can be concluded that the implementation of the fishing numbers game can improve the ability to recognize number symbols 1–10 at TK Al Amin Kebanaran, particularly for children aged 4–5 years. The research findings show a gradual improvement in children's abilities across all indicators, including sequencing, mentioning, imitating, and associating number symbols with the quantity of objects.

In the pre-cycle stage, children's ability to recognize number symbols was still in the low category. After the implementation of the fishing numbers game in Cycle I, there was an improvement; however, it had not yet reached the predetermined success percentage. Improvements in learning strategies in Cycle II resulted in a more optimal increase, marked by the achievement of an average percentage of 81.75%, thus fulfilling the research success criteria.

The results indicate that game-based learning, particularly the fishing numbers game designed in a structured and engaging manner, can increase children's active involvement and help them understand

the concept of number symbols.

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