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The Effect of Wooden Number Board on the Ability to Recognize Number Symbols in Children Aged 4-5 Years at TK Negeri Satu Atap Kerinjing

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A B S T R A C T

This study aims to determine the effect of using a wooden number board on the ability to recognize number symbols in children aged 4–5 years at TK Negeri Satu Atap Kerinjing. This research employed a quantitative pre-experimental method with a one-shot case study design. The sample consisted of 10 children from class A, selected using a saturated sampling technique. The results showed that the average posttest score was 75. Data analysis using a one-sample test indicated that the calculated t-value (t_h) was 4.56, while the table t-value (t_t) was 1.83. Since $t_h > t_t$, it can be concluded that the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted. Therefore, it can be stated that the wooden number board has an effect on the ability to recognize number symbols in children aged 4–5 years at TK Negeri Satu Atap Kerinjing. This is supported by the fact that 8 out of 10 children were categorized as Developing Very Well (DVW), while the remaining 2 were in the category of Developing As Expected (DAE).

Keywords: *Wooden Number Board, Number Symbols, Children Aged 4-5 Years.*

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INTRODUCTION

Early Childhood Education (ECE) is the primary foundation in individual development. The age of 4–5 years is known as the golden age of development, during which children exhibit exceptional learning potential. At this stage, a child's brain develops rapidly, offering a significant opportunity to optimize learning and stimulation. During this period, the development of cognitive, motor, socio-emotional, and language skills becomes a top priority to support character formation and future competencies. One important cognitive aspect to introduce during early childhood is the basic concept of mathematics, including number symbol recognition. The ability to recognize number symbols serves as a fundamental base in mastering mathematics, helping children understand quantity, count, and develop logical reasoning. Through this ability, children build a strong foundation to understand more complex mathematical concepts at the next level of education. The importance of this skill is supported by various studies showing that early introduction to mathematical concepts positively correlates with future academic success.

However, not all children can easily recognize and understand number symbols. This is influenced by various factors such as differences in learning styles, individual abilities, and the learning approaches used. A number symbol is a symbol that represents a number, also known as a digit, used for counting and measurement purposes (Gandana et al., 2017). The ability to recognize number symbols includes identifying the symbols, pointing them out, understanding the quantity represented, and linking them to real objects (Setianingrum &

Azizah, 2021). According to Sofia Hartati (2005) in Gandana et al. (2017b), cognitive development stages of children aged 4–6 include creating imaginative play, shaping objects from clay, building with blocks, counting and recognizing numbers from 1–20, connecting concepts with symbols, identifying differences like same, more, and less, adding objects, understanding time, assembling puzzles, recognizing measuring tools, understanding causes of events, and spotting irregularities between two images.

Instructional media plays a significant role in supporting the learning process. Hamzah et al. (2022) describe learning media as all kinds of tools used by educators to deliver material effectively. Sudjana in Hasan et al. (2021) strengthens this view by stating that learning media is an auxiliary tool that is part of the methodology component, where teachers organize the learning environment to achieve educational goals. Additionally, Schramm (1977) in Khadijah and Ag (2015) defines learning media as technologies that function as message carriers to support learning needs, highlighting media as a communication tool that strengthens interaction between educators and learners. Thus, learning media serves not only as an aid but also as an essential component in creating effective, efficient, and directed teaching and learning interactions.

Educational teaching aids play an important role in early childhood learning. They help children understand abstract concepts in concrete ways through hands-on experiences. One effective tool for supporting early math learning is the Wooden Number Board, a wooden board with numbers and beads designed to teach number symbols through a multisensory approach. Children can see the numbers, touch, move, and count the beads, making learning more enjoyable and meaningful. The use of the Wooden Number Board enables teachers to incorporate play-based learning into the classroom, promoting active engagement and involving multiple senses. This aligns with early childhood education principles, which emphasize experience-based and exploratory learning.

Based on initial observations at TK Negeri Satu Atap Kerinjing, it was found that children aged 4–5 years faced challenges in recognizing number symbols from 1 to 10. Some had difficulty distinguishing similarly shaped numbers, such as 6 and 9, or 3 and 8. There were even children who only recognized a few numbers, and when asked to identify numbers at random, they were confused and unable to respond correctly. Additionally, their ability to name numbers in sequence was still limited, with some frequently skipping or repeating certain numbers. These difficulties were not limited to visual recognition but also included the ability to associate number symbols with the corresponding quantity of objects. Children who could not match the number of beads with the correct symbol demonstrated a lack of conceptual understanding, rather than just technical errors.

In addition to internal school factors, the home environment also contributes to these challenges. Based on information from parents and teachers, most children did not receive additional stimulation at home. Some parents lacked awareness of the importance of supporting learning at home or did not have the resources, such as books or educational tools, to assist their children. As a result, the children relied entirely on school for learning. Some parents also cited limited time due to work commitments as a barrier to helping their children study. These factors highlight the need for innovative and effective learning approaches to help children understand number symbols more easily.

The use of the Wooden Number Board can be an innovative solution to overcome various obstacles faced at TK Negeri Satu Atap Kerinjing. By providing concrete and interactive learning experiences, this tool is expected to enhance children's interest and understanding of number symbols. Children not only learn through visual recognition but also by manipulating beads to count, which in turn develops their fine motor skills, hand-eye coordination, and concentration. Thus, the use of the Wooden Number Board supports number symbol recognition while offering additional benefits for other developmental aspects.

The number board is a learning aid designed to help students understand the concept of numbers and mathematical operations in a more interactive and enjoyable way. Saleh (2017)

defines this medium as a board or cardboard divided into colourful grids equipped with elements like buttons or coloured cards, aiming to improve concentration and make it easier for students to grasp place value concepts. The Wooden Number Board is a hands-on educational tool commonly used in early childhood and Montessori education to introduce children to number sequences, counting concepts, and basic math. It consists of a wooden board with engraved numbers and beads or counters that children use to match quantities with number symbols. This activity helps children develop an understanding of numbers, quantity relationships, and fine motor skills.

This tool is categorized as a "counting manipulative," which supports active learning by engaging children directly in number exploration through real experiences. Such manipulatives combine visual, tactile, and kinaesthetic learning, easing children's transition from concrete to abstract mathematical thinking—an essential stage in early development. Previous studies have shown that activity-based and sensory-based media are effective in enhancing children's number symbol recognition abilities. For example, research by Rahman et al. (2022) showed that number board aids increased children's attention and understanding of number symbols. Rahma and Widyasari (2023) also revealed that creative learning media, such as the smart fruit pouch, helped children better grasp number concepts. Additionally, Wulandari and Munawar (2017) found that educational games like snakes and ladders improved early childhood number recognition skills. These findings affirm the importance of using educational teaching aids in learning, especially to support early numeracy development.

Based on the issues described, the researcher is interested in examining the effect of using the Wooden Number Board on the number symbol recognition ability of children aged 4–5 years at TK Negeri Satu Atap Kerinjing. By using a quantitative approach, this study is expected to provide empirical evidence of the effectiveness of this teaching aid in improving children's abilities. Moreover, this research also aims to contribute to the development of innovative and interactive teaching methods.

METHOD

The research method used in this study is a quantitative pre-experimental method. Pre-experimental research is an experiment conducted with only one group, without a comparison or control group (Rukminingsih et al., 2020). The research design used is a *one-shot case study*, which is an experiment conducted without a comparison group and without a pre-test. The design of the one-shot case study is as follows.

X	***O***

(Sugiyono, 2023)

Figure 1. One-Shot Case Study Design

In this study, the sample was given a treatment, and then at the end of the learning process, a post-test was administered. The population in this study consisted of Class A and Class B children, totaling 22 students. The sampling technique used was saturated sampling. Saturated sampling is a technique in which all members of the population are included as the sample. This technique is commonly used in research involving fewer than 30 participants or in studies aiming for generalization with minimal error margins. For example, if the population consists of 20 people, then all 20 will be used as the sample (Amin et al., 2023). The sample in this study consisted of 10 children aged 4–5 years at TK Negeri Satu Atap Kerinjing, including 7 boys and 3 girls from Class A.

The research was conducted at TK Negeri Satu Atap Kerinjing, located at Jln. Kerio Oemang No. 248, Kerinjing Village, Tanjung Raja Sub-district, Ogan Ilir Regency, South Sumatra Province. The treatment was carried out during the 2024–2025 academic year or the even semester, from February 17 to March 17, 2025. The treatment activities were conducted

by the researcher together with the children for 16 sessions, where in each session, the children were invited to explore the wooden number board as a medium to recognize number symbols.

The data collection techniques used were observation and documentation. The instrument used in this research was a tool to measure the ability of children aged 4–5 years at TK Negeri Satu Atap Kerinjing to recognize number symbols. Before the instrument was used in the study, validity and reliability tests were conducted. The validity test used was the Pearson Product-Moment test, and the reliability was tested using Cronbach's Alpha with Microsoft Excel. The data analysis techniques used were normality testing and hypothesis testing (t-test) using SPSS version 27 to determine the effect of the wooden number board on the ability of children aged 4–5 years to recognize number symbols at TK Negeri Satu Atap Kerinjing.

FINDINGS AND DISCUSSION

Based on the research conducted at TK Negeri Satu Atap Kerinjing, the validity test results showed that the instrument used in this study was declared valid, consisting of 4 items, indicating that all items were valid. An item is considered valid if the calculated r value (r_counted) is greater than the r_table value. The trial results are shown in the following table:

Table 1. Result of Validity and Reliability Test

No. Item	Nilai r_{hitung}	Nilai r_{tabel}	Keterangan
Item 1	0,796	0,754	Valid
Item 2	0,944	0,754	Valid
Item 3	0,987	0,754	Valid
Item 4	0,796	0,754	Valid

Based on Table 1, in the r_table column and the r distribution table with a significance level of 0.05 and a sample size of 7 children, the r_table value was 0.754. The remarks column in the table interprets the comparison between r_counted and r_table. An item is declared valid if r_counted > r_table, meaning all items are valid and can proceed to the reliability test. The criteria for the reliability test state that if the alpha value is greater than 0.70, the data is considered reliable. Based on the reliability test, the alpha value obtained was 0.901. Therefore, it can be concluded that since the alpha value (0.901) > 0.70, the instrument used was considered reliable. Furthermore, the researcher obtained the following post-test data analysis results:

Table 2. Result of Posttest

Anak	Indikator				Jumlah	Rata-Rata	Kategori
	1	2	3	4			
1	4	4	4	4	16	100	BSB
2	4	3	4	3	14	87	BSB
3	4	4	3	4	15	93	BSB
4	4	3	3	4	14	87	BSB
5	4	4	4	4	16	100	BSB
6	4	3	3	2	12	75	BSH
7	4	4	4	4	16	100	BSB
8	3	4	3	3	13	81	BSB
9	4	4	4	3	15	93	BSB
10	3	3	3	3	12	75	BSH

Based on the normality test using SPSS version 27 with both Kolmogorov-Smirnov and Shapiro-Wilk tests, the post-test data on the ability to recognize number symbols among children was normally distributed (Sig. > 0.05). The Shapiro-Wilk test was used because the sample size was less than 50. In the Shapiro-Wilk test, the post-test W_counted value was

0.888, which is greater than the W_table value of 0.842. Thus, the post-test W value was greater than W_table, indicating that the data was normally distributed.

Table 3. Results of Normality Test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Posttest	.168	10	.200*	.888	10	.161

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The hypothesis testing criteria were based on the final conclusion: if t_counted < t_table, then H_0 is accepted and H_a is rejected. If t_counted > t_table, then H_0 is rejected and H_a is accepted. The t_table value with degrees of freedom (df) can be calculated using n-1. After calculations, the result was that t_counted was 4.56 and t_table was 1.83. Therefore, since t_counted > t_table, H_0 is rejected and H_a is accepted. Thus, it can be concluded that there is a significant effect of the wooden number board on the ability to recognize number symbols among 4–5-year-old children at TK Negeri Satu Atap Kerinjing.

The results of the data calculation and hypothesis testing indicate that there is an effect of using the wooden number board media on the ability of 4–5-year-old children at TK Negeri Satu Atap Kerinjing to recognize number symbols. These results were obtained after conducting a post-test or performance test on the children. For the post-test activities, this study used a structured observation method arranged in an observation instrument that had been validated. The performance test was administered in the form of an observation sheet consisting of two indicators with four observed activities, each activity having four descriptors.

Figure 2. Research Documentation

The first indicator, Activity 1, was that the child was able to verbally recite numbers 1 to 10 in order. The assessment in this indicator used four descriptors: 8 out of 10 children scored 4 for correctly reciting numbers 1–10, and 2 children scored 3 for reciting numbers 1–8 with the teacher's reminder. No children scored 1 or 2. This is in line with Jean Piaget's theory that children aged 4–7 are in the preoperational stage, during which they begin to understand symbols and basic concepts, including numbers. At this stage, children can begin to recognize and recite numbers, although their understanding is still limited to concrete experiences (Kurniati et al., 2022).

The first indicator, Activity 2, was that the child was able to identify numbers 1 to 10 randomly. This activity was assessed using four descriptors: 6 children scored 4 for correctly identifying numbers 1–10 randomly, and 4 children scored 3 for identifying numbers 1–8 with the teacher's reminder. No children scored 1 or 2. This finding also aligns with Jean Piaget's

view that children begin to understand symbolic concepts and are able to use symbols, including numbers. At this stage, children begin to recite and arrange numbers 1–10 as part of their cognitive development (Kurniati et al., 2022).

The first indicator, Activity 3, was that the child was able to arrange numbers 1 to 10 sequentially and correctly. Assessment using four descriptors showed that 5 children scored 4 for arranging numbers 1–10 in order using number cards, and the other 5 scored 3 for arranging numbers 1–8 with the teacher's prompt. No children scored 1 or 2. This result supports Piaget's theory that children aged 2–7 begin to understand symbolic concepts and are able to use symbols such as numbers. At this stage, children can recognize, recite, and arrange numbers in sequence from 1 to 10. This ability indicates that children not only memorize the number order but also understand that each number has its own identity (Kurniati et al., 2022).

The second indicator, Activity 1, was that the child was able to match the quantity of beads with the corresponding number symbol from 1 to 10 correctly. This indicator used four descriptors: 5 children scored 4 for correctly matching the quantity of beads to number symbols from 1–10; 4 children scored 3 for matching 1–8 with the teacher's reminder; and 1 child scored 2 for beginning to match 1–5 with the teacher's demonstration. No children scored 1, which would indicate the inability to match quantities to symbols even with assistance.

Based on the results and the overall assessment of number symbol recognition abilities across all indicators, 8 out of 10 children were in the Very Well Developed (BSB) category, as they were able to recognize number symbols independently. Meanwhile, 2 out of 10 children were in the Developing as Expected (BSH) category, as they recognized number symbols with the teacher's assistance. Subsequently, the researcher performed data analysis and hypothesis testing, which led to the conclusion that the use of wooden number board media had a significant effect on the ability to recognize number symbols in children aged 4–5 years at TK Negeri Satu Atap Kerinjing.

This result was obtained after conducting the post-test or performance test with the children. Based on the findings, the researcher concludes that Jean Piaget's theory is proven in the context of 4–5-year-old children's ability to recognize number symbols: 1) Children are able to recite numbers 1–10, 2) Children are able to identify numbers 1–10, 3) Children are able to arrange numbers 1–10 correctly, and 4) Children are able to match the quantity of objects with the corresponding number symbols. This research also confirms that using visually engaging media is highly effective for teaching children aged 4–5 years. This aligns with Jerome Bruner's theory, which states that children at this age are in the iconic stage, where they understand the world through images and visual representations.

CONCLUSIONS

Based on the results of the statistical test (t-test), it can be concluded that the use of the wooden number board media had an effect on the ability to recognize number symbols in children aged 4–5 years at TK Negeri Satu Atap Kerinjing. This is evidenced by the research finding that the t_calculated value (4.56) > t_table (1.83), which means that H_0 is rejected and H_a is accepted. In hypothesis testing, if t_calculated < t_table, then H_0 is accepted and H_a is rejected; if t_calculated > t_table, then H_0 is rejected and H_a is accepted. The t_table value is obtained by calculating the degrees of freedom (df) using the formula n-1. The results of this study also support the theories of Jean Piaget and Jerome Bruner regarding the ability of children aged 4–5 years to recognize number symbols and the use of visual media in the learning process. The implications of this research can also be extended to other developmental aspects. For example, it supports fine motor development, as children are able to coordinate their fine motor skills while playing with the wooden number board. Additionally, the study has an impact on children's social-emotional development, as they patiently take turns while using the wooden number board. This indicates that the research affects not only children's cognitive development but also other developmental domains.

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