

THE EFFECTIVENESS OF SPELLING PUZZLES ON SYMBOLIC THINKING AND EARLY READING SKILLS OF CHILDREN AGED 5–6 YEARS

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ABSTRACT

This study aims to: (1) examine differences in symbolic thinking abilities among children aged 5–6 years between schools that have implemented spelling puzzles for 2 years and those that have implemented them for 5 years; and (2) examine differences in early reading skills among children aged 5–6 years between these schools. This study employed a quantitative method with an ex post facto research design. The population consisted of children aged 5–6 years enrolled in kindergartens in Widodaren District, with a sample of 126 children selected through purposive sampling. Data were collected using questionnaires and analyzed using the Independent Sample T-Test. The results showed that there are differences in symbolic thinking abilities and early reading skills between children in schools with different durations of spelling puzzle implementation. Children in schools that have implemented spelling puzzles for a longer period demonstrated better symbolic thinking and early reading skills. These findings indicate that spelling puzzles are effective in supporting children’s cognitive and early literacy development. These results imply that spelling puzzles can be used as an effective learning medium by teachers to stimulate symbolic thinking and early reading skills in early childhood education.

Keywords: *Spelling Puzzle; Symbolic Thinking; Beginning Reading; Children Aged 5-6 Years Old*

INTRODUCTION

Education plays a strategic role in improving the quality of life; therefore, it needs to be continuously enhanced. The implementation of education consists of three forms, namely formal, non-formal, and informal education. Education for children in the early stages of development is carried out through Early Childhood Education (ECE). Early Childhood Education (ECE) is intended for children aged 0–8 years based on the provisions of the National Association for the Education of Young Children (NAEYC) (Talango, 2020).

The implementation of ECE in Indonesia is regulated in the Regulation of the Minister of Education and Culture Number 146 of 2014 Article 1, which explains that

ECE is an effort to provide guidance and stimulation for children aged 0–6 years to support their optimal growth and development (Muanifah, 2024). Furthermore, the latest regulation stipulated in the Regulation of the Minister of Education, Culture, Research, and Technology Number 8 of 2024 concerning Content Standards for Early Childhood Education, Primary Education, and Secondary Education serves as the most recent reference for the ECE curriculum and replaces previous regulations (Kemendikbudristek, 2024).

ECE is an important aspect in supporting stimulation for children. This period is characterized by rapid brain growth and development. Brain development at this stage greatly influences children's behavior, learning abilities, and emotional development throughout their lives (Morales-quezada et al., 2024). The most rapid brain development occurs during the golden age, in which approximately 80% of brain development takes place between the ages of 0–6 years (Yin et al., 2025). Therefore, providing stimulation during this golden period must be optimized.

The stimulation provided by ECE institutions is equally important and should be prioritized in children's education, in addition to stimulation provided within the family environment. ECE contributes significantly to improving intelligence, language skills, academic readiness, and children's future academic achievement (Suchodoletz et al., 2023). The ECE environment should be designed as a learning space integrated with play activities to optimize children's learning experiences (Shen et al., 2020).

The implementation of ECE is conducted through several pathways, namely formal pathways such as Kindergarten (TK), Raudhatul Athfal (RA), or Bustanul Athfal (BA). Non-formal pathways include Daycare Centers (TPA), Playgroups (KB), and other equivalent ECE units (SPS), which can be integrated with community-based ECE programs such as Posyandu, Bina Keluarga Balita, Taman Pendidikan Al-Qur'an (TPA/TPQ), and other similar services (Rizqiyatunnisa & Mahdi, 2021).

ECE institutions, particularly kindergartens, can utilize various play media to stimulate children's development. Play media in kindergarten should be able to stimulate various developmental aspects, including religious and moral values, cognitive development, language, social-emotional skills, physical-motor skills, and art (Kusbiantari et al., 2023).

The National Education Association (NEA) states that media serves as a tool that can be used, heard, seen, or utilized in teaching and learning activities, and is supported by additional components to optimize its use, thereby enhancing learning effectiveness (Daniyati et al., 2023).

One of the commonly used play media in kindergarten is puzzles. Puzzle games can optimize the abilities and intelligence of early childhood learners (Mulyaningsih & Palangngan, 2020). In kindergarten, puzzles are widely used to stimulate children's cognitive and language development. Types of puzzles vary, including spelling puzzles, jigsaw puzzles, the thing puzzles, letter readiness puzzles, and crossword puzzles (Suratiningsih, 2021).

One type of puzzle widely used in kindergarten is the spelling puzzle. A spelling puzzle is a game that combines images with letters arranged randomly, which children must organize into correct words (Febrianti et al., 2025). This media helps children recognize letters and images and functions as an educational play tool beneficial for children's development. The use of spelling puzzles can improve children's cognitive and language abilities (Hasanah, 2023). Learning media acts as

a bridge for children to optimize their development; therefore, spelling puzzles are often used as an alternative to support children's cognitive and language development.

Cognitive function supports children's readiness to face thinking demands at the next stage of development. One function of cognitive stimulation is to develop symbolic thinking abilities. Piaget stated that the development of symbolic thinking is divided into several stages: sensorimotor, preoperational, concrete operational, and formal operational stages (Laini et al., 2024). Children in the golden age demonstrate symbolic thinking abilities through understanding and expressing symbols of numbers and letters, as well as through artworks that represent real and imaginary objects (Scalise & Ramani, 2021). The aspects of symbolic thinking in children aged 5–6 years include the use of number symbols 1–20, vowel and consonant letter symbols, and the ability to represent various objects and images (Aisyah, 2021). Symbolic thinking abilities influence how children count, understand symbols, and imitate numbers and letters through imagination, which impacts their readiness and success in early literacy and numeracy learning.

Symbolic thinking ability is also related to children's language development. Vygotsky stated that language, as a psychological tool, functions to regulate behavior, plan actions, remember information, and solve problems (Etnawati, 2021). One language ability that can be developed through spelling puzzles is early reading. Early reading ability in kindergarten children is part of language development, characterized by recognizing letters, understanding the relationship between letters and sounds, and the ability to read words (Ganarsih et al., 2022).

The early reading stage involves children's ability to recognize reading direction, understand the relationship between letters and sounds, and read simple written language forms (Ritonga & Fathiyah, 2023). Early reading in group B children is characterized by the ability to mention letter sound symbols, form syllables, read words, and construct simple sentences (A. W. Handayani et al., 2022). Jeanne S. Chall proposed six stages of reading: (1) stage 0 or pre-reading (pseudo reading); (2) stage 1 initial reading and decoding; (3) stage 2 confirmation and fluency; (4) stage 3 reading to learn new things; (5) stage 4 multiple viewpoints; and (6) stage 5 construction and reconstruction (Mansoer & Suslih, 2024). Early reading ability can enhance children's literacy and serve as a bridge for them to read more fluently in the future.

Learning reading, writing, and arithmetic can improve other developmental aspects, so teachers and parents often compete in guiding children to master these skills. There are two approaches to teaching reading, writing, and arithmetic: using only paper and pencil or through a play-based approach. Learning reading, writing, and arithmetic is allowed in ECE but must be implemented through play activities. The application of calistung learning that is not aligned with early childhood characteristics can have negative impacts, such as children becoming bored, disruptive, and reluctant to learn reading, writing, and arithmetic (Apriyanti & Aprianti, 2023). This condition can hinder children's optimal learning processes.

Children are said to have good cognitive development if they are able to understand and differentiate letter symbols and consonant sounds (Th et al., 2023). Conversely, calistung learning that relies solely on paper and pencil tends to make children bored quickly and experience delays in recognizing various letter forms and advanced consonant sounds. Based on neuroscience-based learning, the outer part

of the brain responsible for critical and creative thinking during the golden age has not yet fully developed, so children are not able to respond well to abstract stimuli (Aji & Hidayat, 2023). In line with this, conventional learning of reading, writing, and arithmetic that only relies on paper and pencil with minimal use of puzzle media or other learning tools is not recommended in ECE.

Several studies have examined the use of spelling puzzles as a medium to stimulate symbolic thinking and early reading abilities. Based on the findings of Lasuka (2023), spelling puzzle media is effective in developing visual-spatial intelligence and mathematical logic in early childhood (Lasuka, 2023). Empirical support for this finding is shown by research conducted by Hariandja and Fatmawati (2021), which used spelling puzzles to stimulate early reading abilities in children with dyslexia (Hariandja & Fatmawati, 2021). Furthermore, research by Jihanifa, Putri, and Indriyani (2022) found that spelling puzzles contribute to improving language literacy among first-grade elementary school students at SD Loram Kulon (Jihanifa et al., 2022). Referring to these research findings, spelling puzzle media, which is widely used in ECE, can help and facilitate children in improving symbolic thinking and early reading abilities. Although various studies have examined the use of spelling puzzles as a learning medium in Early Childhood Education, most studies focus on the effect of media use on improving early reading ability, language literacy, or children's visual-spatial intelligence.

Previous studies indicate that repeated and continuous learning experiences play a significant role in enhancing children's cognitive development. Longitudinal research shows that children's understanding improves over time through repeated exposure to learning activities (Acosta et al., 2024). In addition, the use of educational media has been proven to effectively support early literacy development in young children (Acosta et al., 2024). Therefore, longer exposure to learning media is assumed to provide greater opportunities for children to develop symbolic thinking and early reading skills.

However, previous studies mainly focus on the effectiveness of spelling puzzles as a learning medium without considering the duration of their implementation. As a result, it remains unclear whether different durations of use, such as 2 years and 5 years, lead to different outcomes in children's symbolic thinking and early reading development. This lack of evidence creates a gap in understanding the optimal duration of media use in early childhood learning. Without clear evidence regarding duration, teachers may not be able to determine how long learning media should be consistently implemented to achieve optimal developmental outcomes (Windiastuti et al., 2024). Therefore, it is important to examine whether longer exposure to spelling puzzles contributes to more significant improvements in children's symbolic thinking and early reading skills.

These studies generally position spelling puzzles as a learning medium without considering the duration or continuity of media implementation in school learning practices. The use of media over a relatively short period tends not to provide optimal opportunities for children to reach more mature mastery stages (Anis & Fauzan, 2024). Early childhood learning processes themselves involve repetition, habituation, and consistent experiences; therefore, the continuity of media use becomes a determining factor in achieving more optimal understanding (Asmy & Rahimah, 2025). Therefore, comparing the duration of spelling puzzle implementation over 2 years and 5 years is important to examine whether sustained

media use contributes to the quality of children's cognitive development and early literacy. Previous studies have not examined whether different durations of media use in real learning environments produce different developmental outcomes in children. To date, no research has been found comparing the duration of spelling puzzle implementation (2 years vs. 5 years) on symbolic thinking and early reading abilities in children aged 5–6 years. Therefore, this study aims to examine the comparison of the duration of spelling puzzle use in optimizing symbolic thinking and early reading abilities in children aged 5–6 years, particularly between schools that have implemented spelling puzzles for 2 years and those that have implemented them for 5 years. Early childhood learners who only use paper and pencil media tend to experience slower development in early reading skills.

This study also aims to examine the effectiveness of spelling puzzle media in promoting symbolic thinking and early reading abilities in children aged 5–6 years by comparing schools that have implemented the media. Based on observations conducted in ECE institutions in Widodaren District, Ngawi Regency, in March 2024, several kindergartens were found to have consistently used spelling puzzles for two years and five years. The observation results showed that children were able to memorize alphabet letters, arrange letters into syllables, and combine them into appropriate words. In addition, children demonstrated symbolic thinking abilities, such as counting skills, the use of number symbols in counting, recognition of various alphabet and consonant letters, and the ability to match number symbols with corresponding quantities. Students in institutions that have implemented spelling puzzles for approximately five years appeared more accustomed to recognizing letter and number symbols during play activities. Children were able to arrange letters into simple syllables, combine them into words that match pictures, and demonstrate independence in completing tasks with minimal teacher assistance. Additionally, children appeared more active in activities involving matching symbols with quantities during counting. Meanwhile, in institutions that have only implemented spelling puzzles for about two years, children still required teacher guidance in recognizing the relationship between letters and sounds, as well as in arranging letters into words. Some children still attempted to match letters randomly and had not fully understood the meaning of the symbols used. These initial observations indicate differences in children's developmental outcomes, which are presumed to be related to the duration of media use in learning. Based on the existing research gap and field observations, an empirical study is needed to analyze the comparison of the duration of spelling puzzle use in optimizing symbolic thinking and early reading abilities in children aged 5–6 years. This study is expected to provide insights for teachers in determining the optimal duration of learning media use in early childhood education.

METHODS

This study employed a quantitative method, which is an approach that examines social problems by testing theories through variables measured with numerical data and analyzed using statistical procedures to verify theoretical predictions (Ali et al., 2022). This quantitative research used an *ex post facto* design. The *ex post facto* approach is a research method that examines variables that have already occurred in the past; therefore, the study is conducted by observing existing variables without researcher intervention (Afandi & Nashiroh, 2020). The study

examined a comparison of the use of spelling puzzles in schools that have implemented them for 2 years and 5 years. The research design is as follows:

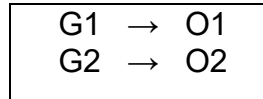


Figure 1. Research Design for Comparing the Use of Spelling Puzzle

Description:

G1 = Group with 2-year duration of use

G2 = Group with 5-year duration of use

O1 = Measurement results of group 1

O2 = Measurement results of group 2

(Analysis: O1 compared with O2)

The study was conducted from May to June 2025. Data collection was carried out during learning activities in each ECE institution included in the research sample. The research data were collected using questionnaires completed by classroom teachers. This study adhered to ethical research standards. Permission was obtained from the respective school authorities, and informed consent was secured from the children's parents or guardians prior to data collection. The confidentiality of participants' data was also maintained. The research instrument was developed based on indicators of symbolic thinking ability and early reading skills in children aged 5–6 years. The indicators of symbolic thinking included the ability to use number symbols (1–20), recognize vowel and consonant letter symbols, and represent various objects and images (Aisyah, 2021; Novianti Yusuf, Wahyu Widiana, Masroh, & Rakeyan Santang, 2023; Nena, Ita, & Dua Dhiu, 2022). Meanwhile, the indicators of early reading skills included the ability to identify letter-sound symbols, form syllables, read words, and construct simple sentences (Handayani, 2022; Sumardi & Haryanto, 2017). The instrument items were measured using a Likert scale adapted for early childhood assessment, ranging from 1 (not yet developed) to 4 (very well developed).

Before being used, the instrument was tested for content validity through expert judgment involving two early childhood education experts and 20 teacher respondents. The experts evaluated the relevance and clarity of each item based on the defined indicators, and revisions were made according to their suggestions before the instrument was administered.

The population of this study consisted of kindergarten (TK/RA) students aged 5–6 years in Widodaren District who participated in learning activities using spelling puzzle media. The population in Widodaren District consisted of 39 kindergartens (TK) and 10 *Raudhatul Athfal* (RA).

The sample was selected from the population using purposive sampling techniques, considering specific criteria for the research subjects to align with the study objectives (Santina et al., 2021). The sample used in this study consisted of 6 schools in Widodaren District with a total of 126 students (Table 1), who met the following criteria:

- a. The selection of Early Childhood Education (ECE) institutions was based on the use of spelling puzzle media as an active learning tool in the classroom.

- b. Spelling puzzle media had been used in the institutions and implemented for two years and five years.
- c. The research sample consisted of children aged 5–6 years.

Data analysis techniques were conducted using SPSS version 22. The data obtained were tested for normality using the Kolmogorov-Smirnov test, and hypothesis testing was conducted using the Independent Samples t-test with a significance level of 0.05.

This study has limitations in terms of internal validity due to the use of an ex post facto design without experimental manipulation. Therefore, the findings indicate differences between groups rather than definitive causal relationships.

Table 1. Sample Distribution List

No	School Name	Duration of Spelling Puzzle Use	Number of Children
1.	RA Ar-Rahman	2 Years	24
2.	TK Santa Maria	2 Years	8
3.	TK Islam Amanah	2 Years	13
4.	TK Tunas Rimba	5 Years	18
5.	TK Islam An-Nur	5 Years	40
6.	TK Negeri Pembina	5 Years	23
Total			126

RESULTS AND DISCUSSION

The discussion is divided into two sections based on the research variables: symbolic thinking and early reading. The results and discussion present hypothesis testing that examines the comparison between schools that have used spelling puzzles for 2 years and 5 years. The data presented in this study include grouped distribution data, normality tests, hypothesis testing, and descriptive statistics, followed by references to support the results and discussion. The following are the results of the discussion examined.

1. Differences in Symbolic Thinking Ability between Schools that Implemented Spelling Puzzle for 2 Years and 5 Years.

Based on the research results, Tables 2 and 3 showing the distribution of children's symbolic thinking ability scores using spelling puzzle media for 2 years and 5 years indicate differences in developmental outcomes. In schools that have used spelling puzzles for 2 years, the score distribution is still quite varied and predominantly falls within the moderate category. In contrast, in the 5-year usage group, the scores are more concentrated in the medium to high range, indicating more optimal development of symbolic thinking.

Table 2. Grouped Distribution Data of Spelling Puzzle Use for 2 Years (Symbolic Thinking)

No	Score Range	Frequency	Cumulative Percent
1.	18-21	2	3.5
2.	22-25	5	12.3
3.	26-29	8	26.3
4.	30-33	15	52.6
5.	34-37	18	84.2
6.	38-41	9	100.0
	Total	57	

Table 3. Grouped Distribution Data of Spelling Puzzle Use for 5 Years (Symbolic Thinking)

No	Score Range	Frequency	Cumulative Percent
1.	25-27	3	4.3
2.	28-30	9	17.4
3.	31-33	17	42.0
4.	34-36	20	71.0
5.	37-39	14	91.3
6.	40-42	6	100.0
	Total	69	

The data were then processed to test the hypothesis. Prior to hypothesis testing, prerequisite analysis tests were conducted, namely the normality test, to ensure whether the data were normally distributed. The normality test was carried out using the Kolmogorov–Smirnov test with the assistance of SPSS version 22, as presented in Table 4. The results of the normality test indicate that:

- a) The 2-year usage group has a significance value of 0.072.
- b) The 5-year usage group has a significance value of 0.200.

Table 4. Normality Test of Symbolic Thinking

Test of Normality				
Kolomogorov-Smornov				
Symbolic Thinking	Group	Statistic	df	Sig.
	2 Years	0,112	57	0,072
	5 Years	0,077	69	0,200

Both values are greater than 0.05, indicating that the data are normally distributed; therefore, the analysis can be continued using the Independent Samples t-test. The data were tested using the Independent Samples t-test to determine

whether there is a difference in symbolic thinking ability between the two groups, as presented in Table 5. The analysis results show that:

- a) t-value ($t_{\text{calculated}}$) = 2.422
- b) Significance (2-tailed) = 0.017 < 0.05

Table 5. Independent Samples t-Test of Symbolic Thinking

		Independent Samples Test				
		t	df	Sig (2-tailed)	t-test for Equality of Means	
					Mean Difference	Std. Error Difference
Results of Symbolic Thinking	Equal variances assumed	2.422	124	0,017	1.950	0,805
	Equal variances not assumed	2.343	97.190	0,021	1.950	0,832

The table shows that the significance value is less than 0.05; therefore, H_0 is rejected and H_1 is accepted, indicating that there is a significant difference between children who have used spelling puzzles for 2 years and those who have used them for 5 years. This is further supported by descriptive statistics presented in Table 6. Table 6 descriptively shows:

- a. The mean of the 5-year group = 34.07
- b. The mean of the 2-year group = 32.12
- c. The mean difference = 1.95 points

Table 6. Descriptive Statistics of the Symbolic Thinking Variable Groups

Group Statistic					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Hasil Berfikir Simbolik	5 Tahun	69	34.07	3.703	0,446
	2 Tahun	57	32.12	5.305	0,703

These findings are further supported by the present study, which indicates that children in schools that have implemented spelling puzzle media for a longer duration demonstrate better symbolic thinking abilities compared to those in schools with shorter implementation periods. This finding suggests that continuous and repeated exposure to learning media provides children with more opportunities to recognize, understand, and use symbols such as numbers and letters. Through consistent interaction with the media, children are able to gradually develop their ability to represent objects, quantities, and concepts symbolically.

These findings are in line with Jean Piaget's theory of cognitive development, which states that children aged 5–6 years are in the preoperational stage, where symbolic abilities develop through representational activities such as playing with letters, images, and language (Kotrunnada et al., 2025). Activities involving arranging spelling puzzles help children transform concrete experiences into more abstract representations and begin to understand symbols. In addition, spelling puzzles function as a mediating tool that enables children to learn through interaction with teachers and the learning environment, allowing symbolic thinking abilities to develop through the process of scaffolding, as proposed by Lev Vygotsky (Janaris et al., 2024).

Furthermore, the effectiveness of longer implementation may also be influenced by teachers' accumulated experience in using the spelling puzzle media. Teachers who have used the media for an extended period are more likely to provide appropriate guidance, modeling, and scaffolding during learning activities (Suryani et al., 2023). This support helps children connect concrete experiences with symbolic representations, thereby enhancing their symbolic thinking abilities more optimally.

These findings are supported by previous studies showing that spelling puzzle media contributes to improvements in visual-spatial intelligence and mathematical logic, which are components of symbolic thinking ability (Lasuka, 2023). In addition, other studies have found that puzzle-based learning has a positive impact on enhancing symbolic thinking in early childhood (Natari & Suryana, 2021).

Although the findings of this study indicate that longer exposure to spelling puzzle media leads to better symbolic thinking development, some previous studies suggest that the effectiveness of learning media is not solely determined by duration, but also by the quality of implementation, teacher involvement, and the learning environment. However, the results of this study emphasize that sustained and repeated exposure over a longer period allows children to internalize symbolic representations more effectively. From a learning theory perspective, repetition and continuous stimulation strengthen cognitive structures and support the transition from concrete to abstract thinking. In addition, from a neurodevelopmental perspective, repeated learning experiences contribute to the strengthening of neural connections related to symbolic processing (Gao, 2025).

This study concludes that schools that have used spelling puzzles for 5 years achieve higher scores compared to those that have used them for 2 years in developing children's symbolic thinking abilities. This finding highlights the importance of sustained and consistent use of learning media in supporting children's cognitive development.

2. Differences in Early Reading Ability between Schools that Implemented Spelling Puzzle for 2 Years and 5 Years

The analysis of symbolic thinking ability is followed by an examination of children's language development, particularly early reading ability in groups from schools with different durations of spelling puzzle implementation, namely 2 years and 5 years. Tables 7 and 8 present the distribution of early reading scores of children aged 5–6 years in both groups. Based on the distribution, there is a noticeable difference in early reading development outcomes between the two

groups. In schools that have used spelling puzzles for 2 years, most children are still in the low to moderate category. Approximately 59.6% of children fall within the score range of 17–25, indicating that their early reading ability is still in the developing stage. In contrast, in the 5-year usage group, most scores are concentrated in the moderate to high category, with around 65.2% of children achieving scores above 24. This indicates that the longer spelling puzzle media is used consistently, the better the development of children's early reading ability.

Table 7. Grouped Distribution Data of Spelling Puzzle Use for 2 Years (Early Reading)

No	Score Range	Frequency	Cumulative Percent
1.	17-19	4	7.0
2.	20-22	18	38.6
3.	23-25	12	59.6
4.	26-28	12	80.7
5.	29-31	8	94.7
6.	32-34	3	100.0
	Total	69	

Table 8. Grouped Distribution Data of Spelling Puzzle Use for 5 Years (Early Reading)

No	Rentang Score	Frequency	Cumulative Percent
1.	18-19	3	4.3
2.	20-21	5	11.6
3.	22-23	12	29.0
4.	24-25	10	43.5
5.	26-27	15	62.2
6.	28-29	9	78.3
7.	30-31	11	94.2
8.	32-33	4	100.0
	Total	69	

The data were then tested for hypotheses to determine differences in children's early reading abilities. Before conducting hypothesis testing, the data were tested for normality using the Kolmogorov–Smirnov test to ensure that the data were normally distributed. The results of this test are presented in Table 9. The results show that:

- a. The 2-year group has a significance value of 0.187
- b. The 5-year group has a significance value of 0.067

Table 9. Normality Test of Early Reading

Test of Normality				
Kolomogorov-Smornov				
Early Reading	Group	Statistic	df	Sig.
	2 Years	0,105	57	0,187
	5 Years	0,103	69	0,067

The data were then tested using a parametric hypothesis test, namely the Independent Samples t-test. The hypothesis testing was conducted to determine whether there is a significant difference between the two groups, and the results are presented in Table 8. The analysis results show that:

- a. The calculated t-value = 2.594
- b. Significance = 0.011 < 0.05

The hypothesis results indicate that H_0 is rejected and H_1 is accepted, meaning that there is a significant difference in early reading ability between children who have used spelling puzzles for 2 years and those who have used them for 5 years. The mean difference of 1.778 points shows that the group with a longer duration of use achieved higher outcomes.

Table 8. Independent Samples t-Test of Early Reading

Independent Samples Test						
		t-test for Equality of Means				
		t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference
Early Reading Results	Equal variances assumed	2.594	124	0,011	1.778	0,658
	Equal variances not assumed	2.573	115.323	0,011	1.778	0,691

The results of the hypothesis are further supported by the descriptive statistics in Table 9, which show that schools that have actively implemented spelling puzzles for 5 years have an average score of 26.30, while schools that have used spelling puzzles for 2 years have an average score of 24.53. This indicates that the intensity and continuity of using learning media contribute to the improvement of children’s early reading abilities.

Table 9. Descriptive Statistics of the Early Reading Variable Groups

	Group Statistic				
	Group	N	Mean	Std. Deviation	Std. Error Mean
Early Reading Results	5 Years	69	26.30	3.863	0,443
	2 Years	57	24.53	4.000	0,530

These findings are further supported by the present study, which indicates that children in schools that have implemented spelling puzzle media for a longer duration demonstrate better early reading abilities compared to those in schools with shorter implementation periods. This suggests that continuous and repeated exposure to learning media provides children with more opportunities to develop letter recognition, phonological awareness, and word formation skills. Through consistent interaction with spelling puzzle activities, children gradually improve their ability to decode and read simple words.

These findings can be explained through the cognitive development perspective of Jean Piaget, who stated that preschool children learn most effectively through concrete and manipulative activities (Anggrian & Saefurahman, 2025). Spelling puzzle activities involve direct manipulation of letters, allowing children to experience the process of recognizing language symbols in a concrete manner. This repeated hands-on experience helps children gradually build an understanding of letter forms, sequences, and word construction.

Furthermore, the effectiveness of longer implementation may also be influenced by teachers' accumulated experience in facilitating spelling puzzle activities. Teachers who have used the media for an extended period are more likely to provide effective guidance, pronunciation modeling, and scaffolding during learning (Darling-hammond et al., 2021). This instructional support helps children understand letter–sound relationships and assists them in constructing words, enabling them to perform reading tasks that they were previously unable to accomplish independently (Anisah, 2024).

In line with Vygotsky's sociocultural theory, early literacy development occurs through interaction and guidance from more knowledgeable others (Kusuma et al., 2025). The scaffolding provided by teachers during spelling puzzle activities supports children in developing reading skills beyond their initial capabilities. This finding is also consistent with learning theories that emphasize repetition and continuous practice as key factors in strengthening early literacy development (Hwang & Cabell, 2021).

These findings are supported by previous studies showing that spelling puzzle media can improve word reading skills and serve as an effective learning tool for children, including those with learning difficulties (Z & Samawi, 2016; Rahmawati & Muhroji, 2024).

In contrast, some studies have found that early reading ability can develop rapidly even within a shorter duration when supported by intensive instruction and structured literacy programs. This suggests that duration is not the only determining factor in reading development. However, the results of this study

emphasize that longer and consistent exposure provides children with more opportunities for repeated practice, which plays a crucial role in strengthening memory and language processing skills essential for early reading development (Hwang & Cabell, 2021).

The differences in outcomes between the two groups indicate that the duration of consistent literacy stimulation plays an important role in developing children's early reading abilities. Longer exposure to learning media provides more opportunities for repeated practice, which supports the gradual development of children's literacy skills.

PRACTICAL IMPLICATIONS

1. The continuous use of literacy media such as spelling puzzles can stimulate the development of symbolic thinking while supporting children's early reading abilities.
2. Learning activities through spelling puzzles help children recognize letter symbols, connect letters with images, and gradually understand meaning.
3. Active teacher guidance (pronouncing letters, encouraging reading, providing examples of symbol use) is essential for optimizing the development of symbolic thinking and early reading skills.
4. Literacy programs in Early Childhood Education (ECE) need to be designed as long-term processes to strengthen the foundation of symbolic thinking, which underlies children's readiness to read.

RESEARCH LIMITATIONS

1. The study only compares the duration of media use and has not examined other factors such as the family environment or teaching methods, which may also influence symbolic thinking and early reading abilities.
2. The comparative design has not fully controlled for external variables that may affect the development of symbolic thinking and early reading in children aged 5–6 years.
3. The sample is limited to the selected schools, so the findings cannot yet be generalized broadly.
4. The data focus on quantitative results; therefore, the developmental processes of children during the use of the media are not described in depth.

CONCLUSION

This study aims to examine the differences in symbolic thinking and early reading abilities of children aged 5–6 years in schools that have implemented spelling puzzle media for different durations, namely 2 years and 5 years. Based on the results of statistical data analysis, it was found that there is a significant difference between the two groups. Children in schools that have used spelling puzzles for 5 years demonstrate higher levels of symbolic thinking and early reading abilities compared to those in schools that have only implemented the media for 2 years.

These findings indicate that the duration of learning media implementation contributes to the quality of stimulation provided in the learning process. Longer and more consistent use of learning media allows for repeated practice and stronger reinforcement, which positively supports the development of children's symbolic thinking and early reading abilities.

This study contributes to the existing literature by highlighting the importance of the duration of learning media use in early childhood education, particularly in supporting cognitive and early literacy development.

The findings also provide practical implications for early childhood educators, suggesting that not only the type of learning media but also the duration and consistency of its implementation should be carefully considered to achieve optimal developmental outcomes in children.

RECOMMENDATIONS

For future research, it is recommended to use different research designs to examine the effects of media use more comprehensively and to consider other variables, such as teaching strategies, learning environments, and the intensity of media use. In addition, future studies may incorporate qualitative approaches so that the process of media implementation in learning can be described more comprehensively.

REFERENCES

- Acosta, Y., Alsina, Á., & Pincheira, N. (2024). Computational thinking and repetition patterns in early childhood education: Longitudinal analysis of representation and justification. *Education and Information Technologies*, 29(6), 7633–7658. <https://doi.org/10.1007/s10639-023-12051-6>
- Afandi, M., & Nashiroh, P. K. (2020). Pengaruh Penggunaan Smartphone Terhadap Prestasi Belajar Siswa Kelas XI MIPA SMAN 10 Semarang. *Jurnal Pendidikan*, 8(1), 43–51.
- Aisyah, H. N. (2021). Identifikasi Kemampuan Berpikir Simbolik Anak Usia 5-6 Tahun. *Jurnal Pendidikan Anak*, 10(1), 42–49.
- Aji, D., & Hidayat, J. (2023). Problematika Pembelajaran Calistung Pada Anak Usia Dini. *Journal Fascho: Jurusan Pendidikan Islam*, 1(2), 1–11.
- Ali, M. M., Hariyati, T., Pratiwi, M. Y., & Afifah, S. (2022). Metodologi Penelitian Kuantitatif Dan Penerapan Nya Dalam Penelitian. *Education Journal*, 2(2).
- Anggrian, M., & Saefurahman, I. M. (2025). Teori perkembangan kognitif piaget dan implementasinya dalam pembelajaran di paud. *RECQA : Research Early Childhood Qurrota A'yun*, 2(01), 1–11.
- Anis, M., & Fauzan, A. (2024). Ulumuddin: Jurnal Ilmu-ilmu Keislaman REPETITION IN EDUCATIONAL PSYCHOLOGY : *Ulumuddin: Jurnal Ilmu-Ilmu Keislaman*, 14(2), 295–316.
- Anisah, Z. (2024). Scaffolding As a Language Learning Technique for Early Childhood. *AL HIKMAH: INDONESIAN JOURNAL OF EARLY CHILDHOOD ISLAMIC EDUCATION*, 8(2), 466–479.
- Apriyanti, S., & Aprianti, E. (2023). Dampak penyelenggaraan aktivitas baca, tulis dan hitung (calistung) pada anak usia dini. *CERIA (Cerdas Energik Responsif Inovatif Adaptif)*, 6(4), 399–407.
- Daniyati, A., Saputri, I. B., Wijaya, R., Septiyani, S. A., & Setiawan, U. (2023). Konsep Dasar Media Pembelajaran. *Journal of Student Research (JSR)*, 1(1), 282–294.
- Darling-hammond, L., Flook, L., Cook-harvey, C., Barron, B., Flook, L., Cook-harvey, C., Darling-hammond, L., Flook, L., Cook-harvey, C., & Barron, B. (2021). Implications for educational practice of the science of learning and

-
- development. *Applied Developmental Science*, 24(2), 97–140. <https://doi.org/10.1080/10888691.2018.1537791>
- Etnawati, S. (2021). Teori Vygotsky Tentang Perkembangan Bahasa Anak Usia Dini. *Jurnal Pendidikan*, 22(2), 130–138.
- Febrianti, S. D., Yanti, N. H., Umam, A. K., Jannah, H., & Sa'diyah, H. (2025). PUZZLE ALFABET SEBAGAI MEDIA PEMBELAJARAN EFEKTIF UNTUK MEMBANTU ANAK DISLEKSIA DALAM MENGENAL HURUF ALFABET. *PENDEKAR: Jurnal Pendidikan Berkarakter*, 3(3), 56–68.
- Ganarsih, A. A., Hafidah, R., & Nurjanah, N. E. (2022). Jurnal Kumara Cendekia PROFIL KEMAMPUAN MEMBACA PERMULAAN ANAK USIA 4-5 TAHUN Perkembangan Bahasa Anak 4-5 reseptif , mengekspresikan bahasa , dan kemampuan membaca permulaan dalam penguasaan kode alfabetik pada tahap mengenal huruf. *Jurnal Kumara Cendekia*, 10(3).
- Gao, W. (2025). The Cognitive Logic of Repetition : A Theoretical Analysis of Repetition in Learning and Cognitive Reinforcement. *EWA Publishing*, 113, 93–98. <https://doi.org/10.54254/2753-7048/2025.NS26625>
- Handayani, A. W., Chandra, A., & Sulianto, J. (2022). PERKEMBANGAN BAHASA ANAK USIA 4-5 TAHUN DITINJAU DARI ASPEK FONETIK DAN ASPEK SEMANTIK. *GENERASI EMAS*, 5(1), 1–7.
- Handayani, I. N. (2022). Upaya Meningkatkan Kemampuan Membaca Permulaan Melalui Media Kartu Kata Bergambar pada Anak Usia 5-6 Tahun. *Islamic Early Childhood Education*, 7(2), 116–121.
- Hariandja, K. A., & Fatmawati. (2021). Meningkatkan Kemampuan Membaca Permulaan Menggunakan Media Spelling Puzzle Bagi Anak Disleksia. *Jurnal Penelitian Pendidikan Kebutuhan Khusus*, 9(1), 60–68.
- Hasanah, N. (2023). MENINGKATKAN KEMAMPUAN MENGENAL KATA MELALUI KEGIATAN The objectives of this study are To determine the implementation of efforts to improve word recognition skills of children aged 5 – 6 years through puzzle play activities at TK Ade Irma Suryani Surabaya. *PAUD Teratai*, 12(1), 1–7.
- Hwang, H., & Cabell, S. Q. (2021). Latent profiles of vocabulary and domain knowledge and their relation to listening comprehension in kindergarten. *Journal of Research in Reading*, 44(3), 636–653. <https://doi.org/10.1111/1467-9817.12360>
- Janaris, A., Syamsudduha, S., & Jamilah. (2024). Pengaruh Penerapan Teori Vygotsky Terhadap Hasil Belajar Siswa Sekolah Dasar pada Pembelajaran Ilmu Pengetahuan Alam di Kabupaten Sumbawa Besar. *PINISI JOURNAL OF EDUCATION*, 4(2), 254–261.
- Jihanifa, F. A., Putri, H. K., & Indriyani, F. (2022). EFEKTIVITAS PEMANFAATAN CULTUR SPELLING PUZZLE TERHADAP PENINGKATAN LITERASI BAHASA KELAS 1 SD 1 LORAM KULON. *Jurnal Universitas Muria Kudus*, 2(2).
- Kemendikbudristek. (2024). Peraturan Menteri Pendidikan, Kebudayaan, Riset, dan Teknologi Republik Indonesia Nomor 8 Tahun 2024. In *Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi* (Salinan). PERATURAN MENTERI PENDIDIKAN, KEBUDAYAAN, RISET, DAN TEKNOLOGI REPUBLIK INDONESIA.
- Kotrunnada, S. A., Gandana, G., & Loita, A. (2025). Kognitif Anak dalam Berpikir
-

-
- Simbolik : Studi Deskriptif Tentang Perkembangan Anak Usia 5-6 Tahun. *Murhum: Jurnal Pendidikan Anak Usia Dini*, 6(2), 1553–1561. <https://doi.org/10.37985/murhum.v6i2.1593>
- Kusbiantari, D., Hardiyanti, D., & Mukaromah, I. (2023). Analisis Tingkat Pencapaian Anak Usai 3-4 Tahun pada 6 Aspek Perkembangan AUD di BKB Cerdas Ceria Wonosobo. *Sentra Cendekia*, 4(1), 24–37.
- Kusuma, R. N., Insani, Z. N., Pratiwi, W. Y., & Ali, M. (2025). Penerapan Teori Belajar Sosial Vygotsky dalam Strategi Guru Kurikulum Cambridge Mata Pelajaran Matematika pada Tingkat SMP. *Jurnal Ilmiah Wahana Pendidikan*, 11(7), 144–155.
- Laini, A., Nurhayati, & Dewi, A. C. (2024). JOTE Volume 5 Nomor 3 Tahun 2024 Halaman 150-155 JOURNAL ON TEACHER EDUCATION Research & Learning in Faculty of Education. *Journal Tecaher Education*, 5(3), 150–155.
- Lasuka, M. (2023). PENGEMBANGAN MEDIA PEMBELAJARAN SPELLING PUZZLE UNTUK MENINGKATKAN KECERDASANVISUAL SPASIAL DAN LOGIKA MATEMATIS ANAK USIA DINI. *DIADIK: Jurnal Ilmiah Teknologi Pendidikan*, 13(2), 519–525.
- Mansoer, Z., & Susliah, E. (2024). Peningkatkan Kemampuan Membaca Permulaan Anak Usia 3-4 Tahun Melalui Metode Phonics. *Jurnal Cerlang Pendidikan Anak Usia Dini*, 1(1), 38–48.
- Morales-quezada, L., Farraj, R. H., Shance, S., Bernshtein, D. H., Cohen, S., Mualem, L., Salem, N., & Yehuda, R. R. (2024). Econeurobiology and brain development in children : key factors affecting development , behavioral outcomes , and school interventions. *Frontiers in Public Health*, 12(2), 1–20. <https://doi.org/10.3389/fpubh.2024.1376075>
- Muanifah, A. (2024). MENDIRIKAN PAUD (PENDIDIKAN ANAK USIA DINI) YANG BERKUALITAS. *Cendekia: Jurnal Pendidikan Dan Pengajaran*, 2(5), 385–390.
- Mulyaningsih, E., & Palangngan, S. T. (2020). PENGARUH PERMAINAN PUZZLE TERHADAP KEMAMPUAN MENGENAL LAMBANG BILANGAN PADA ANAK USIA DINI PENDAHULUAN Taman kanak-kanak merupakan lembaga pendidikan yang ditujukan bagi anak- anak usia 4-6 tahun untuk melaksanakan suatu proses pembelajaran agar anak dapa. *Al-Gurfah : Journal of Primary Education*, 1(1), 29–40.
- Natari, R., & Suryana, D. (2021). Penerapan Permainan Edukatif Puzzle untuk Mengembangkan Aspek Kognitif Anak Usia Dini di Masa Pandemi Covid-19. *KINDERGARTEN: Journal of Islamic Early Childhood Education*, 4(2), 245–252. <http://dx.doi.org/10.24014/kjiece.v4i2.13102>
- Nena, M. T., Ita, E., & Dua Dhiu, K. (2022). Upaya Peningkatan Kemampuan Kognitif Aspek Berpikir Simbolik Menggunakan Media Kartu Angka Pada Anak Usia 5-6 Tahun Di Tk St. Clara Wudu Kecamatan Boawae Kabupaten Nagekeo. *Jurnal Citra Pendidikan Anak*, 1(1), 17–26. <https://doi.org/10.38048/jcpa.v1i1.723>
- Novianti Yusuf, R., Wahyu Widiana, Y., Masroh, S., & Rakeyan Santang, S. (2023). Meningkatkan Kemampuan Berpikir Simbolik Anak Pada Anak Usia 5-6 Tahun Melalui Pemanfaatan Media Sate Buah. *Jurnal Plamboyan Edu (JPE)*, 1(2), 124–131.
-

-
- Rahmawati, E., & Muhroji, M. (2024). Pengaruh Media Puzzle Huruf untuk Meningkatkan Kemampuan Membaca Anak Disleksia. *Ideguru: Jurnal Karya Ilmiah Guru*, 9(3), 1408–1413. <https://doi.org/10.51169/ideguru.v9i3.1103>
- Ritonga, F. R., & Fathiyah, K. N. (2023). Kemampuan Membaca Permulaan melalui Penggunaan Media Big Book untuk Anak Usia Dini. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 7(5), 5907–5918. <https://doi.org/10.31004/obsesi.v7i5.4560>
- Rizqiyatunnisa, & Mahdi, N. I. (2021). Penyelenggaraan Paud Formal , Non Formal Dan. *BUHUTS AL-ATHFAL : Jurnal Pendidikan Dan Anak Usia Dini*, 1(1), 61. <file:///C:/Users/USER/Downloads/3242-9690-1-PB.pdf>
- Santina, R. O., Hayati, F., & Oktarina, R. (2021). ANALISIS PERAN ORANGTUA DALAM MENGATASI PERILAKU SIBLING RIVALRY ANAK USIA DINI. *Jurnal Ilmiah Mahasiswa*, 2(1).
- Scalise, N. R., & Ramani, G. B. (2021). Symbolic Magnitude Understanding Predicts Preschoolers ' Later Addition Skills Symbolic Magnitude Understanding Predicts Preschoolers ' Later Addition Skills. *Journal of Cognition and Development*, 22(2), 185–202. <https://doi.org/10.1080/15248372.2021.1888732>
- Shen, J., Wu, H., Reeves, P., Zheng, Y., Ryan, L., & Anderson, D. (2020). The association between teacher leadership and student achievement: A meta-analysis. *Educational Research Review*, 31(August), 100357. <https://doi.org/10.1016/j.edurev.2020.100357>
- Suchodolez, A. Von, Lee, D. S., Id, J. H., Tamang, S., Premachandra, B., & Yoshikawa, H. (2023). Early childhood education and care quality and associations with child outcomes : A meta- analysis. *Plos One*, 18(5), 1–26. <https://doi.org/10.1371/journal.pone.0285985>
- Sumardi, E., & Haryanto. (2017). *PENGEMBANGAN KEMAMPUAN KEAKSARAAN AWAL PADA ANAK USIA 5-6 TAHUN MELALUI BUKU CERITA BUDAYA LOKAL* (R. Rachmadaniar & B. V. Handayani (eds.); Pengembang). KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN.
- Suratiningsih, S. (2021). Puzzle sebagai Solusi Peningkatan Motivasi Belajar Siswa. *At- Tarbawi*, 13(1), 16–27. <https://doi.org/10.32505/tarbawi.v13i1.2710>
- Suryani, I., Dewi, U., Chuma, M. M., Islam, U., & Sumatera, N. (2023). Scaffolding strategies to support english language learning in reading comprehension : A case study. *Child Education Journal*, 5(1), 24–35.
- Talango, S. R. (2020). Konsep Perkembangan Anak Usia Dini. *ECIE : Jurnal Pendidikan Islam Anak Usia Dini*, 01(01), 93–107.
- Th, H. S., Hjaltalin, S. P., & Hermundur, S. (2023). Acta Psychologica Letter-sound knowledge in Icelandic children at the age 6 years-old. *Elsevier*, 237(237), 1–5. <https://doi.org/10.1016/j.actpsy.2023.103953>
- Windiastruti, E., Isnaini, F. N., Untariana, A. F., & History, A. (2024). Efektivitas Penggunaan Media Teknologi dalam Pembelajaran di Jenjang PAUD. *Jurnal Pembelajaran Inovatif*, 07(02), 8–13.
- Yin, W., Li, T., Wu, Z., Hung, S., Hu, D., Gui, Y., Cho, S., Sun, Y., Woodburn, M. A., Wang, L., Li, G., Piven, J., Elison, J. T., Wu, C. W., Zhu, H., Cohen, J. R., Lin, W., Umn, U. N. C., Connectome, B., & Consortium, P. (2025). Charting brain functional development from birth to 6 years of age. *Nature Human*
-

Behavior, 9(2), 1246–1256. <https://doi.org/10.1038/s41562-025-02160-2>
Z, Z. L., & Samawi, A. (2016). Spelling Puzzle dalam Meningkatkan Kemampuan Membaca Kata Siswa Tunagrahita. *ORTOPEDAGOGIA*, 2(1), 17–19.