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THE EFFECT OF THE USE OF WORDWALL AND CANVA LEARNING MEDIA AND LEARNING MOTIVATION ON THE COGNITIVE DEVELOPMENT OF 5-6 YEAR-OLD CHILDREN AT DHARMA WANITA PUGERAN KINDERGARTEN

Finisya Seffy Christiyanti*[1], Rufi'i[2], Reza Rachmadtullah[3]
[1,2,3]*Universitas PGRI Adibuana*

* Corresponding Author: *seffychrist72@gmail.com*

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ABSTRACT

Cognitive development is an important aspect in the learning process, so choosing the right media is a key factor in supporting the effectiveness of early childhood learning. This study aims to analyze the effect of the use of Wordwall and Canva media and learning motivation on the cognitive development of children aged 5–6 years at Dharma Wanita Pugeran Kindergarten. The research design used a quasi-experiment with Two-Way ANOVA, involving 30 students divided into two treatment groups. The results showed that learning media had a significant effect on cognitive development ($F = 55.60$; $p < 0.05$), where Wordwall produced a higher increase than Canva. Conversely, learning motivation did not have a significant effect ($F = 0.310$; $p > 0.05$) and there was no interaction between learning media and motivation ($F = 2.737$; $p > 0.05$). The research model explained 73% of the variation in cognitive development. These findings confirm that Wordwall is more effective in improving children's cognitive abilities, regardless of their initial motivation level. Practically, these results recommend that teachers integrate gamification media such as Wordwall in early childhood learning to maximize cognitive achievement consistently.

INTRODUCTION

Cognitive development plays a central role in education because it is closely related to students' ability to think critically, analyze information, understand concepts, and solve problems effectively. In facing the challenges of 21st-century learning, mastery of higher-order thinking skills (HOTS) is crucial for students' ability to adapt and innovate amidst rapid change. To support the achievement of these goals, educators are required to implement innovative learning strategies, such as collaborative learning, the use of educational media, and the application of constructivist methods that can facilitate the

process of knowledge construction and the optimal development of critical, creative, and analytical thinking skills (Simangunsong & Manik, 2025; Syahriani et al., 2025).

Learning media plays a crucial role in creating effective and meaningful learning experiences, as it enhances students' interest, motivation, and understanding of the material presented. Selecting the right media significantly impacts how students receive, process, and interpret information, making the learning process more engaging, interactive, and less monotonous. In the digital era, the use of technology-based media such as video, animation, interactive applications, and multimedia is increasingly common, as it has been shown to increase student engagement, active participation, and focus in learning. Furthermore, appropriate learning media accelerates the achievement of cognitive learning objectives and assists teachers in delivering material more clearly and efficiently, significantly improving student learning outcomes (Bawamenewi & Riana, 2024; Wulandari et al., 2023).

One of the digital media widely used in learning is Wordwall. This platform is designed to provide an interactive learning experience through various educational games such as quizzes, matching pairs, open the box, and word searches, which are easily accessible without requiring special technical skills. The game's dynamic design and engaging visual features can increase students' attention, motivation, and engagement in the learning process. Research shows that using Wordwall can significantly improve learning motivation, engagement, memory, and comprehension of material, both in literacy, mathematics, and language learning (Renata et al., 2024; Widhiatama & Brameswari, 2024). One of the digital media widely used in learning is Wordwall. This platform is designed to provide an interactive learning experience through various educational games such as quizzes, matching pairs, open the box, and word searches, which are easily accessible without requiring special technical skills. The game's dynamic design and engaging visual features can increase students' attention, motivation, and engagement in the learning process. Research shows that using Wordwall can significantly improve learning motivation, engagement, memory, and comprehension of material, both in literacy, mathematics, and language learning (Renata et al., 2024; Widhiatama & Brameswari, 2024). This confirms that Wordwall has the potential to be an effective tool for promoting students' cognitive development and learning outcomes.

Besides Wordwall, Canva is also a popular digital learning medium. Canva is known as a visual design-based platform that makes it easy to create presentations, infographics, modules, and various engaging and interactive teaching materials. With its

user-friendly interface and a variety of customizable visual elements and templates, Canva helps students understand content through structured and creative visual representations. Using Canva has been shown to increase student engagement, motivation, creativity, and conceptual understanding, as the material presented becomes more understandable and less monotonous (Abidin et al., 2025). This visual approach aligns with the dual coding theory, where the combination of verbal and visual information can strengthen students' understanding and retention. Canva also supports collaboration, material personalization, and the development of 21st-century skills, making it highly relevant for learning in today's digital era (Erfiana & Rohmah, 2025).

Previous research by Gurning et al. (2024) showed that the use of Canva in learning significantly improves cognitive learning outcomes. Canva enables students to think creatively, organize concepts, and build understanding through effective data visualization. Through interactive and easy-to-use design features, students can express ideas visually, connect abstract concepts with concrete representations, and increase motivation and engagement in the learning process. These findings confirm that visual elements in learning, such as those facilitated by Canva, significantly contribute to the construction of knowledge and the development of students' creative thinking skills (Hutapea et al., 2024).

When compared, Wordwall and Canva have different characteristics and advantages in supporting the learning process. Wordwall emphasizes interaction, competition, and rapid response through an interactive game approach, thereby directly increasing student motivation, engagement, and learning activities (Putri et al., 2025). Meanwhile, Canva focuses on strengthening understanding through visual representation and attractive design, making it easier for students to organize concepts and increase creativity and in-depth understanding of the material (Fermansyah et al., 2025). These differences in characteristics open up opportunities for researchers to examine the effectiveness of each medium in enhancing students' cognitive development, both in terms of active involvement and structured conceptual understanding (Rahmiwati et al., 2025).

In addition to learning media, learning motivation also plays a crucial role in improving students' cognitive abilities. Motivation, both intrinsic and extrinsic, can influence students' learning attitudes, engagement, and persistence in participating in the learning process (Boncquet et al., 2024). tive in exploring material, using effective learning strategies, and demonstrating persistence in completing assignments, thus having a

greater chance of achieving optimal learning outcomes (Howard et al., 2021). Research by Ai (2025) also shows that intrinsic motivation has a stronger relationship with cognitive engagement and long-term academic achievement, while extrinsic motivation can provide additional encouragement in certain situations. Thus, efforts to increase learning motivation are crucial in supporting students' cognitive development and academic achievement.

Several studies have shown that motivation has a significant relationship with cognitive learning outcomes. Research by Yudho et al. (2023) found that students with high levels of motivation showed more consistent and significant improvements in cognitive abilities after participating in Guided Discovery Learning-based learning, compared to students with low motivation. Furthermore, a structural analysis by Lo et al. (2022) also confirmed that motivation, both intrinsic and self-efficacy, directly and strongly influences the achievement of cognitive learning outcomes, with students with high motivation tending to achieve better learning outcomes. These findings indicate that motivation not only plays a role as an internal factor but can also influence the effectiveness of learning media and strategies used to improve students' cognitive abilities.

Digital media such as Wordwall and Canva have been shown to influence student learning motivation. Wordwall creates an interactive, fun, and competitive learning environment through its game-like features, encouraging student enthusiasm and active participation in the learning process (Zahra' & Sofa, 2024). Meanwhile, Canva provides opportunities for students to be creative and produce engaging learning products, fostering a sense of ownership, enhancing creativity, and making students more engaged and confident in learning (Fermansyah et al., 2025). The interaction between the use of digital learning media and learning motivation is an important aspect that requires further study, as both support each other in creating effective and meaningful learning experiences in the digital era (Ulya et al., 2025).

Furthermore, learning motivation is also an important internal factor that influences students' learning outcomes and cognitive engagement. Various studies have shown that both Wordwall and Canva have the potential to increase motivation, engagement, and cognitive understanding through different interactive and visual approaches. However, no research has directly compared the effectiveness of Wordwall and Canva in early childhood by including motivation as a moderator. This research gap is important to fill because the characteristics of early childhood learning are strongly influenced by

motivation levels, media design, and the quality of interactions during the learning process. Therefore, this study aims to analyze the effect of using Wordwall and Canva on the cognitive development of children aged 5–6 years, examine the influence of learning motivation, and examine whether there is an interaction between media type and learning motivation in improving students' cognitive development.

METHODS

This study used a quantitative approach with a quasi-experimental design because researchers could not fully control variables in the context of kindergarten learning. Two experimental groups were given different treatments, namely the use of Wordwall and Canva learning media for four weeks, each with a minimum frequency of three sessions per week. In addition to media treatment, the study also measured learning motivation to see its direct and interactive effects on children's cognitive development. Data analysis was conducted using Two-Way ANOVA to test the effect of media, motivation, and their interaction on cognitive development.

The variables in this study included learning media (Wordwall vs. Canva), learning motivation, and cognitive development. Learning media was operationalized through the use of Wordwall, which consists of interactive games such as match-ups, quizzes, or random wheels, and Canva, which is used to create visual cards, posters, storyboards, or flashcards. Learning motivation was measured using a pictorial Likert scale with five indicators: active participation, enthusiasm, and learning initiative. Meanwhile, cognitive development was measured through a pre-test and post-test using an observation checklist and five performance tasks covering the abilities of comparing, grouping, understanding cause and effect, calculating, and short-term memory. Gain scores were used to determine improvements in cognitive development.

The study population was all 5–6-year-old children at Dharma Wanita Pugeran Kindergarten in the 2025/2026 academic year, totaling 30 children, who were used as a total sample (total sampling). The sample was divided into two groups of 15 children each through matching based on age, gender, and initial motivation scores to reduce bias. The first group received intervention using Wordwall, while the second group used Canva. Data collection techniques included observation of the learning process, cognitive tests before and after the intervention, and a learning motivation questionnaire tailored to the characteristics of early childhood.

To ensure data validity, the study employed source and method triangulation, instrument validation, and control for external variables such as media exposure duration, age, and parental educational background. Statistical assumptions were tested using the Kolmogorov-Smirnov normality test and Levene's homogeneity test as a prerequisite for using ANOVA. Post-test assessments were conducted by external assessors using a blind scoring technique to minimize bias. All procedures, learning logs, Wordwall and Canva documentation, and raw scores were recorded in an audit trail, allowing for transparent and systematic review of the research process.

During the research, all ethical procedures were strictly adhered to. Before the activity began, the researcher requested official approval from the institution, specifically the Principal of Dharma Wanita Pugeran Kindergarten, to obtain permission to implement the intervention using Wordwall and Canva media. Furthermore, the researcher provided an explanation to parents regarding the purpose, benefits, procedures, and potential risks of the study, and then asked them to sign an informed consent form as a form of their child's willingness to participate in the entire series of research activities. The confidentiality of students' identities was guaranteed by using a special code on all instruments and measurement sheets.

RESULTS AND DISCUSSION

Table 1. Respondent characteristics (n=30)

Gender	Wordwall		Canva		Total	
	n	%	n	%	n	%
Woman	7	46,7	11	73,3	18	60,0
Man	8	53,3	4	26,7	12	40,0

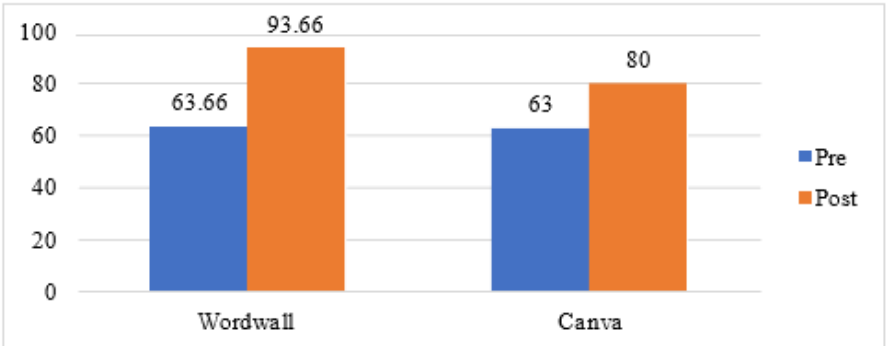

Figure 1. Cognitive development before and after being given learning media

Table 2. Respondents' cognitive development based on learning media and motivation level

Instructional Media	Motivation	n	Mean	Standard Deviation
Wordwall	Low	8	95,62	4,17
	High	7	91,42	5,56
Canva	Low	3	78,33	2,88
	High	12	80,41	4,50

Table 3. Respondents' Cognitive Development in Terms of Learning Media and Motivation Level

Variables	Mean Square	F	p-value	R- Square
Instructional Media	1170,29	55,60	0,000	0,730
Motivation	6,52	0,310	0,582	
Learning Media	57,610	2,737	0,110	

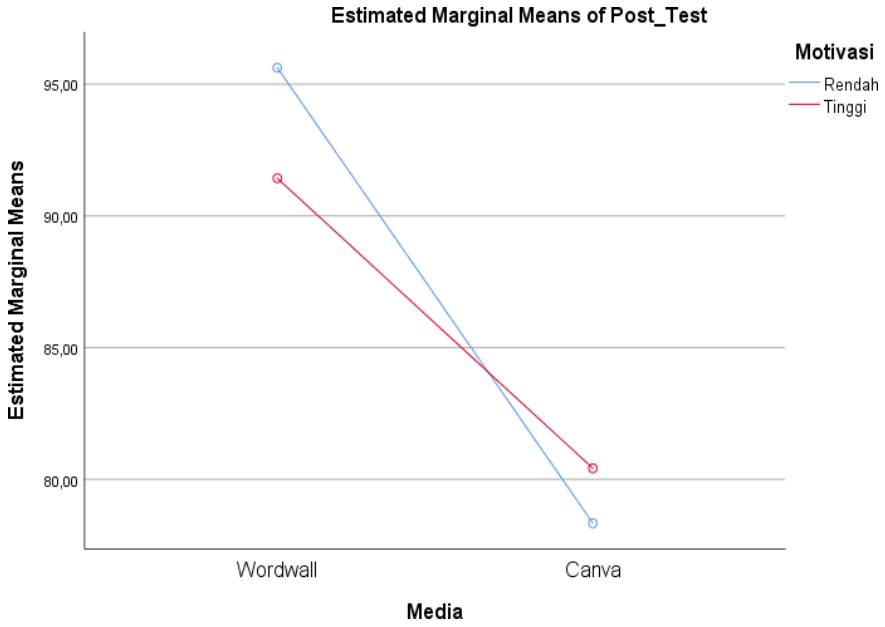

Figure 2. Estimated marginal means of cognitive development after intervention

The majority of respondents were female, 18 (60.0%). The prevalence of female respondents was 7 (46.7%) in the Wordwall group and 11 (73.3%) in the Canva group (Table 1). There was an increase in the cognitive development score of students in the Wordwall learning media group from 63.66 to 93.66 after the intervention. Likewise, the group given the Canva learning media showed an increase from 63.00 to 80.00 (Figure 1). The group using Wordwall showed higher cognitive development (average 93.66) compared to Canva (average 80.00), both in children with low and high motivation. Overall, Wordwall proved to be more effective in improving children's cognitive abilities than Canva (Table 2).

Learning media significantly influenced students' cognitive development ($F = 55.60$; $p < 0.05$), while learning motivation did not ($F = 0.310$; $p > 0.05$), nor did the interaction between the two ($F = 2.737$; $p > 0.05$). Overall, this research model explained 73% of the variation in cognitive development, while 27% was influenced by factors outside the study (Table 3). Wordwall learning media was more effective in improving student learning outcomes compared to Canva, for both high and low motivation students. However, the lines between the two motivation groups did not appear to intersect sharply, but were parallel or only slightly crossed, so there was no significant interaction between learning media and learning motivation. Learning media significantly influenced learning outcomes, but this influence was independent of the level of student learning motivation (Figure 2).

The results of the study indicate that learning media has a very significant influence on students' cognitive development. Wordwall proved significantly more effective than Canva, as evidenced by the striking difference in posttest scores between the two groups. Wordwall's effectiveness in improving students' conceptual understanding and thinking skills is a central finding that strengthens gamification media's position as a superior interactive learning tool. Various studies have shown that the use of Wordwall significantly improves conceptual understanding in religious studies, mathematics, and language, with substantial increases in pretest to posttest scores (Chotimah et al., 2025; Irhas et al., 2025). Furthermore, Wordwall has also been shown to develop students' critical and creative thinking skills through interactive, fun, and competitive learning activities (Fauziyati, 2023).

The advantages of Wordwall can be understood through its game-based characteristics, thus encouraging active student engagement throughout the learning process. Elements such as competition, point-earning, and instant feedback provide continuous learning stimulation and increase students' intrinsic motivation (Renata et al., 2024). This mechanism aligns with Cognitive Load theory and Mayer's multimedia principles, where active interaction and repeated practice in a game-based learning environment have been shown to reduce cognitive overload and optimally improve student learning achievement and engagement (flow) compared to passive visual media (Chang et al., 2018).

Meanwhile, Canva serves more as a visual presentation medium, emphasizing design and information presentation. It effectively helps students understand material visually through engaging displays, infographics, and posters that facilitate conceptual

understanding (Susanti et al., 2025). However, Canva does not provide direct-response exercises or real-time question-and-answer interactions like Wordwall, resulting in passive student engagement focused on visual consumption (Muhajir et al., 2024). This limitation makes Canva's contribution to the development of higher-order cognitive skills, such as analysis and application, relatively limited if not supported by thoughtful instructional design and other supporting activities (Handayani et al., 2025).

The difference in results between the two media indicates that students' cognitive abilities improve more drastically when they are given interactive activity-based learning. Wordwall, with its gamification feature, facilitates learning that is not only informative but also encourages a strong retrieval practice process. Through interactive elements such as quizzes, points, and instant feedback, Wordwall creates a learning environment that motivates students to actively remember and apply the knowledge they have learned (Alqarni, 2025). Previous research findings by Rosiana et al. (2025) showed that the use of interactive quizzes and gamification was significantly more effective than passive visual media in improving students' knowledge retention and academic achievement, both in the short and long term.

The research results also showed that learning motivation did not significantly influence cognitive development. This indicates that differences in students' initial motivation levels do not determine learning success when interactive media is used. In other words, Wordwalls can provide a powerful additional motivational effect to overcome differences in students' intrinsic motivation.

The insignificant influence of motivation on cognition contradicts the common assumption that motivation is the dominant factor in learning outcomes. However, in the context of gamification media, extrinsic motivation created by the game environment, such as points, badges, and leaderboards, can replace the role of intrinsic motivation and still drive student engagement and academic achievement (Ratinho & Martins, 2023). This aligns with the concept of triggered situational interest, where stimulation from game elements can increase interest and participation in learning, even in students who initially lack high motivation (Bharti, 2023).

The results also showed no significant interaction between learning media and learning motivation. The effectiveness of Wordwall proved stable and was not affected by student motivation levels. Both students with high and low motivation still experienced significant cognitive improvements after using Wordwall. The results showed no interaction between Wordwall media and learning motivation on learning outcomes, so

the main effect of Wordwall media use was much more dominant than student motivation variables. Thus, Wordwall can consistently improve learning outcomes across various motivation levels, confirming that the media plays a more decisive role in cognitive achievement than individual motivation (Ulandari et al., 2023).

The lack of interaction between learning media and students' motivation levels confirms that media selection is a key factor in improving learning outcomes, especially in heterogeneous classrooms. Teachers can rely on Wordwall as an effective learning strategy without worrying about variations in student motivation, as it can provide consistent cognitive improvements across different motivation levels. Meanwhile, Canva still provides benefits in the learning process, but it does not show as strong an impact as Wordwall in improving students' cognitive abilities (Wahyuningtyas et al., 2025). These findings reinforce the importance of selecting the right media to optimize learning outcomes in diverse environments.

Statistically, the two independent variables explained 73% of the variation in students' cognitive development. This figure indicates that learning media was the largest determining factor, while motivation had a very small influence. The remaining influence was due to other factors such as learning style, duration of instruction, and quality of teacher interaction, but these were not the primary focus of this study.

This study confirms that Wordwall is the most effective learning medium for enhancing students' cognitive development compared to Canva. This effectiveness is independent of motivation, making Wordwall a strategic choice for classroom learning with diverse student characteristics. These findings provide practical implications: teachers need to integrate gamification into the learning process to maximize cognitive learning outcomes.

This study has several limitations that should be considered when interpreting the findings. First, the sample size was relatively small, only 30 children, so generalizing the results to a broader population should be done with caution. Second, the study location was limited to a single institution, Dharma Wanita Pugeran Kindergarten, so the conditions, student characteristics, and learning practices may not be representative of variations across schools. Third, the relatively short intervention duration (four weeks) limited the study's ability to capture long-term cognitive changes. Furthermore, learning motivation was measured using a simple, picture-based scale adapted for early childhood; although appropriate for developmental characteristics, this instrument has limitations in capturing motivational dynamics in greater depth. These limitations open

up opportunities for future research to use larger samples, involve more schools, extend the intervention duration, and develop more comprehensive motivation measurement instruments.

The findings of this study provide several important implications. Theoretically, the results reinforce the concept that the design characteristics of digital learning media, particularly gamification-based media such as Wordwall, can have a direct influence on cognitive development independent of a child's initial motivation level. This adds to the empirical evidence that interactive elements and instant feedback play a strong role in facilitating cognitive processes in early childhood. Practically, these findings can serve as a basis for kindergarten teachers in selecting effective learning media. Wordwall can be a primary alternative for increasing children's engagement and cognitive abilities, especially in classes with heterogeneous learning motivation. Teachers are also advised to combine the use of Wordwall with Canva to enrich learning variations, so that children receive a balanced learning experience between interaction, concept visualization, and creativity. Thus, the results of this study support the implementation of digital learning strategies that are more structured and tailored to the developmental needs of early childhood.

CONCLUSIONS AND SUGGESTIONS

The results of the study indicate several important conclusions. First, learning media significantly influences children's cognitive development, with Wordwall proving more effective than Canva in improving students' cognitive abilities. Second, learning motivation does not significantly influence cognitive development, meaning that the child's learning outcomes are not determined by their initial motivation level. Third, no interaction was found between the type of learning media and motivation, indicating that Wordwall consistently provides positive effects across various motivation levels. Fourth, this research model explains 73% of the variation in cognitive development, indicating that the choice of learning media is a crucial factor in achieving learning outcomes in early childhood.

Based on these findings, several recommendations can be made. Practically, teachers and schools are advised to integrate Wordwall media more intensively into learning due to its strong effectiveness in increasing children's engagement and cognitive abilities, and to utilize Canva as a complement to support visual-based learning and creativity. Schools can also develop more structured digital media utilization policies to

support varied learning processes. For further research, it is recommended to use a larger sample size, involve more than one educational institution, extend the duration of the intervention, and develop a more comprehensive motivational instrument to more accurately capture changes in motivation. Future research can also explore other variables, such as learning styles or teacher interactions, to gain a broader picture of the factors influencing children's cognitive development.

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