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The Effect of Number Gema Application on the Ability to Recognize Number Concepts in Children Aged 5-6 Years at Kindergarten Negeri Pembina 1 Pekanbaru

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A B S T R A C T

Early childhood is a golden period of child development, including cognitive aspects such as the ability to recognize the concept of numbers. This study aims to determine the influence of the Gema Numbers application on the ability to recognize numbers of children aged 5–6 years in Kindergarten Negeri Pembina 1 Pekanbaru City. The method used was an experimental One Group Pre-test Post-test design. A total of 20 children participated in the study. Learning was conducted for four sessions using the Gema Numbers application as an interactive learning tool. Data were collected through pretest and posttest using observation sheets and analyzed with a t-test. The pretest results showed that the child's ability was still low (40.5%), while the posttest results increased significantly to 83.5%. All indicators of number ability improved, from recognizing symbols to comparing numbers. The results of the t-test showed a significant influence of the use of the application on improving children's abilities. Thus, the Gema Numbers application is effectively used as a fun interactive learning medium in introducing the concept of numbers to early childhood.

Keywords: *Early Childhood, Echo of Numbers, Concept of Numbers.*
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INTRODUCTION

Early childhood is an individual who is in a period of very rapid growth and development, which is even often referred to as a developmental leap period. Therefore, this age is known as the golden age, which is the most valuable period compared to the next stage of life. This period is a unique phase of life because children have distinctive physical, psychological, social, and moral characteristics (Isna, 2019) . All aspects of child development can be optimally stimulated during this period. Each child has different potentials, and these potentials develop through the interaction between the uniqueness of the individual and the surrounding environment. Early numeracy is an essential foundation for children's learning and cognitive development. It plays a crucial role in predicting later academic achievement, particularly in mathematics and problem-solving skills. Children who develop strong early numeracy skills tend to perform better in school and have higher long-term educational outcomes. Several studies emphasize that introducing mathematical concepts early can significantly enhance children's cognitive abilities and readiness for formal education (e.g., Duncan et al., 2007; Clements & Sarama, 2011; Jordan et al., 2009).

Zulminiati, (2018) states that early childhood experiences extraordinary growth and development so it is called a developmental leap period. This age is very important because it is a critical time for the development of children's intelligence. Children are in a process of change that includes growth, development, maturation, and refinement both physically and spiritually, which lasts throughout a lifetime in a gradual and continuous manner.

According to Astuti & Novianti, (2020), children's cognitive development can be stimulated in various ways, one of which is by playing while learning. Experts state that play

has an important function in the optimal development of children. Play affects all aspects of development and is an effective means of stimulating cognitive aspects such as mathematics. The goal of learning mathematics for early childhood is to develop logical and mathematical thinking skills in a fun and uncomplicated way. Therefore, the goal is not just for children to be able to count in large numbers, but for them to understand mathematical language and be able to use it in the process of thinking.

Pertiwi et al, (2018) explained that the aspects of cognitive development in the Child Development Achievement Level Standards (STPPA) at the age of 5–6 years consist of learning and problem-solving skills, logical thinking, and symbolic thinking. Symbolic thinking involves using symbols to understand a particular concept. In this case, children aged 5–6 years are expected to be able to pronounce the number symbol and match the symbol with the appropriate number. Therefore, effective media and learning strategies are needed so that children can remember and understand each number symbol. This matching activity is useful to help children compare shapes, colors, sizes, numbers, patterns, and more.

The ability to recognize numbers is very important for children to master because it is the basis for understanding various mathematical concepts at the next level of education. According to Media et al, (2022), the mastery of the concept of numbers involves understanding the surrounding objects, objects, or events. Children begin to recognize symbols such as numbers, pictures, movements, or words to represent objects they encounter. Because children's thinking skills are still concrete, they need symbols that are also concrete in the learning process. Mastery of basic mathematical concepts such as numbers, shapes, sizes, spaces, and positions can be developed through fun activities. Numeracy skills also support the formation of logical, critical, meticulous, creative, and disciplined attitudes.

According to Siti (2015), the ability to recognize number concepts is very important to be developed from an early age because it is the basis for understanding mathematical operations at the next level of education, starting from elementary school to college. The inability to recognize the concept of numbers from an early age can hinder the understanding of spatial relationships, the concept of numbers, and the ability to visual-motor associations. This can have an impact on low mathematics learning outcomes. Children who do not master the concept of numbers tend to have difficulty recognizing numbers, symbols, and spaces. Cahyaningrum et al, (2022) states that the ability to recognize numbers is a child's understanding of the number of objects, which is closely related to the counting process. This ability is important to develop because numbers often appear in everyday life and become the foundation in learning mathematics. Rosmiyati & Sri Wahyuni (2019) adding that numeracy skills are very useful in daily life. Number concepts are the basis for developing children's mathematical skills, so it is very important to be introduced from an early age through various media and fun activities.

The ability to recognize number concepts in early childhood provides great benefits in supporting children's cognitive development and learning readiness. Children who understand the concept of numbers from the beginning will find it easier to think logically, recognize number symbols, and understand the relationship between numbers and objects. Cahyaningrum et al, (2022) states that proper number recognition makes it easier for children to follow advanced mathematics learning, as well as support their ability to solve problems, improve memory, and build critical thinking skills. Therefore, stimulating this ability from an early age is very important so that children have optimal academic readiness.

The ability to recognize the concept of numbers in children aged 5–6 years is influenced by various interrelated factors. One of the main factors is the stimulation of the learning environment, such as the use of interesting and interactive learning media, both nature-based and concrete media (Syukur & Fallo, 2019)). In addition, according to Stuart (2015), parental involvement also plays an important role in children's numeracy development. Activities such as playing while counting or reading number books at home also support children's cognitive development. Internal factors such as children's cognitive readiness, including memory, focus,

and problem-solving skills, also determine the speed and accuracy of understanding the concept of numbers.

Gift (2021) states that play is an important tool in early childhood learning. Playing is an activity that is done on the basis of fun, without emphasizing the end result. Playing has characteristics such as being fun, spontaneous, voluntary, and actively involving all participants. Play activities can be differentiated based on the child's social development and interests, such as free play, pretending, building, composing, composing, and sports. Play is very closely related to children's growth and development, because it is able to support all aspects of development, such as self-awareness, emotional, social, communication, and motor.

Gift (2021) He also added that play has the power to encourage the development of children as a whole. Giving children the opportunity to play is giving them the opportunity to learn in a natural and fun way. This allows children to gain meaningful learning experiences. The development of digital technology has encouraged the presence of interactive learning media, one of which is the Gema Número (Joy of Playing Numbers) application, which is designed to improve the ability to recognize numbers in early childhood through interactive games that are in accordance with the stages of children's cognitive development. This medium allows children to recognize numbers, patterns, compose words from numbers, and understand basic operations with the help of interactive visual and sound displays. This application is designed to be child-friendly and can be used independently or with the assistance of teachers and parents. The use of Gema Numbers media at Kindergarten Negeri Pembina 1 Pekanbaru is expected to optimize the numeracy literacy skills of children aged 5-6 years through a fun and effective learning approach.

Based on the results of observations at Kindergarten Negeri Pembina 1 Pekanbaru in grade B3, researchers found various problems, including most children have not been able to count numbers 1 to 10 sequentially, some children have not been able to sort numbers correctly, the majority of children have not understood the concept of simple addition and subtraction, some children have not been able to connect concrete objects with number symbols, and some children have not been able to compare more or fewer objects.

Based on the description of the problem, the researcher intends to conduct an experimental study entitled "The Effect of Number Echo Application on the Ability to Recognize Number Concepts in Children Aged 5–6 Years at Kindergarten Negeri Pembina 1 Pekanbaru."

METHOD

This research uses a quantitative approach, which is a process to obtain an understanding through data in the form of numbers that are used as a tool to explain and describe the phenomenon being studied. The type of research used is experimental research, with a pre-experimental design in the form of One Group Pre-test Post-test Design. In this design, the experiment was carried out on only one group without a comparison group.

The variables used in this experimental study were:

Variable (X) : Number Echo Application

Variable (Y) : Ability to know the concept of numbers

Table 1. One Group Pre Test Post Test Design

O_1	X	O_2
Pre-test	**Treatment**	**Post-test**

Source: (Sugiyono, 2016)

Information:

O1 : Pre-test score

O2 : Post-Test score

X : Treatment given (Number Echo Application).

The population in this study is children aged 5-6 years in group B consisting of 7 classes with a total of 140 children at Kindergarten Negeri Pembina 1 Pekanbaru. Population is a generalized area consisting of objects that have certain qualities and characteristics that are

determined by researchers to be studied and drawn In conclusion ((Rukminingsih et al., 2020)). Sample is part of the number and characteristics that are by population (Charismana et al., 2022). The determination of the sample in this study uses a non-probability sampling technique, namely purposive sampling, which is a method of selecting samples based on certain considerations or criteria that are in accordance with the purpose of the research. The sample in this study is 20 children from the B3 group aged 5-6 years at Kindergarten Negeri Pembina 1 Pekanbaru.

FINDINGS AND DISCUSSION

Research Results

This research aims to introduce learning media in the form of a desktop-based Gema Nomer application as a tool to improve the ability to recognize number concepts in children aged 5–6 years. The use of this media is based on problems found through direct observation and observation in the field. In this case, the researcher uses the Echo of Numbers media as a form of stimulation for children's ability to recognize the concept of numbers. This research uses a quantitative approach, which is based on the philosophy of positivism with a focus on objective phenomena that are analyzed quantitatively through numbers, statistical processing, structure, and controlled experiments. The experimental method in this study was used to determine the influence of a treatment on other variables under controlled conditions (Ali et al., 2022) .

Overview of Research Sites

Kindergarten Negeri Pembina 1 Pekanbaru is a center for learning and development of Early Childhood Education (PAUD) which has been established since 1980. This school is located at Jalan Sarwo Edhi, Suka Mulya Village, Sail District, Pekanbaru City, Riau Province. The current principal is Mrs. Syarifa Warni, M.Pd. The number of educators at Kindergarten Negeri Pembina 1 Pekanbaru City is recorded as 13 teachers and 1 principal. The subjects of this study were 20 children, consisting of 8 girls and 12 boys, all of whom were 5–6 years old. The teaching and learning process at Kindergarten Negeri Pembina 1 Pekanbaru City is carried out with a quantitative learning approach and supported by the use of technology in the learning process.

Research Implementation

Experimental data collection was carried out in six meetings, consisting of one *pretest*, four treatments, and one *posttest*. Observations were made on 20 children aged 5–6 years. The treatment schedule is as follows:

Table 2. Treatment Schedule

Day/Date	Activities	Place
Monday, 26 May 2025	*Pretest*	Class B3
Tuesday, 27 May 2025	Treatment 1. The researcher conducted an experiment by giving a menu treatment to recognize numbers and guess numbers in the number echo application.	Class B3
Wednesday, 28 May 2025	Treatment 2. The researcher conducted an experiment by giving a menu treatment, sorting numbers and counting objects on a number echo application.	Class B3
Tuesday, June 3, 2025	Treatment 3. The researcher conducted an experiment by giving a number guess menu treatment and pair numbers and pair numbers on a number echo app.	Class B3
Wednesday, 4 June 2025	Treatment 4. The researcher conducted an experiment by providing a menu treatment comparing the number and menu of the concept of plus and minus.	Class B3
Tuesday, June 10, 2025	*Posttest*	Class B3

Source: Processed Research Data 2025. Appendix 3 Page 64

Description of Research Results Data

Data analysis was carried out using a t-test through *IBM SPSS* version 23 to find out the difference in *pretest* and *posttest results*. This study aims to measure the influence of the

Gema Número application on the ability to recognize number concepts in 20 children aged 5–6 years at Kindergarten Negeri Pembina 1 Pekanbaru City. These abilities are assessed based on five indicators. The following is a description of the results of the study:

Table 3. Description of Research Results

Variable	X Score Possible (Hypothetical)				X Score Obtained (Emrical)			
	Xmin	Xmax	Mean	SD	Xmin	Mmax	Mean	SD
Pretest	20	5	12,5	2,5	5	10	8,1	1,5
Posttest	20	5	12,5	2,5	15	19	16,7	1,4

Source: Processed Research Data 2025. Appendix 5 Page 66

Table 4. Overview of the Ability to Recognize Number Concepts in Children Aged 5-6 Years at Kindergarten Negeri Pembina 1 Pekanbaru City Before the Treatment of the Number Echo Application (Pretest)

Yes	Indicators	Ideal Score	Factual Score	%	Category
1	Children are able to recognize number symbols	80	37	46.25	MB
2	The child is able to pronounce the symbol of the number	80	38	47.50	MB
3	Children are able to count numbers	80	34	42.50	MB
4	Your child is able to connect numbers	80	29	36.25	MB
5	Children are able to compare numbers	80	24	30.33	MB
	Sum	**400**	**162**		
	Average				
	%			**40.50**	
	Category				**MB**

Source: Processed Research Data 2025. Appendix 6 Page 66

Based on Table 4, the ability to recognize the concept of the number of children aged 5–6 years before treatment is in the Starting Development (MB) category with an average percentage of 40.50%. The highest indicator is the ability to pronounce number symbols (47.50%), while the lowest indicator is the ability to compare numbers (30.33%), both are still in the Starting Developing (MB) category. An overview of the child's abilities before being given the treatment of the Number Echo application can be seen in the following table:

Table 5. Ability to Recognize Number Concepts in Children Aged 5-6 Years at Kindergarten Negeri Pembina 1 Pekanbaru City Before the Treatment of Number Echo Application (Pretest)

Yes	Category	Range (In %)	F	%
1	BSB	76-100	0	0.00%
2	BSH	51-75	0	0.00%
3	MB	26-50	18	90.00%
4	BB	0-25	2	10.00%
	Sum		**20**	
	%			**100.00%**

Source: Processed Research Data 2025. Appendix 7 Page 67

Based on table 5. It is known that all children are able to recognize the concept of numbers in the category of starting to develop 90.00% and not yet developing 10.00%.

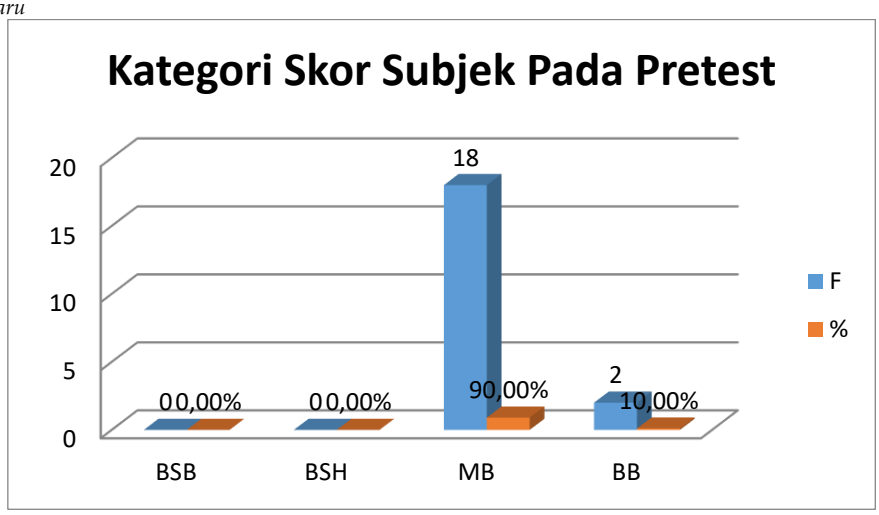

Figure 1. Subject Score Categories on the Pretest

Table 6. Overview of the Ability to Recognize the Concept of Number Children Aged 5-6 Years at Kindergarten Negeri Pembina 1 Pekanbaru City After Being Given a Number Echo Application (Posttest)

Yes	Indicators	Ideal Score	Factual Score	%	Category
1	Children are able to recognize number symbols	80	73	91.25	BSB
2	The child is able to pronounce the symbol of the number	80	71	88.75	BSB
3	Children are able to count numbers	80	67	83.75	BSH
4	Your child is able to connect numbers	80	63	78.75	BSB
5	Children are able to compare numbers	80	60	75.00	BSH
	Sum	**400**	**334**		
	Average		**66.8**		
	%			**83.50 %**	
	Category				**BSB**

Source: Processed Research Data 2025. Appendix 8 Page 68

Based on Table 6, the ability to recognize the concept of the number of children aged 5–6 years after treatment is in the Very Good Development (BSB) category with an average percentage of 83.50%. The highest indicator is the ability to recognize number symbols at 91.25% (BSB), while the lowest indicator is the ability to compare numbers at 75.00%, which is included in the category of Developing According to Expectations (BSH).

Table 7. Ability to Recognize the Concept of the Number of Children Aged 5-6 Years at Kindergarten Negeri Pembina 1 Pekanbaru City (Posttest)

Yes	Category	Range (In %)	F	%
1	BSB	76-100	14	70.00
2	BSH	51-75	6	30.00
3	MB	26-50	0	00.00
4	BB	0-25	0	00.00
	Sum		**20**	
	%			**100.00**

Source:Processed Research Data 2025 Appendix 9 Page 69

Table 7 shows that most children, namely 70.00%, have the ability to recognize number concepts in the Very Good Developed (BSB) category, while the other 30.00% are in the Developing According to Expectations (BSH) category.

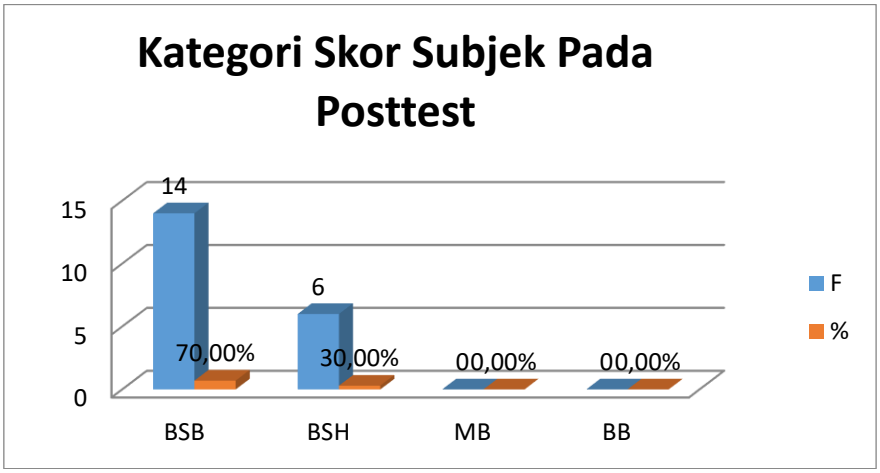

Figure 2. Postest Subject Score Categories

Comparison of Pretest and Posttest Data

This study uses a one group pretest-posttest design, namely by comparing the results before and after treatment. The results of the pretest and posttest can be seen in the following table:

Table 8. Recapitulation of the Ability to Analyze the Concept of Number Children Aged 5-6 Years at Kindergarten Negeri Pembina 1 Pekanbaru City

Yes	Category	Score Range	F Pretest	%	F Posttest	%
1	Very Well Developed	76%-100%	0	0	14	70,00
2	Growing Up With Expectations	51%-75%	0	0	6	30,00
3	Start Growing	26%-50%	18	90,00	0	0
4	Not Yet Developed	0%-25%	2	10,00	0	0
Sum			**20**	**100**	**20**	**100**

Source: Processed Research Data 2025. Appendix 10 Page 69

Based on Table 8, there is a significant difference between the ability to recognize the concept of numbers for children aged 5–6 years before and after being given treatment. At the time of the pretest, all children were in the Not Developing and Starting to Develop category. However, after being given four treatments, there was a significant improvement. The posttest results showed that 14 children were in the Very Good Developed category and 6 children in the Developing As Expected category. No child is classified as Undeveloped at the posttest stage.

Hypothesis testing

Data Analysis

This study uses quantitative data analysis in accordance with the experimental method. The statistical technique used is a t-test with the aim of finding out the extent to which the influence of an independent variable on a partially bound variable is made, assuming that other variables are considered constant. The test was performed at a significance level of 5% ($\alpha = 0.05$) or with a confidence level of 95%.

Homogeneity Test

The homogeneity test in this study was carried out to ensure that the analyzed data came from populations with relatively similar levels of diversity. Homogeneity analysis was performed using chi-square tests with the help of the IBM SPSS version 23 program. If the significance value (Sig.) > 0.05, then H_0 accepted, which means the data comes from subjects with a diversity that is not significantly different. The results of the homogeneity test using the chi-square test are presented in the following table:

Table 9. Homogeneity Test Results

	Pretest	Posttest
Chi-Square	4,000a	1,500a
Df	5	5

Asymp. Sig.	.549	.827

Source: Processed Research Data 2025. Appendix 12 Page 70

Based on the table above, it is known that the value of Asymp. The sig. for the pretest was 0.549 and for the posttest was 0.827. Since both significance values are greater than 0.05, H₀ is accepted. Thus, it can be concluded that the data in this study are homogeneous or have the same variance.

Normality test

The normality test is carried out to find out whether the data distribution is normal or not. In this study, the researcher used the Kolmogorov-Smirnov normality test (one-sample K-S test) with the help of the SPSS version 23 program. More detailed information about the results of the normality test can be seen in the following table:

Table 10. Normality Test

One-Sample Kolmogorov-Sminov Test			
		Pretest	**Posttest**
N		20	20
Usual $Parameters^{a,b}$	Mean	8.1000	16.7000
	Std.Deviation	1.55259	1.49032
Most Extreme Differences	Absolute	.174	.181
	Positive	.111	.181
	Negative	-.174	-.158
Test Statistic		.174	.181
Asymp. Sig. (2-tailed)		$.113^{c,d}$	$.086^{c,d}$

Source: Processed Research Data 2025, Appendix 13 Page 71

Based on the table above, the data is said to be normally distributed if the significance value (Sig.) in the Kolmogorov-Smirnov column is greater than 0.05. If the Sig. value is less than 0.05, then the data is considered not to be normally distributed. In the pretest, the Sig. value was 0.113 and in the posttest was 0.086. Since both values are greater than 0.05, H₀ is accepted. Thus, the data in this study is normally distributed and suitable for further analysis.

Hypothesis Test

The comparison of pretest and posttest results in this study was analyzed using a statistical test paired sample t-test through the SPSS version 23 program. This test aims to find out if there is a significant difference before and after the use of the Number Echo application on the ability to recognize number concepts in the experimental group. The data is said to have experienced a significant increase if the significance value (Sig.) < 0.05. If the value of Sig. < 0.05, then H₀ is accepted and H_a is rejected.

Before drawing conclusions about whether or not the influence of the Gema Número application on the ability to recognize the concept of numbers for children aged 5-6 years in Kindergarten Negeri Pembina 1 Pekanbaru City, the following statistical hypothesis is compiled:

> *H_0 : There was no effect on the application of number echoes in the ability to recognize number concepts in children aged 5-6 years at Kindergarten Negeri Pembina 1 Pekanbaru City.*
>
> *H_a : There is an influence on the application of the echo of numbers in the ability to recognize the concept of numbers for children aged 5-6 years in Kindergarten Negeri Pembina 1 Pekanbaru City.*

The comparison of *pretest* and *posttest* in the experimental class is as follows:

Table 11. T test

Paired Samples Test									
		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	**Std Deviation**	**Std.Error Mean**	**Lower**	**Upper**	**t**	**Df**	**Sig. (2-tailed)**
Pair	Pretest-	-	1.09545	.24495	-9.11268	-8.08732	-35.109	19	.000

1	Posttest	8.60000

Source: Processed Research Data 2025. Appendix 14 Page 71

Based on Table 11, the statistical test value of t calculated was -35.109. Because what is used is a two-party test, the negative value is ignored (Sugiyono, 2010), so that the t calculation becomes 35.109. With a significance value of 0.000 < 0.05, it can be concluded that there is a significant influence of the use of the Number Echo application on the ability to recognize number concepts in early childhood .

To determine whether the hypothesis is accepted or rejected based on the results of the SPSS analysis version 23, a comparison is made between the value of $t_{calculated}$ and $t_{of\ the\ table}$. It is known that $t_{calculates}$ 35.109 greater than t table of 2.093, with dk as follows:

dk = (n-1)
= (20-1)
=19

With a dk of 19, a table t-value of 2.093 is obtained. Since t_{count} (35,109) > t_{table} (2,093), H_0 is rejected and H_a is accepted. Thus, it can be concluded that there is a significant influence of the use of the Gema Número application on the ability to recognize number concepts in children aged 5–6 years.

The Effect of Number Echo Application on the Ability to Recognize the Concept of Number Children Aged 5-6 Years at Kindergarten Negeri Pembina 1 Pekanbaru City

To find out the extent of the influence of the Gema Número application on the ability to recognize number concepts in children aged 5-6 years at Kindergarten Negeri Pembina 1 Pekanbaru City, a follow-up analysis was carried out based on the results of statistical tests.

Normalized Gain Test

$$G = \frac{Skor\ Posttest - skor\ pretest}{Skor\ Ideal - skor\ pretest} \times 100\%$$

$$G = \times 100\% \frac{334-162}{400-162}$$

$$G = \frac{172}{238} \times 100\%$$

$$G = 72.26\%$$

Information:

G = *Difference between values Pretest and Posttest*
Posttest = *value after given Treatment*
Pretest = *numerical value before it is done Treatment*
100% = *fixed number*

Table 12. Normalized Gain Category

Normalized Gain	Rating Categories
G < 30%	Low
30% < G < 70%	Keep
G > 70%	Tall

Source: Processed Research Data 2025, Appendix 15 Page 71

Based on the results of the calculation using the gain formula (G), an increase of 72.26% was obtained, which is included in the high category because it exceeds 70%.

Discussion

The discussion of the results of this study is based on comparative analysis in experimental research, with independent variables in the form of the use of the Number Echo application (X) and the bound variable, namely the ability to recognize the concept of numbers (Y). The analysis was carried out to see the changes that occurred before and after the treatment was given to the sample. After obtaining the difference in values between the pretest and posttest, the next step is to evaluate the extent to which the ability to recognize number concepts has improved after the child has received treatment.

Research Results Before Being Given Number Echo Application Based on Pretest Results

This research began with the provision of a pretest to 20 children aged 5–6 years at Kindergarten Negeri Pembina 1 Pekanbaru to find out their initial ability to recognize the concept of numbers before being treated using the Gema Numberan application. The assessment includes five indicators: recognizing the number symbol, mentioning the number

symbol, counting, correlating and comparing numbers, which are assessed through observation and concrete activities. The results of the pretest show that the child's ability is still low, with an average score of 8.1 out of 20 (40.5%) and is in the category of "Starting to Develop" (MB); no children reached the BSH or BSB categories. The achievement of indicators varied, the highest in mentioning the number symbol (47.50%) and the lowest in comparing numbers (30.33%), indicating an inequality in the mastery of concepts. These findings indicate that children do not understand numbers conceptually and tend to memorize without understanding quantitative meaning (Chanet Dayura geraisa, 2021)), and still requires learning based on concrete and visual media (Ranita Sari et al., 2021)). This is reinforced by the statement Gift (2022) that early childhood is generally able to name numbers, but does not understand the value and number in its entirety. However, children have a curiosity to acquire their knowledge from the surrounding environment, such as in the cognitive field (Gift % Septiani, 2020). Rosalianisa (2023) He added that the ability to recognize symbols, compare, and connect numbers is greatly influenced by the child's cognitive stages that are still developing, so even though digital media can help, assistance is still needed. Thus, the low pretest results show that the previous learning media has not been effective enough, and the use of the Gema Nomer application as an interactive and contextual learning media is considered important to improve children's abilities optimally.

The results of the research after being given a number echo application based on the posttest results

After four meetings using the Gema Numberan application, the posttest was carried out with the same instruments and indicators as the pretest to measure the development of children's ability to recognize the concept of numbers objectively. This application carries a learning while playing approach with interactive activities such as getting to know numbers, counting, sorting, guessing, and comparing numbers. The results of the posttest showed a significant increase: the average score of children rose to 16.7 out of 20 (83.5%) and all students were in the "Develop Accordingly" (BSH) and "Very Good Development" (BSB) categories, with none remaining in the MB or BB categories. In detail, the increase occurred in all indicators: recognizing number symbols from 46.25% to 91.25%; mention the symbol of the number from 47.50% to 88.75%; counting from 42.50% to 83.75%; connecting the numbers from 36.25% to 78.75%; and compare the number from 30.33% to 75.00%. This reinforces the findings Ningsih et al., (2024) that digital media supports cognitive development through play activities, and is in line with (Gift et al., 2025) which emphasizes the importance of innovation in digital learning media for early childhood. According to Piaget's theory, children aged 5–6 years are in the pre-operational stage, making it easier to learn through concrete and visual experiences. The Number Echo app fulfills these characteristics with an engaging audio-visual display and fun exploratory activities (La Sule, Wondal rosita, 2021). Mardhian Ningrum et al., (2021) said that audio-visual displays in the form of images, animations, and sounds can increase attention and motivate children to be more active in learning. With this approach, children are more focused, motivated, and active in learning. Based on posttest data and statistical analysis, it was concluded that the Number Echo application effectively improves the understanding of number concepts, including symbols, sequences, sums, as well as the simple concepts of addition and subtraction. This proves that play-based digital media can be an innovative and relevant learning alternative for early childhood education, as it provides a learning space through play activities (Kurnia, 2021).

The Effect of Number Echo Application on the Ability to Recognize Number Concepts in Children Aged 5-6 Years at Kindergarten Negeri Pembina 1 Pekanbaru

This study aims to determine the influence of the application of Number Echo on the ability to recognize the concept of numbers in children aged 5–6 years through two stages, namely pretest and posttest. Pretest results showed that most children had difficulty in pronouncing number symbols, counting, sorting numbers, and comparing numbers, suggesting that they memorized numbers more without understanding the quantitative meaning conceptually (Haslana & Wirastania, 2017). After being given treatment in the form of

learning using the Gema Numbers application for several meetings, the child's ability to recognize number symbols, count, and compare numbers increases. The app uses a play-and-learn approach through animation, sound, and interactive visuals, which has been shown to encourage children's motivation and focus on learning (Yusuf et al., 2022)). The results of the posttest showed that the majority of children were able to pronounce the numbers 1-10 correctly, sort the numbers up and down, and compare the numbers correctly. Children's enthusiasm and engagement are also higher than in conventional learning, which suggests that digital media creates a more lively and contextual learning experience (Fitriani et al., 2016). This application has been shown to be in harmony with the pre-operational stage of the child according to Piaget's theory, in which the child learns optimally through visual, auditory, and kinesthetic approaches (Humaida & Suyadi 2021). Through fun yet educational digital games, children are able to build a meaningful understanding between symbols and quantity. Thus, the Gema Número application has a significant positive impact on improving children's ability to recognize the concept of numbers in a fun and effective way, as emphasized by Scarlett (2024) that digital-based educational games are able to attract children's attention, increase active engagement, and strengthen the understanding of quantitative concepts as a whole.

CONCLUSIONS

Based on the results of a study on the influence of the Gema Número application on the ability to recognize number concepts in children aged 5–6 years at Kindergarten Negeri Pembina 1 Pekanbaru City, it was concluded that before being given treatment, the child's ability to recognize the concept of numbers was relatively low with an average percentage of 40.50% and was in the category of Starting to Develop (MB). Children are not yet fully able to recognize number symbols, name symbols, count, connect numbers with objects, and conceptually compare numbers. After participating in learning using the Gema Numbers application for four meetings, there was a significant increase in the child's ability, with the average achievement increasing to 83.50% and included in the Very Good Development (BSB) category. The results of the t-test on the pretest and posttest data showed that there was a positive and significant influence of the use of the Number Echo application on the improvement of the ability to recognize number concepts in early childhood. Thus, the hypothesis in this study is accepted.

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