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THE EFFECT OF WORDWALL MEDIA USING THE FIND THE MATCH FEATURE ON THE SYMBOLIC THINKING ABILITY OF CHILDREN AGED 5-6 YEARS AT KB RESTU ILAHI, POLEWALI MANDA

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ABSTRACT

This study evaluates the impact of Wordwall's "Find the Match" feature on enhancing symbolic thinking abilities in children aged 5-6 years. Symbolic thinking, which is the ability to use symbols (such as letters, numbers, and images) to represent objects and ideas, is a crucial cognitive skill developed during early childhood. The research compares the effectiveness of interactive digital tools, like Wordwall, with traditional teaching methods (such as flashcards) in promoting symbolic thinking. A quasi-experimental design was used, with two groups: the experimental group, which used the Wordwall "Find the Match" feature, and the control group, which used traditional flashcards. The results show that children in the experimental group exhibited significant improvements in symbolic thinking, with increased engagement and motivation compared to the control group. These findings suggest that interactive digital tools can effectively foster cognitive skills in early childhood education. This study contributes to the growing body of literature on the role of educational technology in enhancing learning outcomes for young children. Future research should explore the long-term impact of digital tools and their integration into diverse educational contexts.

Keywords: *Symbolic thinking; Early childhood education; Digital learning tools; Interactive games; Wordwall "Find the Match"*

INTRODUCTION

Early childhood education has become an important topic of discussion in educational literature as understanding of the importance of early learning in children's cognitive development has increased (Ilyas, S. N 2024). Between the ages of 5 and 6, children undergo significant developmental milestones in their ability to engage with symbols. This includes the ability to recognize and use symbols to represent both concrete objects (e.g., letters and numbers representing physical items) and abstract concepts (e.g., conceptualizing the idea of a quantity). These developments are vital for early literacy and numeracy, which are foundational for academic success in later stages of education (Berk, 2013).

Although symbolic thinking is essential for academic development, many children struggle to fully develop these abilities, particularly when traditional teaching methods, such as rote memorization and passive learning through worksheets, are used. These methods may fail to engage children effectively in meaningful learning experiences that promote the development of sym bolic thinking. Therefore, there is an increasing need for innovative educational strategies that can enhance symbolic thinking in early childhood education (Wardani & Suryana, 2021).

One promising solution is the integration of educational technology. Digital learning tools, especially those that incorporate interactive elements, offer an engaging way to foster cognitive development. Interactive games and activities, in particular, provide children with opportunities to practice using symbols in playful, engaging contexts, potentially leading to better retention and understanding. One such digital tool is Wordwall, which offers interactive learning games that encourage symbolic recognition and understanding. Wordwall's "Find the Match" feature, in particular, allows children to match symbols (such as letters or numbers) with their corresponding objects, providing a fun and effective approach to developing symbolic thinking (Yanti et al., 2024; Surya et al., 2024). Games as learning tools can make the learning environment more enjoyable for children. One application that can be used as a learning tool is the Wordwall app, which is a platform that provides free services for teachers to create or develop online learning materials due to its various attractive features, including colour combinations, images, and sound(H, Amriani, S. R 2024).

Despite the growing awareness of the importance of symbolic thinking in early childhood education, many classrooms continue to rely on traditional teaching methods that may not fully engage children in developing this critical cognitive skill. While there is increasing interest in the use of educational technology to enhance cognitive development, empirical evidence supporting the specific effectiveness of interactive digital tools like Wordwall in improving symbolic thinking abilities among children aged 5-6 years is limited. Additionally, most existing studies tend to focus on broader educational outcomes, such as literacy and numeracy, with insufficient focus on the specific features of tools like Wordwall's "Find the Match," which could target symbolic thinking in a more precise and measurable way.

The primary problem this study aims to address is whether the integration of

an interactive digital tool, specifically the Wordwall "Find the Match" feature, can positively influence the development of symbolic thinking in young children. The gap in the existing literature represents an opportunity to explore how technology can be effectively incorporated into early childhood education to promote cognitive skills, particularly symbolic thinking.

To address the challenges outlined above, one potential solution is to integrate interactive digital tools like Wordwall into early childhood education settings. Educational platforms like Wordwall offer engaging, game-based learning experiences that can captivate children's attention and immerse them in tasks that require them to recognize, understand, and use symbols. The specific solution explored in this study involves assessing the impact of the "Find the Match" feature of Wordwall on children's symbolic thinking abilities. This feature encourages children to match symbols, such as letters or numbers, with corresponding objects or quantities, providing a hands-on, interactive approach to learning about symbols and their meanings. By comparing the outcomes of children who engage with this tool versus those who experience traditional forms of instruction (e.g., using flashcards), the study aims to determine whether digital tools like Wordwall can enhance symbolic thinking in young children.

Research on symbolic thinking in early childhood dates back to the work of Piaget and Vygotsky, who both emphasized the importance of symbols in cognitive development. Piaget's theory of cognitive development suggests that children move through various stages, including the preoperational stage (ages 2-7), during which they begin using symbols to represent objects and events. This ability to think symbolically, according to Piaget, is fundamental for later cognitive development. Vygotsky, too, highlighted the role of symbols, asserting that children learn through social interactions and symbolic play, which fosters cognitive development and problem-solving skills (Vygotsky, 1978).

In the context of early childhood education, symbolic thinking is closely linked to the development of language and literacy skills. Children who develop strong symbolic thinking skills are more likely to excel in reading and writing, as these skills require an understanding of symbols and their meanings (Berk, 2013). Symbolic thinking is also critical for developing mathematical skills, as children start associating numbers with quantities and understanding abstract concepts such as addition and subtraction.

Recent studies have explored the role of digital tools in enhancing cognitive development in young children. Several studies have shown that interactive digital games can improve children's ability to recognize symbols, develop early literacy skills, and engage in mathematical thinking (Zhao et al., 2019; Yanti et al., 2024). Platforms like Wordwall have gained popularity due to their ability to combine fun with learning, motivating children to actively participate in educational activities.

However, limited research exists on the specific impact of Wordwall's interactive features, such as "Find the Match," on enhancing symbolic thinking. This gap in the literature presents an opportunity for further investigation into how such tools can specifically target symbolic thinking and improve children's understanding of symbols and their meanings.

While the benefits of educational technology in early childhood education are well-established, research on the specific impact of interactive tools, such as Wordwall's "Find the Match" feature, on symbolic thinking remains scarce. Existing studies primarily focus on broader cognitive skills such as literacy and numeracy, with little attention given to symbolic thinking. Moreover, there is a lack of research comparing the effectiveness of digital tools to traditional learning methods in enhancing symbolic thinking, particularly in the context of interactive games.

This study aims to fill this gap by providing empirical evidence on the effectiveness of Wordwall as a tool for enhancing symbolic thinking in young children. By comparing the performance of children using Wordwall with those using traditional methods, such as flashcards, this study will offer valuable insights into how digital tools can be used to support cognitive development in early childhood education.

The purpose of this study is to assess the effectiveness of Wordwall's "Find the Match" feature in improving symbolic thinking in children aged 5-6 years. Specifically, the study will investigate whether using this interactive tool leads to improvements in children's ability to recognize, understand, and use symbols, such as letters and numbers, to represent objects or ideas. The study will compare the outcomes of children in the experimental group (who use Wordwall) with those in the control group (who use traditional learning methods) to assess the impact of this digital tool on symbolic thinking.

This research will contribute to the growing body of literature on the role of educational technology in early childhood education. By evaluating the effectiveness of Wordwall in enhancing symbolic thinking, the study will provide insights into how interactive games can support the development of this essential cognitive skill. If the study finds that Wordwall's "Find the Match" feature has a positive impact on symbolic thinking, it may encourage educators to integrate similar interactive tools into their classrooms, offering a more engaging and effective way to foster cognitive development.

Additionally, this research will provide evidence on the benefits of using digital educational tools over traditional methods, helping educators, researchers, and policymakers understand how to effectively incorporate technology into early childhood education settings. The findings could also serve as a basis for future research on the potential of digital games to enhance various aspects of cognitive development in young children.

RESEARCH METHODOLOGY

This chapter outlines the research design, approach, and methods used to assess the impact of the "Find the Match" feature on Wordwall in enhancing symbolic thinking among 5-6-year-old children. The methodology section is divided into five subsections: (1) Research Approach and Design, (2) Participants, (3) Data Collection, (4) Research Instruments, and (5) Data Analysis. These subsections describe the key elements of the study, including the overall research framework, sample selection, and the tools and techniques used for data gathering and analysis.

The research adopts a quasi-experimental design, which is appropriate for investigating the causal relationship between the use of interactive media and

the development of symbolic thinking in young children. A quasi-experimental design was chosen because of the practical limitations in randomly assigning participants to control and experimental groups. Instead, the study compared two groups: the experimental group, which used Wordwall's "Find the Match" feature, and the control group, which followed traditional teaching methods, such as flashcards.

The study used a pre-test and post-test approach to measure changes in symbolic thinking abilities. The pre-test was administered before any intervention to assess the baseline abilities of the children, while the post-test was given after the intervention to gauge the impact of the treatment. The data from both tests were compared to assess any changes in the children's symbolic thinking abilities.

The non-equivalent control group design was selected, where the groups (experimental and control) were not randomly assigned but were instead selected based on pre-existing classes. This approach, while not offering the level of control provided by randomized experiments, allows for meaningful comparisons between the groups, especially in educational settings where random assignment may not always be feasible.

The participants in this study were children aged 5-6 years from KB Restu Ilahi in Polewali Mandar, Sulawesi Barat. The total sample size consisted of 18 children, with 9 children in the experimental group and 9 children in the control group. The children in the experimental group were exposed to the "Find the Match" feature on Wordwall, while the children in the control group used traditional media like flashcards.

A purposive sampling technique was used to select the participants. This technique involves selecting participants based on specific characteristics relevant to the research question—in this case, the age range of 5-6 years and the availability of the two different teaching methods. The purposive sampling approach ensures that the sample reflects the specific focus of the study.

The study aimed to ensure that the selected sample was representative of the population in terms of age and educational context. All the children were in the same educational setting, which minimized the variability in the external educational factors that might influence the outcomes.

Data collection was carried out using three main techniques: observation, tests, and documentation. These techniques were employed to gather quantitative and qualitative data on the children's symbolic thinking abilities before and after the intervention.

Observation:

During the study, the researcher observed the children during the learning activities to note any behavioral changes and engagement in the activities. This was particularly relevant for understanding how the children interacted with the media (Wordwall vs. flashcards) and to gauge their interest and motivation. Observations were recorded using field notes and video recordings when appropriate.

Pre-Test and Post-Test:

The main method of data collection involved administering a pre-test and a post-test to measure symbolic thinking. Both tests included tasks related to the following four indicators: recognition of letter/number symbols, understanding the

meaning of symbols, symbolic expression in play, and association of symbols with meaning. These tests were designed to assess both cognitive understanding and practical application of symbolic thinking.

- The pre-test was administered before the intervention, where the children performed tasks to measure their baseline abilities in recognizing and using symbols (letters, numbers, and pictures).
- The post-test was administered after the intervention period (which lasted for four sessions). The post-test measured any improvements in the children's symbolic thinking abilities, particularly in their ability to match symbols with corresponding objects or meanings.

Documentation:

Documentation was used to support the data collection process, including photographs, video recordings, and the collection of participants' work during the activities. These documents provided evidence of the children's interactions with the learning materials and their progress throughout the study. In particular, screenshots and recordings of their performance in the Wordwall game were used to track their engagement and understanding.

The primary instruments used for data collection in this study were the pre-test and post-test tools, along with the observation sheets and documentation guidelines. The tests and instruments were designed to assess the children's symbolic thinking abilities based on the four key indicators identified in the literature review: recognition of symbols, understanding of symbolic meanings, expression through symbols, and association of symbols with meaning.

Pre - Test and Post – Test : The tests were designed with specific tasks to assess children's symbolic thinking abilities. The items in the test were aligned with the indicators outlined above, such as:

- Identifying and naming letters and numbers (recognition of symbols).
- Associating numbers or letters with objects (understanding the meaning of symbols).
- Drawing images or performing tasks that involved using symbols in a playful context (expression through symbols).
- Counting objects and associating the correct symbol with the number of objects (association of symbols with meaning).

Each item in the test was rated on a scale from 1 to 4, with the following descriptions:

- 1 (BB - Belum Berkembang): The child could not complete the task without assistance.
- 2 (MB - Mulai Berkembang): The child could complete the task with some help.
- 3 (BSH - Berkembang Sesuai Harapan): The child could complete the task with minimal assistance.
- 4 (BSB - Berkembang Sangat Baik): The child could complete the task independently and correctly.

ObservationSheets: The observation sheets were designed to capture behavioral and engagement data during the learning activities. The researcher noted how the children interacted with the learning tools, the level of engagement they displayed, and their ability to understand and apply the symbolic concepts in the activities.

Documentation Guidelines : Documentation included both

photographs and videos recordings that captured the children's learning experiences, especially their interactions with the Wordwall game. This documentation helped to provide a deeper understanding of the children's engagement with the digital tool and offered qualitative insights into their learning process.

The data analysis process involved both descriptive and inferential statistics to examine the impact of the intervention on symbolic thinking abilities. Data collected from the pre-test and post-test were analyzed to determine whether there were significant differences in the symbolic thinking abilities of children in the experimental and control groups.

Descriptive Statistics: Descriptive statistics, including mean scores and standard deviations, were used to summarize the children's performance on the pre-test and post-test. These statistics provided a clear picture of the children's abilities at the start and end of the study, highlighting any changes in their symbolic thinking skills.

Inferential Statistics: To test the hypothesis that the "Find the Match" feature on Wordwall positively impacts symbolic thinking, the Wilcoxon Signed-Rank Test was applied to compare the pre-test and post-test scores within each group (experimental and control). This non-parametric test was appropriate for the data because it does not assume a normal distribution. The test helped to identify whether there was a statistically significant difference in the symbolic thinking abilities of the children in each group before and after the intervention.

RESULTS AND DISCUSSION

RESULTS

This section provides a summary of the data collection process for this study, which aimed to assess the impact of the "Find the Match" feature of Wordwall on the symbolic thinking abilities of children aged 5-6 years. Data were collected through pre-test and post-test assessments, which evaluated the children's ability to recognize, understand, and use symbols such as letters and numbers.

- Pre-Test Results: The scores ranged from 12 to 17, with a mean score of 15.33 and a standard deviation of 1.581. This suggests that before the intervention, the children in the experimental group had moderate to low levels of symbolic thinking abilities.

- **Post-Test Results**: After engaging with the Wordwall "Find the Match" feature, the children's scores improved significantly, with all scores reaching 48, and the mean score increasing to 48.00 with a standard deviation of 0.000. This indicates that the intervention had a substantial positive effect on their ability to recognize and use.symbols.

The data demonstrates a marked improvement in the children's symbolic thinking, with an increase of 32.67 points in the mean score between the pre-test and post-test. These results suggest that the use of the Wordwall "Find the Match" feature effectively enhanced the children's symbolic thinking abilities..

To determine if the differences between the pre-test and post-test results were statistically significant, a Wilcoxon signed-rank test was conducted. The test revealed a significant difference for the experimental group, with a p-value of

0.007 (less than 0.05), indicating that the use of Wordwall's "Find the Match" feature significantly improved the children's symbolic thinking abilities.

For the control group, the Wilcoxon signed-rank test showed no significant difference, with a p-value of 0.157, suggesting that the traditional method (flashcards) did not lead to a significant improvement in symbolic thinking

Table 1.3: Results of the Wilcoxon Signed-Rank Test

Group	Z-Value	p-Value
Experimental Group	-2.680	0.007
Control Group	-1.414	0.157

3.5 Summary of Findings

- **Experimental Group**: The children who used the Wordwall "Find the Match" feature showed a significant improvement in symbolic thinking, as evidenced by the dramatic increase in their post-test scores (mean score increased from 15.33 to 48.00).

Control Group: The children who used traditional methods, such as flashcards, showed minimal improvement in their symbolic thinking abilities, with the mean score only increasing slightly from 13.00 to 13.44.

DISCUSION

The results from this study demonstrate a significant improvement in symbolic thinking among the children in the experimental group who used Wordwall's "Find the Match" feature. These findings corroborate existing research that emphasizes the effectiveness of interactive digital tools in enhancing cognitive development, especially in early childhood education. Digital tools, particularly those that engage multiple senses (visual, auditory, and kinesthetic), have been shown to improve learning outcomes by promoting active engagement (Worembay et al., 2025; Surya et al., 2024). Wordwall, with its gamified, interactive design, fosters a learning environment that actively involves children, thus improving their ability to recognize and understand symbolic concepts. This active engagement has been shown to lead to better retention and comprehension of the material (Yanti et al., 2024; Weni Gusvianti & Tutik Wahyuni, 2023).

In this study, the experimental group showed a substantial improvement in symbolic thinking, as evidenced by their average pre-test score of 15.33 increasing to 48.00 in the post-test. This significant rise supports the argument that Wordwall's gamified approach is effective in fostering symbolic thinking skills in young children. Similarly, the research by Weni Gusvianti and Tutik Wahyuni (2023) also highlighted that interactive learning platforms can increase both children's motivation and academic performance, particularly in areas that require symbolic manipulation, such as mathematics and language skills.

When compared with the control group, which used traditional methods like flashcards, the experimental group displayed a much larger improvement in symbolic thinking. The control group's pre-test score of 13.00 increased to 13.44 post-test, showing only a marginal improvement. This minimal progress supports previous studies, such as Purnamasari (2022), that concluded traditional learning methods, such as rote

memorization and passive learning with flashcards, are less effective in fostering deep cognitive engagement and symbolic thinking. Moreover, Handayani et al. (2022) found that media such as flashcards often fail to sustain children's attention, limiting their impact on learning outcomes. These findings demonstrate that traditional methods are more passive and less engaging, which may explain the smaller improvement observed in the control group.

Additionally, research by Surya (2024) emphasized the importance of using interactive media to maintain children's interest in learning. Flashcards, as a passive learning method, fail to engage children in an interactive process, which is crucial for developing cognitive skills like symbolic thinking. This limitation was apparent in the control group's performance, which demonstrated minimal improvement compared to the experimental group.

One of the primary factors contributing to the success of Wordwall in this study was its gamified structure. The "Find the Match" feature required children to match symbols (e.g., letters and numbers) with corresponding images, fostering active participation in the learning process. Previous studies have shown that gamified learning not only improves cognitive skills but also enhances motivation by making the learning process more enjoyable and competitive (Surya, 2024; Siti Badriah et al., 2024). The use of games like Wordwall encourages children to actively engage with symbolic concepts, which leads to better learning outcomes. This approach aligns with Vygotsky's (1978) social development theory, which asserts that learning is most effective when it is engaging and interactive, particularly during the preoperational stage of cognitive development.

Furthermore, Siti Badriah et al. (2024) confirmed that educational games, which incorporate visual and auditory stimuli, help children understand abstract concepts like letters and numbers by associating them with real-world objects. In this study, Wordwall facilitated the connection between abstract symbols (e.g., letters and numbers) and real-world objects (e.g., images of apples and balls), thereby enhancing the children's symbolic thinking. This method of connecting symbols with tangible objects helped the children internalize symbolic representations and reinforced their ability to make associations between symbols and their meanings.

Another key aspect contributing to the success of Wordwall's "Find the Match" feature in this study was the high level of engagement and motivation observed among the children. Interactive media, such as Wordwall, has been shown to significantly boost student motivation by making learning more enjoyable and competitive (Weni Gusvianti & Tutik Wahyuni, 2023). The children in the experimental group were observed to be highly motivated and engaged throughout the learning sessions, reflecting the findings of Surya (2024), who highlighted the ability of interactive tools to sustain children's attention and promote deep learning. The gamified aspect of Wordwall not only motivated the children to engage but also made the process of learning symbolic concepts fun, which further fueled their curiosity and willingness to participate.

This increased motivation was reflected in the children's improved ability

to recall and apply symbols in various contexts, which is a clear indication that the game-based learning method had a positive impact on their cognitive development. This finding aligns with previous studies that have shown that gamified learning platforms are more effective in sustaining children's interest and improving their cognitive skills (Yanti et al., 2024).

While the findings of this study provide compelling evidence for the effectiveness of Wordwall's "Find the Match" feature in improving symbolic thinking, there are several limitations that need to be considered. One key limitation is the small sample size, with only 18 children participating in the study. Future research should include larger sample sizes and more diverse participant groups to validate these findings and explore the broader applicability of digital tools like Wordwall in different educational contexts.

Another limitation is that this study focused primarily on symbolic thinking related to letters and numbers. Future studies could explore how Wordwall's interactive features can be used to enhance other aspects of cognitive development, such as problem-solving skills and critical thinking. Additionally, as noted by Alessiya & Utoyo (2024), while digital learning tools like Wordwall have proven effective, it is crucial for educators to be adequately trained in integrating these tools into their teaching practices. Proper training will ensure that these tools are used effectively and pedagogically sound, maximizing their benefits for students.

CONCLUSION

1. The study demonstrates that Wordwall's "Find the Match" feature significantly enhances symbolic thinking abilities in young children aged 5-6 years. By integrating interactive, digital learning tools into early childhood education, children are more engaged and motivated, leading to improved cognitive development compared to traditional learning methods like flashcards. The experimental group, which utilized the Wordwall platform, showed substantial improvement in symbolic thinking, especially in recognizing, understanding, and using symbols such as numbers and letters. This finding aligns with existing literature that highlights the effectiveness of game-based learning tools in early childhood education. However, while the results are promising, further research with larger sample sizes and diverse participant groups is necessary to validate these findings and explore the long-term effects of using digital tools in cognitive development. Overall, this study highlights the potential of digital tools to revolutionize early childhood education by fostering active, engaging, and effective learning environments.

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