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# The Influence of Vocal Bingo Game on the Ability to

# **Recognize Vowel Letters in Children Aged 4-5 Years**

Sahyla Nabila<sup>1</sup>, Dewi Komalasari<sup>2</sup>, Dwi Jayanti Kurnia Dewi<sup>3</sup>, Afifah Rahmaningrum<sup>4</sup>

<sup>1,2,3,4</sup> Universitas Negeri Surabaya, Surabaya, Indonesia

e-mail: \*<u>1</u>sahyla.21001@mhs.unesa.ac.id, <u>2</u>dewikomalasari@unesa.ac.id, 3dwidewi@unesa.ac.id, <u>4</u>afifahrahmaningrum@unesa.ac.id

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## ABSTRACT

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Copyright ©2025 by Authors. Published by Universitas Muhammadiyah Tangerang Recognizing vowel letters is a fundamental component early childhood of development. This study investigates the impact of the vocal bingo game on the ability of children aged 4-5 years to recognize vowel letters. The research was motivated by the low vowel recognition skills observed at TK Muslimat NU 79 Miftahul Huda. A quantitative approach was applied using a quasi-experimental Nonequivalent Control Group Design. The participants were divided into two groups experimental and control—each comprising 15 children. An observation sheet, tested for validity and reliability, was used to assess vowel recognition. Data analysis included normality, homogeneity, and hypothesis testing using SPSS version 23. The results revealed a significance value of 0.031 (p<0.05), indicating a significant difference between the experimental and control The posttest mean score of the experimental group (18.07) was higher than that of the control group (15.47). These findings suggest that the vocal bingo game is an effective instructional medium for enhancing early literacy skills in young children.

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#### Introduction

Early childhood (toddler stage) is a crucial period in a child's development, during which the foundations of personality, abilities, and interests begin to form. Children are considered to be in early childhood between the ages of 0 and 6, and during this time, they possess unique potential within themselves (Chairunnisa, 2021). At this stage, the majority of brain cell networks are actively involved in regulating activities and determining the quality of human development (Putri et al., 2023).

Children in early childhood require proper education to ensure the optimal development of all aspects. One effort to support their growth and development is the implementation of early childhood education designed according to their developmental stages (Agustin & Komalasari, 2023). Formal education institutions such as kindergartens (Taman Kanak-Kanak) or Islamic kindergartens (Raudhatul Athfal) are intended for children aged 4 to 6 years, with the goal of supporting their holistic growth and development (Safitri & Marlina, 2020).

Child development encompasses several aspects, including religious and moral values, Pancasila values, physical-motor skills, cognitive skills, language, and social-emotional development. All of these aspects are important, but language development is particularly critical. Language skills are essential for expressing thoughts, feelings, and desires. If a child's language development is not optimal, they may struggle with communication (Nurlatifah et al., 2025). Therefore, the role

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of both teachers and parents is vital in fostering and developing children's language abilities (Ngulwiyah & Hasanah, 2024).

Language development includes several key stages: listening, speaking, reading, and writing. Reading is one of the fundamental skills that should be developed from an early age. The primary goal of reading ability is to build a strong foundation for children's future learning (Syahputri et al., 2025). Another perspective emphasizes that before learning to read, children must first recognize and memorize the shapes of both lowercase and uppercase letters (Rislina & Khan, 2015).

Letter recognition helps children identify and understand the shapes of letters in words, while phonemic awareness enables them to recognize and differentiate the sound units that form words (Zulinnuha & Komalasari, 2023). According to Valley (as cited in Intan & Eka, 2023), children's ability to recognize letters can be identified through their ability to name and pronounce each letter of the alphabet. Letter recognition is divided into two categories: recognition of vowels and consonants. This study focuses on children's ability to recognize vowels. In the Indonesian language, there are five vowels: a, i, u, e, and o.

Children aged 4–5 typically begin to recognize letters; however, observations at TK Muslimat NU 79 Miftahul Huda indicate that the vowel recognition abilities of the children are still low. When asked to name or identify vowels using flashcards or a whiteboard, the majority (8 out of 15 children) appeared confused and gave random answers. This issue is suspected to be due to the lack of variety in learning

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methods, which rely mainly on singing and worksheets (e.g., letter tracing or copying), as well as limited learning media available at the institution.

Among the issues mentioned above, one possible solution to improve vowel recognition among 4- to 5-year-old children is through engaging and enjoyable games. Therefore, the researcher employed play-based activities as a medium to enhance letter recognition skills. The most effective way to engage children is by entering their world—particularly through play. Young children are more enthusiastic about learning when it aligns with their natural instinct that learning is a form of play. Play activities are thus more than just fun—they are educational in themselves.

Several studies have shown that play-based media is effective in improving vowel recognition in children aged 4–5 years, such as the vowel domino game (Waskita et al., 2023), pocket door media (Azizah & Setyowati, 2022), and the Playing or Playmat Singing media (Nurdiana et al., 2024). Building on these relevant studies, this research introduces a novel approach using a "vowel bingo" game to enhance the vowel recognition skills of children aged 4–5 years. This game is designed to be fun and engaging, thereby capturing children's attention.

Bingo games, originally known as Lo Giuoco del Lotto d'Italia from Italy, is traditionally a game of chance that has become widely popular in Western countries and is easily adaptable (McMahon, 2017). According to Coco, "bingo game can be called a holistic game, because

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can make the player feel enjoy the game." This suggests that bingo is a holistic and enjoyable activity that can be implemented at various educational levels, assisting educators in tracking children's progress in specific learning areas (Widyahening & Sufa, 2021).

The vowel bingo game was introduced as a digital innovation specifically designed to improve vowel recognition in early childhood. Unlike traditional bingo games, this version incorporates interactive technology, allowing children to see, hear, and interact with letters through a digital screen, making the experience more engaging and effective. This aligns with Piaget's theory, which emphasizes the importance of concrete experiences in children's learning processes.

Based on the above background, the research problem formulated is: "What is the effect of the vowel bingo game on the vowel recognition skills of children aged 4–5 years?" The objective of this study is: "To examine influence of the vowel bingo game on vowel recognition skills in children aged 4–5 years".

### Methods

This research is a quantitative study employing an experimental method using a Quasi-Experimental Design, specifically the Nonequivalent Control Group Design. The study was conducted at TK Muslimat NU 79 Miftahul Huda, involving children aged 4–5 years during the even semester of the 2024/2025 academic year. The research population comprised all children aged 4–5 years, with two classes assigned as the experimental and control groups, each consisting of 15

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children. The sampling technique used was total sampling, in which the entire population of 30 children was included as the research sample.

**Table 1 Research Design** 

$O_1$	X	$O_2$
O <sub>3</sub>		$O_4$

Notes:

O1 = Pre-test for the experimental group

O2 = Post-test for the experimental group

X = Treatment using the vocal bingo game

O3 = Pre-test for the control group

O4 = Post-test for the control group

The research process began with an initial observation to assess the children's baseline abilities. This was followed by a one-session pre-test administered to both groups, in which participants completed a worksheet and used flashcards related to vowel letters. The experimental group then received treatment over three sessions using the vocal bingo game, while the control group received conventional instruction. Finally, a post-test was conducted in a single session, following the same procedures as the pre-test.

For data collection, the instrument used was an observation sheet assessing children's ability to recognize vowel letters, based on three indicators: pointing to letters, pronouncing letter sounds, and identifying initial letters. In addition to the observation sheet, expert validation forms for content and media were employed to ensure that

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the vocal bingo game was appropriate for the learning objectives and suitable for children aged 4–5 years. Before use, the instruments were tested for validity and reliability. Validity testing used Aiken's V-method. According to Aiken (as cited in Retnawati, 2016), an item is considered highly valid and usable if it has a value of 1 (Retnawati, 2016).

Reliability testing was conducted in the field by involving 15 children and 2 teachers from TK Dharma Wanita Bohar. The results were calculated using the Percentage of Agreement (PA) formula and processed with the help of Microsoft Excel (Winastiti, 2019). According to Borich (as cited in Ibrahim, 2005), an instrument is considered reliable if it has a reliability coefficient of  $\geq 0.75$  or 75%.

The data analysis techniques used in this study included normality testing, homogeneity testing, and hypothesis testing, processed using SPSS version 23. Normality was tested using the Shapiro-Wilk test, which is suitable for small to medium sample sizes (n < 50 to 200). Homogeneity was tested using Levene's Test. Hypothesis testing was conducted to determine the final results: if the data were normally distributed and homogeneous, a parametric statistical test (Independent Sample T-Test) was performed. Conversely, if the data were not normally distributed and not homogeneous, a nonparametric test (Mann-Whitney U-Test) was used.

#### **Results and Discussions**

Learning through a play-based approach has proven effective in early childhood education, as it enhances both engagement and

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learning motivation. In this study, the vowel bingo game demonstrated a positive contribution to children's ability to recognize vowel letters (a, i, u, e, o). This can be seen in Tables 2 and 3, which present a summary of the results from both groups.

Table 1 Recapitulation of Data from Pre-test and Post-test Results of Control Group

Control Group							
No	Name	Pretest	%	Postest	%	Posttest - Pretest	
1	AFWM	12	60%	12	60%	0%	
2	ANH	12	60%	12	60%	0%	
3	AFR	19	95%	19	95%	0%	
4	ANR	14	70%	14	70%	0%	
5	FAP	9	45%	10	50%	5%	
6	GSR	17	85%	18	90%	5%	
7	MAF	19	95%	20	100%	5%	
8	MRA	14	70%	14	70%	0%	
9	RDP	17	85%	18	90%	5%	
10	RAA	18	90%	18	90%	0%	
11	RIM	18	90%	18	90%	0%	
12	SCM	18	90%	19	95%	5%	
13	SAA	13	65%	13	65%	0%	
14	TAAA	8	40%	10	50%	10%	
15	ANP	17	85%	17	85%	0%	
	Total	225	75%	232	77%	2%	
Average		15	5	15,47			

Based on the table above, it can be seen that the implementation of the pre-test and post-test in the control group showed that out of 15 children, 6 experienced an improvement, while the remaining 9 did not. The children who showed improvement were FAP, GSR, MAF, RDP, SCM, and TAAA, with five children showing an increase of 1 point (5%) and one child showing an increase of 2 points (10%). However, since

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this group did not receive any special treatment, the observed improvement is considered to be natural. Meanwhile, the 9 other children did not show any improvement, which may be due to the learning method applied being insufficiently effective in enhancing the children's abilities, or due to a lack of interest and variation in methods that could stimulate the children's memory and engagement with the vowel letter material.

Table 2 Recapitulation of Pretest and Posttest Results Data for the Experimental Group

					Posttest	
No	Name	Pretest	<b>%</b>	Postest	<b>%</b>	- Pretest
1	ANF	16	80%	19	95%	15%
2	AI	18	90%	20	100%	10%
3	ARPS	13	65%	17	85%	20%
4	ARD	17	85%	19	95%	10%
5	FAE	8	40%	16	80%	40%
6	GYW	14	70%	16	80%	10%
7	MYA	16	80%	20	100%	20%
8	MIF	18	90%	20	100%	10%
9	RFA	18	90%	20	100%	10%
10	DZP	8	40%	15	75%	35%
11	FBS	15	75%	20	100%	25%
12	NAA	14	70%	18	90%	20%
13	NAPZ	13	65%	18	90%	25%
14	ZQP	13	65%	18	90%	25%
15	QS	9	45%	15	75%	30%
-	Γotal	210	<b>70%</b>	271	90%	20%
Average		14		18,07		

Based on the table above, it can be observed that all children in the experimental group experienced an improvement in learning outcomes. Before the intervention, the children's average scores fell within the

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moderate to low category, with a total pre-test score of 210 or 70%. After participating in the learning activities using the vocal bingo game, the post-test score increased to 271 or 90%, reflecting a 20% improvement. This significant score increase in the experimental group indicates the effectiveness of game-based learning methods in helping early childhood learners recognize vowel letters.

The average score increase in the control group was only 0.47, whereas the experimental group achieved an average increase of 4.07. These results are supported by Piaget's theory (as cited in Ginting, 2018), which states that children construct understanding gradually through the processes of assimilation (integrating new information with existing cognitive schemas) and accommodation (adjusting or forming new schemas based on new experiences), and develop through play experiences that align with their cognitive development stages.

In addition to the results presented in the table, a normality test was also conducted using the *Shapiro-Wilk* test, analyzed with SPSS software version 23.

**Table 3 Normality Test Results** 

Tests of Normality

		Kolmogorov-Smirnov <sup>a</sup>		Shapiro-Wilk			
	Kelas	Statistic	df	Sig.	Statistic	df	Sig.
Kemampuan Anak	Pretest Eksperimen	.186	15	.174	.892	15	.071
	Posttest Eksperimen	.183	15	.190	.867	15	.031
	Pretest Kontrol	.245	15	.016	.891	15	.071
	Posttest Kontrol	.235	15	.026	.888	15	.062

a. Lilliefors Significance Correction

Based on the normality test results table, it can be seen that in the *Shapiro-Wilk* column, only the experimental group posttest data is not normally distributed, with a significance value of 0.031 (<0.05).

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Meanwhile, the other three data have a significance value> 0.05 which indicates that the data is normally distributed. From these results it can be concluded that only one of the four data does not meet the normality assumption. Therefore, the data cannot be analyzed using parametric statistics, but rather using non-parametric statistics, namely the *Mann-Whitney* U-Test.

The following are the results of the hypothesis test using nonparametric statistics, namely the Mann-Whitney U Test. The hypotheses tested in this study are:

- Ho: There is no effect of the vocal bingo game on the ability to recognize letters in children aged 4-5 years.
- Ha: There is an effect of the vocal bingo game on the ability to recognize letters in children aged 4-5 years.

**Table 4 Hypothesis Test Results** 

Test Statistics<sup>a</sup>

	Kemampuan Anak
Mann-Whitney ∪	61.000
Wilcoxon W	181.000
Z	-2.162
Asymp. Sig. (2-tailed)	.031
Exact Sig. [2*(1-tailed Sig.)]	.033 <sup>b</sup>

a. Grouping Variable: Kelas

Based on the results of the hypothesis test, a significance value of 0.031 was obtained. (2-tailed). Because the value is <0.05, Ha is accepted and Ho is rejected. Thus, the results of this analysis indicate that the vocal bingo game has an effect on the ability to recognize vowels in children aged 4-5 years.

The vocal bingo game developed in a digital version is designed

b. Not corrected for ties.

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with an attractive visual display, such as bright colors, clear letter images, and animations that can attract children's attention. The presence of strong visualization can make children enthusiastic when the game is displayed. Some children, such as MIF, DZP, GYW, ANF, ARD, and FAE even fought to sit at the front so they could see the game display more clearly. When given an explanation of how to play, they spontaneously mentioned the letters that appeared on the screen. These findings indicate that visuals in digital media can increase children's participation in vowel letter learning activities.

These findings are consistent with Piaget's theory of cognitive development, particularly the preoperational stage (ages 2–7), during which children learn through symbolic ability and concrete visual representation. At this stage, learning media that incorporate visual and auditory elements can help children better understand abstract concepts such as letters (Piaget, 1972). Additionally, Mayer's multimedia learning theory as cited in (Rahayu et al., 2024) supports these findings, suggesting that learning is more effective when information is presented through a combination of visual and verbal channels. The use of visuals in digital media assists children in recognizing letters more easily through dual channels (visual and auditory).

Another finding revealed that most children were able to recall and mention letters along with objects that began with the corresponding vowel quickly, indicating an improvement in letter recognition speed. Moreover, children were observed actively interacting, sharing letters

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with peers, and expressing joy upon getting a "Bingo". These responses demonstrate that the game supports not only cognitive development but also enhances children's social and emotional aspects. High levels of enthusiasm were observed, with some children unwilling to stop playing.

After several treatment sessions, children who were initially shy and confused began to master the vowel bingo game, such as ARPS, GYW, RFA, DZP, NAPZ, and QS, showing fluency and focus. Through repeated learning methods and support from teachers and peers, children gradually overcame these challenges. This reflects Vygotsky's concept of the Zone of Proximal Development (ZPD), which emphasizes the importance of guidance from more competent individuals in enhancing children's understanding.

During the treatment process with the vowel bingo game, children showed gradual progress in recognizing vowel letters. When the teacher asked, "Which letter are you playing right now?", the children could accurately respond with the corresponding vowel, such as "a" or "i". When asked to name an object from the bingo box beginning with that letter, they responded with words like "atap" (roof), "air" (water), or "ibu" (mother). This indicates that the children not only recognized vowel letters but also associated them with the initial sounds of words. These accurate responses demonstrate that the vowel bingo game can stimulate phonological development and expand children's vocabulary. According to Piaget as cited in (Hijriati, 2017), children aged 4–5 years

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are in the preoperational stage, during which they begin to use symbols to represent objects, including letters and sounds. Through vowel bingo games, children can learn vowel letters with the aid of easily understood symbols and images, making it easier for them to imagine and grasp letter concepts.

During the bingo game sessions, children were called one by one to play at the front of the class. To avoid passive behavior and maintain the engagement of those waiting for their turn, the teacher provided worksheets and simple projects. These activities served to fill the gap and prevent idle time in class. The use of these activities in between the main sessions reflects a classroom management strategy aimed at maintaining focus and participation. This aligns with Uno's view (as cited in Suwandayani, 2018), which states that structured learning activities help minimize disruptions during teaching and learning processes and enhance overall instructional effectiveness.

Based on observations during the treatment, children showed high interest in letter-based play using the vowel bingo game. This interest emerged because traditional classroom instruction tends to be monotonous, relying heavily on worksheets without incorporating interactive, especially digital-based, games. This is supported by the classroom teacher's opinion, who noted that interactive learning methods are more motivating for children compared to conventional approaches such as writing or memorization. These findings are consistent with research by (Otoyo et al., 2024), which stated that the

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use of interactive games is an effective innovation for increasing learning motivation in early childhood education. Through this approach, what was previously monotonous learning becomes more engaging, participatory, and child-centered.

However, the implementation of this media also presented some challenges. One of them was children's difficulty in operating digital devices such as laptops, due to the lack of exposure to technology in the school environment. Therefore, improving supporting facilities and familiarizing children with digital devices are essential to ensure the smooth integration of technology-based learning. Another implication of this study is the importance of parental involvement in supporting children's learning at home. Collaboration between teachers, schools, and parents is expected to strengthen the effectiveness of game-based learning such as vocal bingo games.

Overall, this study confirms that the vocal bingo game has a positive effect on the ability to recognize vowels in children aged 4-5 years. A significant increase was seen from the pre-test and post-test scores of the experimental group. This high enthusiasm contributed to increasing children's understanding of vowels, so that learning objectives could be achieved more effectively.

#### Conclusion

Based on the research findings, it can be concluded that the vocal bingo game has a significant effect on improving the ability of children aged 4–5 years to recognize vowel letters. The data analysis results

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indicate a significant difference between the experimental group, which received treatment using the vocal bingo game, and the control group, which underwent conventional learning.

The results of the Mann-Whitney U-Test showed a significance value (2-tailed) of 0.031 < 0.05. This indicates that the vocal bingo game is proven to be effective in enhancing vowel recognition skills in children aged 4–5 years. Furthermore, the average increase in pretest and post-test scores in the experimental group reached 4.07, while in the control group it was only 0.47. This difference demonstrates that game-based learning is more effective than conventional methods.

Several recommendations are proposed to improve the effectiveness of early childhood education. Teachers are encouraged to adopt game-based learning methods, particularly the vocal bingo game, in classroom activities to enhance children's interest and motivation in learning vowel letters. Additionally, teachers should provide more guidance to children with low self-confidence to help them actively participate in the game.

Educational institutions are expected to support the use of innovative learning methods by providing facilities and training for teachers in developing educational games. Future research could expand on this study by examining the effectiveness of the vocal bingo game in enhancing other skills, such as speaking and listening abilities, in early childhood education.

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