THE INFLUENCE OF VENDING MACHINE MEDIA ON ENHANCING NUMBER CONCEPT RECOGNITION SKILLS IN CHILDREN AGED 4–5 AT TK NEGERI PEMBINA LINTAU BUO UTARA DISTRICT

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ABSTRACT

Early childhood education covers several essential developmental domains, among which cognitive skills play a critical role in shaping a child's ability to think, reason, and solve problems. One of the fundamental cognitive aspects that must be fostered during this period is the recognition of number concepts. However, many children at this stage exhibit limited skills in understanding numerical concepts, which highlights the need for engaging and interactive learning media that can enhance their interest and ability in this area. This study aimed to determine the effectiveness of using vending machine media in improving number concept recognition skills among children aged 4–5 years. The research was conducted at TK Negeri Pembina, Lintau Buo Utara District, involving 20 children as research subjects. The study applied a quantitative research approach using an experimental method with a one-group pretest-posttest design to measure the differences in the children's number concept recognition abilities before and after the intervention. Data were collected through observation and documentation techniques, and the results were analyzed statistically. The findings revealed a significant improvement in the children's ability to recognize number concepts following the application of the vending machine media. The improvement rate reached 63.66%, which falls into the moderate category based on normalized gain criteria. This indicates that the vending machine media is an effective and innovative learning tool for fostering numerical understanding in early childhood education. Overall, the use of vending machine media proved to be an engaging and educational approach that not only enhanced children's cognitive skills but also made the learning process more enjoyable and meaningful. This media has the potential to be further developed and integrated into early childhood education programs to support cognitive development in a fun and interactive manner.

Keywords : *Early Childhood, Vending Machine, Number Concept Recognition Skills*

INTRODUCTION

Early Childhood Education (ECE) is an educational program designed specifically for young children, where teachers assist in guiding their growth and development in accordance with their developmental stages, while also nurturing their potential to the fullest. This period is marked by rapid growth and development, often referred to as the "golden age." Although early childhood education is the lowest level in the formal education system, it holds significant importance as it serves as the foundation for children's future learning. According to Maghfiroh & Shofia Suryana (2021), early childhood refers to the age range of 0 to 6 years, during which children undergo rapid growth and fundamental developmental processes that are critical for later stages of life. Tatminingsih (2016) explains that early childhood includes individuals under the age of six, even those still in the womb, who are undergoing processes of physical, mental, personality, and intellectual development, whether or not they are enrolled in an ECE institution. Therefore, it can be concluded that early childhood education is guidance provided to children aged 0 to 6 years, which significantly determines the trajectory of their future lives. This stage forms the essential groundwork for later learning and plays a crucial role in helping children make friends, foster independence, learn new routines, and develop various aspects of their growth. According to Zaini (2015), early childhood education offers children the opportunity to maximize their personality and potential development. It is organized to enhance their physical growth (fine and gross motor coordination), intelligence (thinking ability, creativity, emotional and spiritual intelligence), and socio-emotional development (attitudes, behavior, and religious values).

One critical aspect that needs to be developed in early childhood education is cognitive ability. Cognitive skills can be nurtured through activities that introduce number concepts, which in turn enhance children's abilities to think, reason, and solve problems. Number concept recognition includes activities such as counting, enumerating, relating objects to numbers, and making comparisons. According to Syafitri et al. (2018), the ability to recognize numerical symbols enhances children's skills in reasoning, problem-solving, and critical thinking. Introducing numerical concepts should be done as early as possible in a fun and enjoyable way. Cahyaningrum et al. (2022) states that number concept recognition refers to a child's ability to understand quantity, perform calculations, establish one-to-one correspondence, and write numerical symbols. Teaching these concepts must be carried out through enjoyable methods. Gandana et al. (2017) defines numbers as a set of symbols that closely represent the quantity of objects. To improve young children's ability to understand number concepts, learning through play-based media can be highly effective. Pratiwi (2017) argues that play is an essential and non-negotiable element in early childhood education since, for young children, learning is inseparable from play; they learn by playing and play while learning.

Instructional media in the form of play can make the learning process more interesting and tangible, thereby facilitating easier comprehension for children. According to Guslinda & Kurnia (2018), even though play is generally considered a free and spontaneous activity without direct real-world goals, it still brings enjoyment without necessarily focusing on end results. One example of a play medium that can develop number concept recognition in children is the use of Vending Machine media. Gunawan et al. (2022) defines a vending machine as an automatic device that sells food, beverages, toys, and other items without the need for a cashier or operator. Arifudin et al. (2023) describes vending machines as practical applications of language theory and automata capable of automatically dispensing goods and meeting human needs. Putri (2014) adds that vending machines are designed to dispense desired products automatically without human intervention, typically

operated by inserting coins or banknotes. In this research, the Vending Machine media is an educational tool developed by the researcher by combining education and technology as a new innovation to help enhance number concept recognition in early childhood. This media displays numbers from 1 to 10, with buttons that can be pressed to produce corresponding sounds. When the number button is pressed and produces a sound, a box next to the button releases objects that match the selected number. To improve children's number concept recognition abilities, appropriate, creative, and innovative learning media is essential.

Based on observations and interviews conducted with teachers at TK Negeri Pembina, Lintau Buo Utara District, several challenges were identified: (1) children still experience confusion and often guess answers; (2) children are unable to properly understand numerical concepts and symbols; (3) children are hesitant when mentioning numbers, frequently mixing them up or forgetting numbers beyond five; and (4) children have difficulty associating concrete objects with number symbols. Therefore, the objectives of this study are: (1) to determine the number concept recognition skills of children aged 4–5 years before using Vending Machine media; (2) to assess the number concept recognition skills of children aged 4–5 years after the use of Vending Machine media; and (3) to examine the influence of Vending Machine media on the development of number concept recognition skills in children aged 4–5 years.

METODE

This study utilized a quantitative research approach, which focuses on the systematic collection and statistical analysis of numerical data to explain phenomena. Quantitative methods prioritize measurable outcomes, allowing researchers to establish patterns, relationships, and causality between variables through objective and structured procedures. In this case, the research was categorized as an experimental study, which aimed to investigate the causal relationship by examining the effect of an independent variable on a dependent variable in a controlled environment. The research employed an experimental design using the One-Group Pretest-Posttest Model, which involved observing changes in the dependent variable after applying a specific treatment to a single group of participants. The variables under study were clearly defined: the independent variable (X) was the application of Vending Machine Media, and the dependent variable (Y) was the children's ability to recognize number concepts. Experimental research, by its nature, is designed to test hypotheses regarding cause-and-effect relationships between variables. According to Sugiyono (2017), experimental methods are intended to determine the influence of a particular treatment on a specific outcome under well-controlled conditions to minimize the influence of extraneous variables.

The design of this study comprised three essential stages:

Pretest (O_1): This initial stage involved measuring the participants' existing number concept recognition skills before any treatment was administered. The pretest served as a baseline to identify the children's initial capabilities in understanding numerical concepts prior to the introduction of the Vending Machine Media.

Treatment (X): The intervention stage consisted of applying the Vending Machine Media as a learning tool aimed at improving the children's ability to recognize and understand number concepts.

Posttest (O_2): The final assessment was conducted after the treatment to evaluate any improvements in the children's number concept recognition skills. This posttest provided comparative data to measure the effectiveness of the Vending Machine Media.

The population of this study included all children aged 4–5 years enrolled at TK Negeri Pembina, Lintau Buo Utara District, with a total of 20 participants involved in the research sample. The sampling method employed was total population sampling, meaning that the entire population was used as the research sample to ensure comprehensive data collection. The research employed two primary data collection techniques: observation and documentation. Observation enabled the researcher to directly assess the children's behaviors, responses, and engagement during the learning process, while documentation was utilized to capture relevant research data through written records, photographs, and other visual media. According to Sugiyono (2017), documentation serves as an essential method of collecting data by recording events in various forms, such as images, writings, or creative works produced by the participants. In this study, photographic documentation was particularly important in capturing the activities conducted throughout the research process. Moreover, the researcher used Children's Worksheets (Lembar Kerja Anak - LKA) as a structured instrument to evaluate the children's number concept recognition skills both before and after the implementation of the Vending Machine Media. These worksheets provided a reliable measurement tool for assessing the level of skill acquisition resulting from the applied treatment.

At the beginning of the study, the researcher administered a pretest to establish the participants' initial competencies in recognizing number concepts. Following the completion of the learning intervention, a posttest was conducted to determine the extent of the improvement achieved. The resulting data were analyzed to derive conclusions regarding the effectiveness and impact of the Vending Machine Media on enhancing the number concept recognition abilities of the children. In summary, this research sought to explore and determine the extent to which the use of Vending Machine Media could influence and improve the number concept recognition skills of children aged 4–5 years, providing valuable insights into the role of innovative educational media in early childhood cognitive development.

HASIL PENELITIAN DAN PEMBAHASAN

The purpose of this study was to determine the influence of Vending Machine Media on the number concept recognition skills of children aged 4–5 years. The research was conducted at TK Negeri Pembina, Lintau Buo Utara District, located at Jl. Ladang Lawas, Lintau Buo Utara District. The head of the school is Mrs. Haswita, S.Pd., and the total number of teaching staff is six. Data collection involved 20 children aged 4–5 years as research subjects.

The descriptive data of the research results are presented in the table below:

Tabel 1. Descriptive Statistics

Descriptive Statistics					
	N	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*
Pretest	20	9	16	11,60	1,603
Posttest	20	21	24	21,95	,945
Valid N (listwise)	20				

Source: Processed Research Data 2025

Based on the data presented above, the average score of children's number concept recognition skills increased after the implementation of the Vending Machine Media, rising from an initial score of 11.60 to 21.95. This indicates that the use of Vending Machine Media had a positive influence on the number concept recognition skills of children aged 4–5 years.

Overview of Number Concept Recognition Skills in Children Aged 4–5 Years Before the Implementation of Vending Machine Media

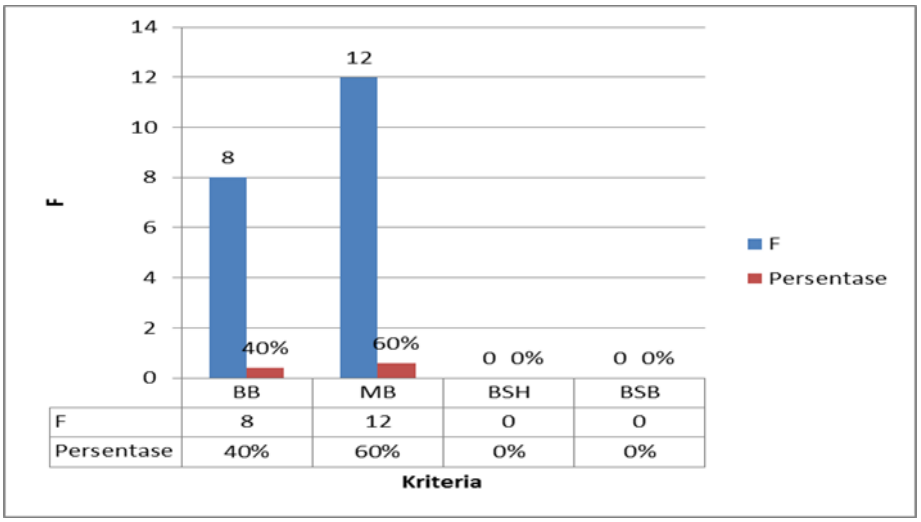


Figure 1. Diagram Of Number Concept Recognition Skills Before Treatment (Pretest)

Based on the figure above, it can be seen that the number concept recognition skills of children aged 4–5 years before the use of Vending Machine Media were categorized as "Not Yet Developed" (BB) for 8 children, representing 40%, and "Beginning to Develop" (MB) for 12 children, representing 60%. Meanwhile, there were no children in the categories of "Developing as Expected" (BSH) or "Developing Very Well" (BSB).

Overview of Number Concept Recognition Skills in Children Aged 4–5 Years After the Implementation of Vending Machine Media

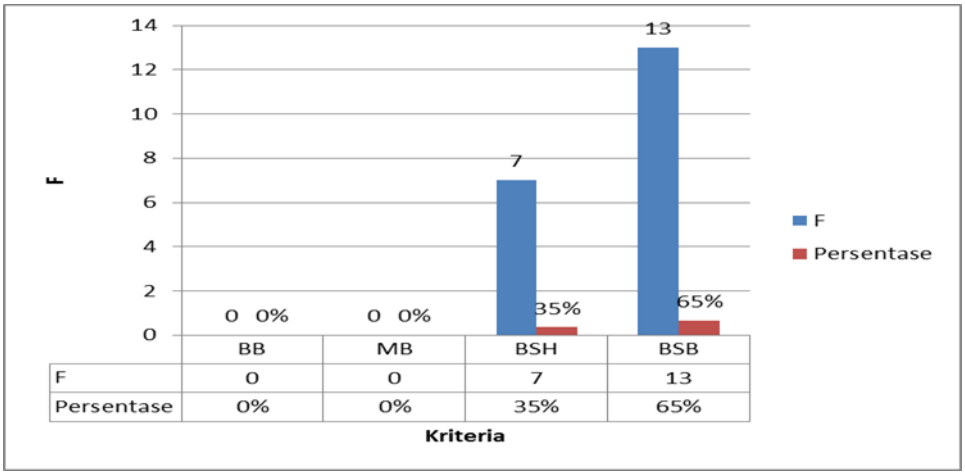


Figure 3.Diagram of Number Concept Recognition Skills After Treatment (Posttest)

Based on the diagram above, it is evident that the number concept recognition skills of the children improved after the use of Vending Machine Media. A total of 13 children (65%) were categorized as "Developing Very Well" (BSB), and 7 children (35%) were categorized as "Developing as Expected" (BSH). Meanwhile, there were no children in the "Beginning to Develop" (MB) or "Not Yet Developed" (BB) categories, each accounting for 0%.

Comparison Of Pretest And Posttest Result

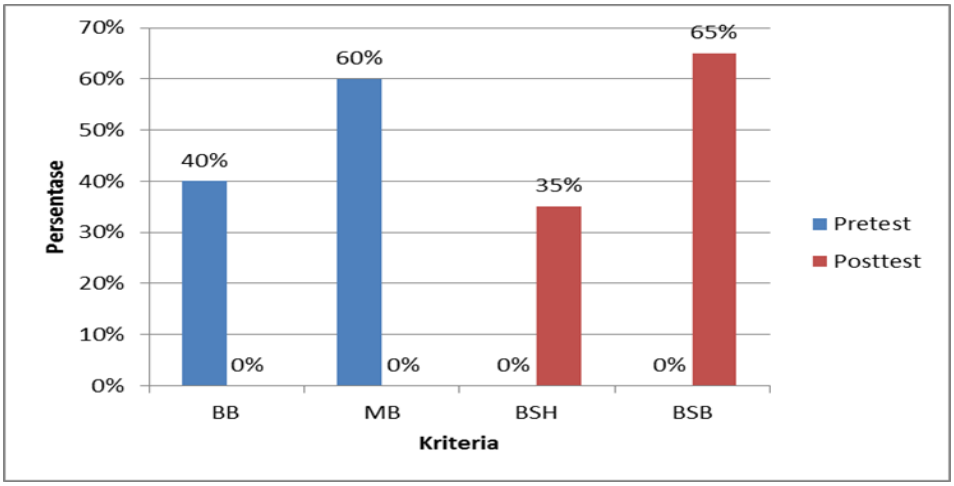


Figure 4. Diagram of Number Concept Recognition Skills in Pretest and Posttest

Based on the diagram above, it can be seen that prior to the application of Vending Machine Media, the number concept recognition skills of the children were distributed as follows: 8 children (40%) were in the "Not Yet Developed" (BB) category, 12 children (60%) were in the "Beginning to Develop" (MB) category, while no children (0%) were in either the "Developing as Expected" (BSH) or "Developing Very Well" (BSB) categories. After the treatment using Vending Machine Media, there was a noticeable improvement, with the majority of the children—13 children (65%)—classified in the "Developing Very Well" (BSB) category, and 7 children (35%) in the "Developing as Expected" (BSH) category. No children (0%) were found in the "Beginning to Develop" (MB) or "Not Yet Developed" (BB) categories. This significant shift in distribution indicates that the use of Vending Machine Media positively influenced the number concept recognition skills of children aged 4–5 years.

Hypothesis Testing

1. Linearity Test

The linearity test aims to determine whether the data conform to a linear pattern or not. The results of the linearity test on the number concept recognition skills of children aged 4–5 years using Vending Machine Media showed a significance value of 0.315, indicating that the data are significant because the value is greater than 0.05 (0.315 > 0.05). Therefore, the null hypothesis (Ho) is accepted, meaning that the two sets of data are linearly related.

2. Normality Test

The normality test is a statistical test used to determine whether the data in a study are normally distributed. This test was conducted using the Kolmogorov-Smirnov method, where if the

significance value is greater than 0.05, the data are considered to be normally distributed, whereas if the value is less than 0.05, the data are not normally distributed. The test results showed a significance value of 0.053 before the treatment and 0.089 after the treatment. Since both values are greater than 0.05, the null hypothesis (Ho) is accepted, indicating that the data are normally distributed.

3. Hypothesis Test

The hypothesis test was conducted to determine whether there was a significant difference between the pretest and posttest results after the application of Vending Machine Media.

Table 2. Paired Samples Test

Paired Samples Test									
		Paired Differences					*t*	*df*	*Sig. (2-tailed)*
		Mean	*Std. Deviation*	*Std. Error Mean*	*95% Confidence Interval of the Difference*				
					Lower	*Upper*			
Pair 1	*Pretest - Posttest*	-10,350	1,814	,406	-11,199	-9,501	-25,510	19	,000

Source: Processed Research Data 2025

Based on the table above, it is shown that the calculated t-test value is 25.510. Since the test was conducted on both sides, the absolute value was used, making the calculated t-value 25.510. The significance value (Sig. 2-tailed) obtained was 0.000, which is less than 0.05 (0.000 < 0.05), indicating that Vending Machine Media has a significant effect on improving number concept recognition skills in children aged 4–5 years.

To determine whether the hypothesis is accepted or rejected based on the SPSS version 21 output, the calculated t-value was compared with the t-table value. The results show that the calculated t-value of 25.510 is greater than the t-table value of 2.093, with a degree of freedom (df) as follows:

df = (n – 1)
df = 20 – 1
df = 19

With df = 19, it can be seen that the calculated t-value (25.510) is greater than the t-table value (2.093). Therefore, the null hypothesis (Ho) is rejected and the alternative hypothesis (Ha) is accepted. This indicates that the use of Vending Machine Media had a significant effect on the number concept recognition skills of children aged 4–5 years at TK Negeri Pembina, Lintau Buo Utara District.

To determine the magnitude of the effect of Vending Machine Media in enhancing number concept recognition skills in children aged 4–5 years at TK Negeri Pembina, Lintau Buo Utara District, a gain analysis was conducted. The gain test is used to assess the degree of improvement from the pretest to the posttest after the intervention using the Vending Machine Media. The calculation of the gain score was performed using the following formula:

$$G = \frac{Skor\ Posttest - Skor\ Pretest}{Skor\ Ideal - Skor\ Pretest} x100\%$$

$$G = \frac{439 - 227}{560 - 227} x100\%$$
$$G = \frac{212}{333} x100\%$$
$$G = 63{,}66\%$$

Table 3. Categories Of Normalized Gain

Nilai G	Kriteria Penilaian
G < 30%	Rendah
30% < G < 70%	Sedang
G > 70%	Tinggi

CONCLUSIONS

The number concept recognition skills of children aged 4–5 years at TK Negeri Pembina, Lintau Buo Utara District, prior to the treatment using Vending Machine Media, were categorized as "Beginning to Develop" (MB). At this stage, the children were able to mention numbers from 1 to 5 and count objects in quantities of 1 to 5. However, they were not yet able to mention numbers from 1 to 10, arrange number symbols in order from 1 to 10, associate number symbols with objects, or distinguish between groups of objects in terms of similarity, greater quantity, or fewer quantity.

After the application of Vending Machine Media, the number concept recognition skills of children aged 4–5 years at TK Negeri Pembina, Lintau Buo Utara District showed improvement. Following the treatment, the children's skills were categorized as "Developing Very Well" (BSB). The children were able to arrange number symbols from 1 to 10 in the correct order, associate number symbols with corresponding objects, and differentiate between groups of objects in terms of sameness, greater quantity, and fewer quantity.

Based on the research findings, the use of Vending Machine Media had a significant influence in improving the number concept recognition skills of children aged 4–5 years at TK Negeri Pembina, Lintau Buo Utara District, with an improvement rate of 63.66%, classified as a moderate category. Therefore, it can be concluded that Vending Machine Media positively affects the enhancement of number concept recognition skills in children aged 4–5 years at TK Negeri Pembina, Lintau Buo Utara District.

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