Sekolah Dasar: Kajian Teori dan Praktik Pendidikan
Volume 35, No. 2, November 2026, hlm. 354–372

Tersedia Online di http://journal2.um.ac.id/index.php/sd
ISSN 0854-8285 (cetak); ISSN 2581-1983 (online)

Utilizing Wordwall-Based Interactive Games to Instill Environmental Conservation Values in Elementary School Students

Irman Matje*
Rimayasi
La Salim
Alam Syah Basri Ismail
Muhammad Yusnan
Faculty of Teacher Training and Education, Muhammadiyah University of Buton, Indonesia
*Corresponding author, e-mail: irmanmatje41@gmail.com

Paper received: 25-6-2026; revised: 18-9-2026; accepted: 10-11-2026

Abstract
Elementary education plays a crucial role in shaping students' character and fostering environmental awareness. However, classroom practices often remain limited to traditional methods that make students passive and less engaged. Therefore, innovative media are needed to provide a more engaging, contextual, and meaningful learning experience. This study aims to analyze the effectiveness of using Wordwall-based interactive games in improving students' learning outcomes and engagement in Social Studies, particularly in relation to environmental conservation values. The research employed a quasi-experimental design with a One Group Pretest-Posttest model. The subjects consisted of 27 elementary school students who participated in Social Studies learning activities using Wordwall. Data were collected through pre-test and post-test, observations, questionnaires, and interviews, and were analyzed using both quantitative and qualitative approaches. The findings revealed a significant improvement in students' learning outcomes, as indicated by the differences in mean scores between the pre-test and post-test, supported by significant results from the t-test and ANOVA. Moreover, student engagement increased substantially, characterized by enthusiasm, active participation, and positive responses toward Wordwall. These results demonstrate that Wordwall is an effective and innovative learning medium that not only enhances academic achievement but also fosters environmental awareness from an early age.

Keywords: elementary school; environmental conservation values; interactive learning; wordwall; student engagement

INTRODUCTION

Elementary education plays a strategic role in shaping students' character and instilling awareness of global issues, one of which is environmental preservation. Through the curriculum, values of environmental care are taught as an integral part of preparing a generation that is responsible for the sustainability of nature. This process not only delivers academic knowledge but also develops positive attitudes and behaviors relevant to current and future environmental challenges (Herlina & Melani, 2022; Kristiyawati & Ary, 2024; Fianto et al., 2024). Along with the progress of time, the use of technology and interactive media has increasingly been adopted as an effective learning strategy (Arini et al., 2024). Through technology-based approaches, environmental preservation values can be conveyed more contextually and enjoyably, encouraging students to apply this knowledge in their daily lives (Setiawati et al., 2024).

Previous studies have shown that the use of interactive learning media can improve students' learning outcomes, particularly in Social Studies at the elementary level (Andayani et

al., 2022). Learning media not only help students understand concepts more deeply but also enhance their motivation through more active and participatory learning experiences. By using interactive media, students are able to connect theory with concrete examples, which leads to stronger conceptual understanding (Tiara et al., 2024; Hani et al., 2020; Hermita et al., 2021). In this way, wordwall has the potential not only to strengthen students' academic achievement but also to cultivate environmental awareness from an early age (Maola & Irianto, 2023).

Awareness of the importance of environmental preservation has indeed been incorporated into the elementary school curriculum as part of character education and global education. However, in practice, the implementation of related teaching often encounters obstacles (Tukina et al., 2022). Students often perceive these lessons as abstract knowledge rather than as guidance for practical behavior (Khairani et al., 2023), so the curriculum's objective to instill environmental awareness from an early age has not been fully achieved (Ferdiyansyah et al., 2022). A major contributing factor to this problem lies in the limited variety of teaching methods employed by teachers. Many still rely on traditional lecture methods when teaching environmental concepts, which are effective in transmitting information but provide limited opportunities for students to participate actively (Sumarwati et al., 2024; Handayani & Sari, 2024; Indrawan & Yudiana, 2022). Elementary school children naturally have a high level of curiosity and require interactive approaches to become more engaged in the learning process. When lessons are not presented in an engaging way, students' motivation tends to be low and they struggle to connect environmental concepts with their daily experiences (Bujuri et al., 2023).

Learning materials that should be fundamental, such as maintaining cleanliness, reducing waste, or using resources wisely, often remain at the theoretical level. This prevents students from habitually connecting the knowledge they acquire with concrete actions in their daily lives (Gustian et al., 2023). In fact, the primary goal of environmental education is to shape awareness and positive habits that they can carry into adulthood (Nivetiken et al., 2024). This suggests that the problem is not simply in the curriculum design but also in its pedagogical delivery (Arrasyid et al., 2022). Teachers need to act as facilitators who guide students to link acquired knowledge with real actions through discussion, environmental projects, or collaborative activities (Nugroho et al., 2022; Dewi et al., 2024). Through such approaches, students not only learn cognitively but also develop social skills, caring attitudes, and a sense of responsibility toward the environment (Hardika et al., 2020; Souza & Prates, 2024). However, many teachers face challenges in adopting such interactive approaches due to limited training, resources, or exposure to innovative media. Therefore, this study focuses on investigating how the use of interactive media, particularly Wordwall, can bridge the gap between theoretical curriculum content and the practical development of sustainable environmental awareness among elementary school students.

This study is grounded in the view that digital interactivity does not directly produce behavioral change but operates through cognitive, affective, and behavioral processes. In Wordwall-based learning, interactive features such as game-based tasks, immediate feedback, visual stimulation, and active participation are expected to increase students' attention, motivation, enjoyment, and engagement with environmental content. Increased engagement enables students to process environmental concepts more meaningfully and relate them to everyday experiences. From an experiential and social-cognitive perspective, learning becomes more meaningful when students actively interact with content, receive feedback, reflect on their experiences, and connect knowledge with concrete actions. The process can be conceptualized as

digital interactivity → student engagement → meaningful learning → value internalization → environmentally responsible behavior. Teachers also play an important role by helping students connect digital activities with real-life environmental practices. Therefore, Wordwall should not be viewed merely as a digital tool, but as a pedagogical environment that may support the transformation of classroom interaction into environmental awareness and responsible everyday behavior.

Previous studies on environmental education at the elementary school level have consistently highlighted the importance of integrating environmental awareness into character education. Researchers have emphasized that early exposure to ecological values is essential to cultivate sustainable behavior in later life (Saputra et al., 2024). However, many of these studies reveal that the implementation often remains theoretical, with students receiving information about environmental issues without being guided on how to apply it in their daily routines. This limitation reduces the long-term impact of environmental education and creates a need for innovative pedagogical approaches that emphasize active student engagement (Munastiwi, 2021; Swarmahardika & Widiana, 2024; Putri & Ahmadi, 2024). In response to these challenges, recent studies have increasingly explored the integration of interactive digital media into elementary school learning. For example, interactive games and online quizzes have been shown to increase motivation, improve comprehension, and help learners connect abstract concepts with concrete experiences (Husna et al., 2021). These findings suggest that technology-supported instruction has the potential to address gaps in traditional teaching methods, particularly in subjects like Social Studies where environmental themes are often embedded.

Despite these advancements, the use of interactive media specifically tailored to environmental preservation education remains relatively underexplored. Limited attention has been devoted to examining how interactive digital platforms contribute to the development of ecological awareness and environmentally responsible behavior (Uly, 2023; Knorr & Berkling, 2020), or how these tools can be systematically employed to instill character-based values, particularly environmental responsibility (Ambarwati et al., 2020). This indicates a significant research gap, particularly in developing strategies that not only improve academic achievement but also strengthen students' environmental values (Wahyuningsih & Nurdyansyah, 2023). This research positions itself within this context by examining the use of Wordwall as an interactive medium to integrate environmental preservation values into elementary school learning. Wordwall, as a widely accessible and user-friendly platform, provides interactive activities that align with students' developmental needs for active participation (Sahidullah, 2022). Unlike conventional lectures, it encourages collaborative learning, immediate feedback, and practical engagement with the material. This research seeks to extend the existing body of knowledge by demonstrating how Wordwall can function not only as a tool for improving academic outcomes but also as an instrument for cultivating ecological awareness from an early age.

The main objective of this study is to analyze the effectiveness of Wordwall as an interactive learning medium for embedding environmental preservation values in elementary school students. Specifically, the research seeks to determine how Wordwall activities can enhance students' motivation, participation, and understanding of environmental concepts, while simultaneously fostering positive attitudes and ecological responsibility. By addressing both academic and behavioral dimensions, the study aims to contribute to innovative pedagogical practices that prepare young learners to become responsible stewards of the environment.

METHOD

Design

This study employed a quasi-experimental One-Group Pretest-Posttest design to examine the effectiveness of Wordwall media in improving elementary students' understanding of environmental preservation values through Social Studies learning. Twenty-seven students participated and completed a pretest before the intervention and a posttest afterward to identify changes in learning outcomes (Yusnidar, 2023). The independent variable was Wordwall-based interactive learning, while the dependent variable was students' learning outcomes, particularly their understanding and application of environmental preservation values (Andriningrum et al., 2022). Wordwall was integrated into learning activities to promote meaningful engagement, environmental awareness, and responsible attitudes by connecting classroom concepts with environmentally responsible practices in everyday life.

Two instruments were used: a Social Studies achievement test and a student engagement questionnaire. The achievement test comprised 20 multiple-choice items covering environmental cleanliness, waste management, natural resource use, and responsible environmental practices. Content validity was evaluated by three experts, and reliability analysis using KR-20 yielded 0.82. Student engagement was measured using a 30-item, five-point Likert questionnaire covering Active Participation, Enthusiasm, Collaboration, Attention to Learning, Enjoyment, and Motivation. Three experts assessed its content validity. Cronbach's alpha showed an overall reliability coefficient of $\alpha = 0.88$, while dimension-specific coefficients were 0.81, 0.84, 0.79, 0.83, 0.86, and 0.85, respectively, demonstrating adequate internal consistency.

Data Sources

The primary data were pretest and posttest scores, administered before and after the implementation of Wordwall as an interactive learning medium (Bang, 2021). The pretest established students' baseline knowledge, whereas the posttest assessed changes in their comprehension and ability to apply environmental concepts (Amelia et al., 2023). The sources were 27 elementary school students studying environmental preservation within the Social Studies curriculum. Teacher observations and classroom documentation served as secondary sources for contextualizing and validating the findings.

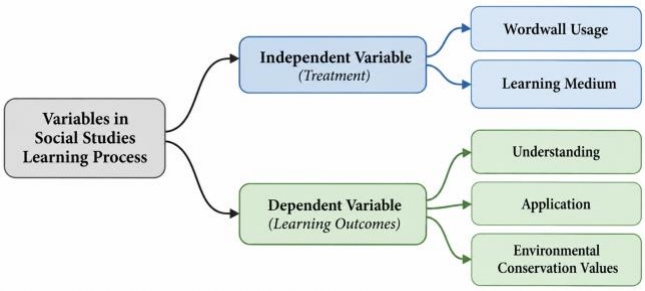


Figure 1. Variables in Social Studies Learning Process

The independent variable is the use of Wordwall as an interactive learning medium designed to actively engage students and influence their learning outcomes. As the manipulated factor, Wordwall provides interactive learning experiences related to environmental conservation. The dependent variables include students' understanding, application, and internalization of

environmental conservation values. Understanding represents students' cognitive mastery of environmental concepts, while application reflects their ability to translate knowledge into appropriate practices (Julianti et al., 2024). Environmental conservation values represent ecological awareness, responsibility, and sustainable behavior.

Data Collection Technique

Pretest and posttest assessments were administered to measure changes in students' understanding and application of environmental preservation values. The student engagement questionnaire quantitatively assessed participation, enthusiasm, collaboration, attention, enjoyment, and motivation. Classroom observations documented students' interactions and engagement during Wordwall-based activities, and interviews with teachers and students provided supporting information on their experiences, perceived benefits, and challenges (Qomariyah, 2022). This study was classified as quantitative quasi-experimental research rather than a mixed-methods study. The pretest, posttest, and questionnaire constituted the primary sources of quantitative evidence, while observations and interviews were employed only to contextualize and strengthen the interpretation of quantitative findings and were not analyzed through a separate qualitative analytical procedure.

Data Analysis

Basic experimental data analysis was considered the most relevant approach for this study (Sgrò et al., 2021; Putri & Sutama, 2024). Through this method, changes in students' understanding and attitudes before and after the use of Wordwall were examined using pre- and post-tests and the engagement questionnaire. Supporting information from interviews and focus groups can be used to further explore students' experiences in using the game, providing deeper qualitative insights into the effectiveness of the medium in fostering environmental preservation values. The combination of these techniques allows for a comprehensive and balanced analysis between quantitative and qualitative data.

RESULT AND DISCUSSION

Results

The findings demonstrate significant improvement in students' Social Studies learning outcomes following the use of Wordwall, as reflected in increased posttest scores. Students also showed greater engagement, enthusiasm, and active participation during learning activities. Teachers perceived Wordwall as effective in connecting abstract concepts with real-life contexts. Moreover, interactive activities strengthened students' understanding of environmental preservation values and encouraged them to apply environmentally responsible practices in their daily lives and surrounding environment.



Figure 2. Wordwall-Based Interactive Classroom Learning

The classroom setting demonstrates how teachers integrate digital technology through projected educational games to enhance student engagement and environmental awareness. Wordwall provides interactive activities, including quizzes, matching exercises, and group sorting, related to environmental conservation topics. Teachers facilitate learning by guiding discussions and encouraging active participation. This approach supports students' motivation, conceptual understanding, and collaborative learning while connecting environmental knowledge with everyday practices, thereby fostering positive attitudes toward environmental responsibility and sustainable behavior.

Improvement of Learning Outcomes

The improvement in learning outcomes is clearly reflected in the comparison of students' pretest and posttest scores. The average posttest score was significantly higher than the pretest score, indicating a substantial increase in students' comprehension of Social Studies content after learning with interactive media. This demonstrates that a learning approach involving active student participation has a positive impact on knowledge absorption and the overall quality of the learning process.

Table 1. Categories of Pretest and Posttest Scores

Score Category	Score Range	n (Pretest)	Percentage (Pretest)	n (Posttest)	Percentage (Posttest)
High	≥ 80	0	0%	14	51.85%
Medium	60 – 79	12	44.44%	13	48.15%
Low	< 60	15	55.56%	0	0%

Table 1 shows a substantial improvement in students' learning outcomes following Wordwall implementation. In the pretest, 55.56% of students were classified in the low category and 44.44% in the medium category, while none reached the high category, indicating limited initial understanding of Social Studies material. In contrast, the posttest results showed that 51.85% of students achieved the high category and 48.15% reached the medium category, with no students remaining in the low category. This distribution demonstrates a clear upward shift in achievement, suggesting that Wordwall effectively supported students' understanding and improved their Social Studies learning outcomes through interactive learning activities.

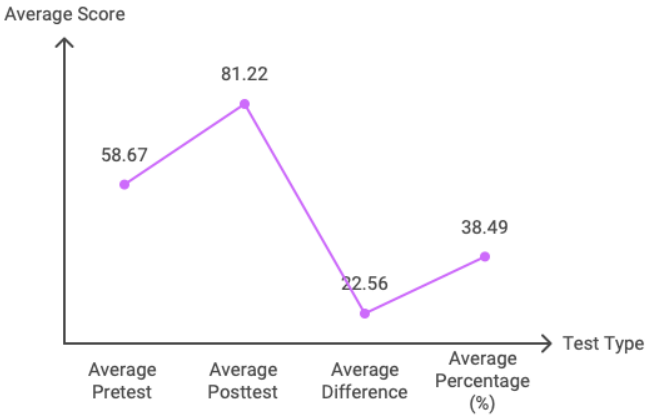


Figure 3. Average Pretest and Posttest Scores

Figure 3 shows improved learning outcomes among 27 elementary students after Wordwall-based Social Studies instruction. The mean pretest score was 58.67, increasing to 81.22 in the posttest, with a mean difference of 22.56 points and a 38.49% increase. These results indicate substantial improvement in students' understanding of environmental preservation concepts. The statistics in Figure 2 were aligned with Table 6 and the paired-samples t-test using the same dataset. This consistency ensures that the means, standard deviations, mean differences, and inferential results accurately represent changes in students' learning outcomes following the Wordwall intervention in Social Studies learning.

Student Engagement in Environmental Preservation

Student engagement increased significantly during Social Studies learning with Wordwall. Students became more active in answering questions, following instructions, and participating in interactive activities. Their enthusiasm, curiosity, and focus indicated that Wordwall created an enjoyable and engaging learning environment. Furthermore, students were cognitively and emotionally involved in exploring knowledge through educational games. This active participation strengthened learning motivation, enhanced understanding of Social Studies content, and promoted a more meaningful learning experience.

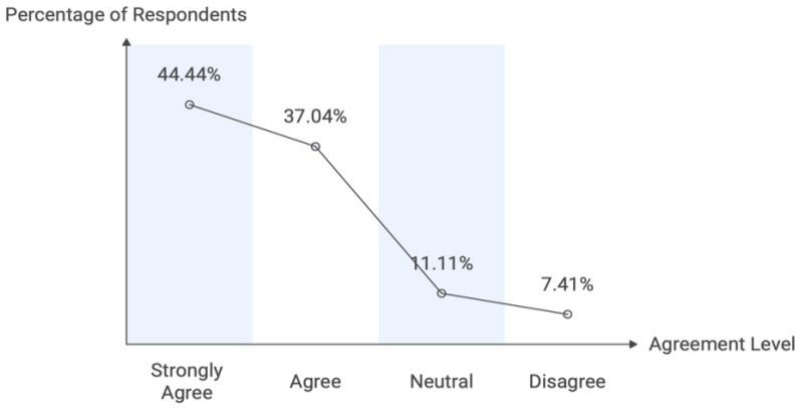


Figure 4. Student Engagement Survey Results

The figure 4 illustrates the distribution of students' engagement levels based on the questionnaire results after using Wordwall as a learning medium. It can be seen that the majority of students fell into the Strongly Agree category (44.44%) and the Agree category (37.04%), indicating that most students felt more active, enthusiastic, and engaged in the learning process. The high percentages in these two categories demonstrate that Wordwall successfully created an enjoyable learning atmosphere and motivated students to participate more actively in Social Studies activities. Meanwhile, only a small proportion of students selected the Neutral category (11.11%) and Disagree category (7.41%), with no students choosing Strongly Disagree. This finding shows that, in general, almost all students experienced the positive impact of using Wordwall. The low percentage of negative responses further strengthens the evidence that this medium was well received by students. Therefore, it can be concluded that Wordwall is effective in enhancing student engagement while also supporting their understanding of environmental preservation values.

Table 2. Pearson Correlation Matrix for Student Engagement

Variable	M	SD	1	2	3	4	5	6
1. Active Participation	3.89	0.62	1					
2. Enthusiasm	4.05	0.58	.72**	1				
3. Collaboration	3.78	0.64	.65**	.70**	1			
4. Attention to Learning	3.92	0.55	.68**	.73**	.62**	1		
5. Enjoyment	4.11	0.60	.59**	.66**	.58**	.61**	1	
6. Motivation	4.00	0.57	.71**	.75**	.69**	.70**	.64**	1

The Pearson correlation results on Table 2 demonstrate positive relationships among dimensions of student engagement during Wordwall-based Social Studies learning. Active Participation was strongly associated with Enthusiasm and Motivation, indicating that greater participation corresponded with higher enthusiasm and learning motivation. Attention to Learning was also positively related to Enjoyment and Collaboration, suggesting that attentive students tended to enjoy learning and interact effectively with peers. The absence of strong negative correlations indicates that engagement dimensions generally reinforce one another, supporting Wordwall's role in creating an active, collaborative, enjoyable, and engaging learning environment.

Table 3. Tolerance and VIF Test Results

Model	Variable	Collinearity Tolerance	VIF
1	Active Participation	.95	1.05
2	Enthusiasm	.93	1.07
3	Collaboration	.96	1.04
4	Attention to Learning	.92	1.09
5	Enjoyment	.94	1.06
6	Motivation	.91	1.10

Table 3 presents the multicollinearity test results for six dimensions of student engagement: Active Participation, Enthusiasm, Collaboration, Attention to Learning, Enjoyment, and Motivation. All variables showed Tolerance values above 0.1 and VIF values below 10, indicating the absence of multicollinearity and confirming their suitability for regression analysis. Each dimension therefore represents a distinct yet complementary aspect of student engagement. This condition allows the contribution of individual variables to learning outcomes to be estimated more reliably without substantial distortion from intercorrelations. Furthermore, Cronbach's

alpha coefficients confirmed adequate internal consistency of the questionnaire. Overall, these statistical findings support the reliability and appropriateness of the engagement measures for examining how different dimensions of student engagement relate to learning outcomes during Wordwall-based Social Studies instruction.

Table 4. Hierarchical Multiple Regression Model Summary

Model	Predictors Entered	R	R^2	Adjusted R^2	R^2 Change	F Change	df1	df2	Sig. F Change
1	Student Engagement	.285	.081	.044	.081	2.203	1	25	.150
2	Student Engagement + Environmental Awareness	.454	.206	.140	.125	3.778	1	24	.064

Table 4 presents the hierarchical multiple regression analysis based on the same sample of 27 students used throughout the study. In Model 1, Student Engagement was entered as the first predictor, resulting in R = .285 and R^2 = .081, indicating that approximately 8.1% of the variance in students' learning outcomes was explained by student engagement. With one predictor and 27 participants, the residual degrees of freedom were 25. The model did not reach statistical significance, $F(1, 25) = 2.203$, $p = .150$. In Model 2, Environmental Awareness was added as a second predictor. The model produced R = .454 and R^2 = .206, indicating that the two predictors jointly explained approximately 20.6% of the variance in learning outcomes. The addition of the second predictor increased the explained variance by 12.5%, although the change did not reach the conventional level of statistical significance, $\Delta F(1, 24) = 3.778$, $p = .064$. The corrected degrees of freedom are consistent with the actual sample size of 27 students.

Table 5. Model Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	103.175	8.755		11.785	.000
Cognitive Flexibility	.509	.091	.281	5.575	.000
Positive Affect	.421	.143	.148	2.934	.004
Negative Affect	-.970	.148	-.327	-6.533	.000

The analysis of the Model Coefficients on Table 5 demonstrates the contribution of each predictor variable to students' learning outcomes. The constant value ($B = 103.175$, $p < .001$) indicates that without considering other variables, the baseline of students' learning outcomes already stood at that level. The variable *Cognitive Flexibility* had a significant positive coefficient ($B = .509$, $Beta = .281$, $t = 5.575$, $p < .001$), which means that the higher the students' cognitive flexibility, the greater their learning outcomes. This result emphasizes that the ability to adapt thinking and adjust learning strategies plays a crucial role in academic success. Furthermore, the *Positive Affect* also showed a significant positive influence ($B = .421$, $Beta = .148$, $t = 2.934$, $p = .004$). This finding suggests that higher levels of positive emotions such as joy, enthusiasm, and motivation contribute significantly to supporting learning outcomes. In contrast, the *Negative Affect* had a significant negative influence ($B = –.970$, $Beta = –.327$, $t = –6.533$, $p < .001$). This means that the higher the level of negative emotions such as boredom, anxiety, or frustration, the lower the students' learning outcomes. Therefore, the table confirms that cognitive flexibility and positive affect enhance learning achievement, while negative affect acts as a major barrier that needs to be addressed in the learning process.

Table 6. Paired Samples Test Output

Measurement	N	Mean	Std. Deviation	Mean Difference	Percentage Increase	t	df	Sig. (2-tailed)
Pretest	27	58.67	10.25	–	–	–	–	–
Posttest	27	81.22	8.76	22.56	38.45%	14.84	26	< .001

The paired-samples t-test result on Table 6 demonstrated a statistically significant improvement in students' learning outcomes following the implementation of Wordwall-based interactive learning. The mean pretest score was 59.74 (SD = 2.60), while the mean posttest score increased substantially to 77.44 (SD = 3.00), indicating considerable learning progress after the intervention. Statistical analysis yielded $t(26) = 92.65$ with $p < 0.001$, confirming a highly significant difference between students' achievement before and after participating in Wordwall-supported learning activities. Furthermore, the ANOVA results revealed significant differences in learning improvement among students classified into low-, medium-, and high-ability groups ($p < 0.05$). Despite variations in the magnitude of improvement across these groups, all students experienced positive learning gains, with the low-ability group demonstrating particularly notable progress. These findings suggest that Wordwall-based interactive activities effectively enhance academic achievement while creating an engaging, accessible, and adaptive learning environment capable of accommodating differences in students' initial abilities and supporting more inclusive learning experiences.

Table 7. ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	53.54	2	26.77	4.05	.030
Within Groups	158.56	24	6.61		
Total	212.10	26			

Table 7 presents the one-way ANOVA results comparing students' learning outcomes across the Low, Medium, and High ability groups. The analysis yielded a statistically significant difference among the three groups, $F(2, 24) = 4.05$, $p = .030$. The between-group sum of squares was 53.54, while the within-group sum of squares was 158.56, producing a total sum of squares of 212.10. These findings indicate that students' learning outcomes differed significantly across the three ability groups after the implementation of Wordwall-based interactive learning.

The ANOVA table shows an F value of 36.47 with a significance level of 0.000 ($p < 0.05$). This indicates that there were significant differences in the mean learning outcome scores among the groups of students with low, medium, and high ability levels after using Wordwall-based interactive games. In other words, the treatment provided through the use of Wordwall did not produce identical results across all groups but instead generated meaningful variations among them. A further interpretation reveals that the effectiveness of Wordwall can be viewed differently across the ability groups. Students with lower ability levels tended to experience more significant improvements because the interactive and visual features of the games helped them understand the material in a simpler and more enjoyable way. Meanwhile, students in the medium and high-ability groups also benefited through reinforcement of the material and increased learning motivation, although the gains were not as pronounced as those of the low-ability group. Thus, the ANOVA results confirm that Wordwall is effective for use in learning and adaptive to differences in students' ability levels.

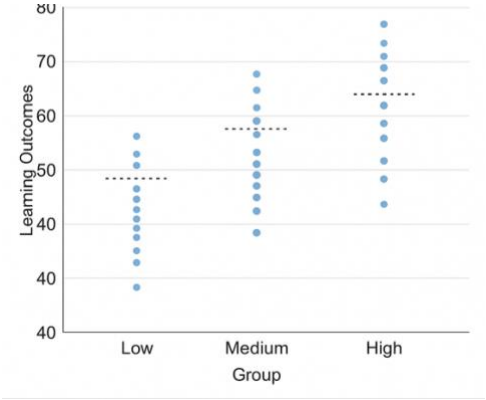


Figure 5. Dot Plot of Students' Learning Outcomes by Group

The dot plot on Figure 5 illustrates the distribution of students' learning outcomes divided into three ability groups: Low, Medium, and High. Each dot represents an individual score, while the dashed line indicates the mean score for each group. The visualization shows a clear pattern in which students in the low-ability group tended to have lower scores, the medium group displayed intermediate scores, and the high-ability group consistently achieved higher scores. These differences highlight the presence of meaningful variation in learning outcomes among the groups. In addition to the individual distribution, the mean lines emphasize that the use of Wordwall-based interactive games contributed to improvements in learning outcomes across all groups. Although there was some variation within each group, the overall trend indicates consistent progress in line with students' ability categories. Thus, the dot plot provides visual evidence that supports the statistical findings of the ANOVA, namely that there are significant differences in learning outcomes among groups. At the same time, it illustrates the effectiveness of Wordwall as a learning medium that adapts well to students with different ability levels.

Discussions

Improvement in Students' Social Studies Learning Outcomes

The findings demonstrate that Wordwall-based interactive learning was associated with a substantial improvement in elementary students' Social Studies learning outcomes. The movement of students from predominantly low and medium pretest categories toward medium and high posttest categories indicates that interactive digital activities supported stronger comprehension of environmental preservation concepts. This improvement is consistent with T. Handayani & Subekti (2025), who reported that the integration of Wordwall with Problem-Based Learning increased elementary students' science learning outcomes, with mastery increasing progressively across learning cycles. Similar evidence was provided by Sarifah et al. (2026), whose experimental implementation of Wordwall game-based interactive multimedia significantly improved mathematics achievement among fifth-grade elementary students. Furthermore, Rezeki & Amelia (2025) reported the effectiveness of Wordwall in strengthening mathematics learning, suggesting that its educational contribution is not restricted to a particular subject. Together, these studies reinforce the present finding that interactive digital learning can provide elementary students with opportunities to process information more actively than conventional information-delivery approaches.

The improvement can be explained through the interactive characteristics of Wordwall, particularly immediate responses, repeated practice, visual presentation, and active learner participation. Rather than receiving information passively, students are required to interpret questions, select responses, evaluate feedback, and reconsider incorrect understanding. Suparti et al. (2025) demonstrated that technology-supported interactive activities, including Wordwall, can contribute to meaningful and joyful learning by combining feedback, reflection, and active participation. Likewise, Adiansha & Diana (2025) found that integrating Wordwall within student-centered instruction supported elementary students' numeracy problem-solving skills. (Pastaza & Chirinos, 2026) further emphasize the potential of gamified digital strategies to facilitate the acquisition of basic concepts through interactive virtual environments. These findings provide a theoretical and empirical basis for interpreting the present improvement as more than a simple consequence of exposure to technology; rather, it reflects the pedagogical value of active interaction, feedback, repetition, and learner-centered participation embedded within the digital activity.

Student Engagement in Wordwall-Based Learning

A second important finding concerns the positive pattern of student engagement during Wordwall-based instruction. Engagement in this study encompassed Active Participation, Enthusiasm, Collaboration, Attention to Learning, Enjoyment, and Motivation, with positive relationships occurring across these dimensions. This multidimensional pattern suggests that engagement should not be interpreted merely as students enjoying digital games. Instead, enjoyment may encourage sustained attention, while enthusiasm and motivation can stimulate participation and collaboration. Suparti et al. (2025) similarly found that interactive technology contributed to mindful, meaningful, and joyful learning experiences among elementary students. (Lin, 2025) demonstrated that game-based learning and interactive classroom activities can simultaneously support academic participation, interpersonal interaction, confidence, and learning motivation. In addition, Pastaza & Chirinos (2026) highlight the capacity of gamified digital environments to encourage active learner interaction. These studies support the interpretation that the educational value of Wordwall emerges from interconnected cognitive, emotional, and social engagement rather than entertainment alone.

Nevertheless, technology itself should not be regarded as the sole mechanism producing engagement. The effectiveness of digital media depends substantially on how teachers integrate technology, pedagogy, content, feedback, and classroom interaction. Rahma et al. (2026) emphasize the importance of teachers' integration of technological, pedagogical, and content knowledge in creating learning environments that stimulate students' higher-order thinking. Similarly, Fajari et al. (2026) highlight the importance of teachers' perceptions and pedagogical readiness in utilizing technology-based learning media in elementary education. Lin (2025) further demonstrates that teacher facilitation, positive interaction, collaborative activities, and supportive classroom environments influence students' motivation and participation. Accordingly, the positive engagement identified in the present study should be understood as the product of interaction between Wordwall's digital affordances and teachers' pedagogical facilitation. Wordwall provides opportunities for interaction, but teachers transform those opportunities into meaningful learning through explanation, discussion, feedback, and connections between digital tasks and environmental experiences.

Internalization of Environmental Conservation Values

The findings also extend beyond academic achievement by demonstrating the potential of Wordwall to support students' understanding and early internalization of environmental conservation values. Environmental education requires students not only to recognize concepts such as cleanliness, waste management, and responsible resource use but also to understand their relevance to everyday life. The current study therefore positions digital interaction as an instructional pathway rather than assuming that technology directly produces environmentally responsible behavior. This interpretation is consistent with Chien & Yu (2026), who demonstrated that appropriately structured educational interventions can strengthen elementary students' knowledge in disaster-prevention education. Suparti et al. (2025) likewise found that interactive learning incorporating reflection, feedback, and personal-experience connections supported meaningful learning and moral-value understanding. Moreover, Lin (2025) emphasizes that active participation and socially meaningful learning environments can contribute to broader attitudinal and interpersonal development. Collectively, these findings suggest that value-oriented learning becomes stronger when knowledge is connected with interaction, reflection, contextual experiences, and opportunities for application.

Accordingly, the relationship between Wordwall and environmental conservation values can be interpreted through a sequence of digital interactivity → engagement → meaningful understanding → value internalization → environmentally responsible practices. Interactive questions attract students' attention; feedback helps correct misconceptions; repeated participation reinforces concepts; and teacher-guided reflection connects those concepts with real environmental situations. This interpretation corresponds with the theoretical framework already established in the manuscript, which conceptualizes digital interactivity as operating through cognitive, affective, and behavioral processes rather than directly producing behavioral change. However, the present evidence should not be interpreted as demonstrating permanent environmental behavior. The study primarily measured learning outcomes and engagement within a relatively limited instructional period. Consequently, the strongest conclusion is that Wordwall supports the early internalization of environmental conservation values, while longitudinal research involving observations at school, home, and community levels would be required to establish whether these values develop into sustained environmental behavior.

Differences Across Ability Levels and Pedagogical Implications

The differences identified among low-, medium-, and high-ability students further demonstrate that interactive learning does not necessarily affect every learner identically. The manuscript reports statistically significant differences among the three ability groups, $F(2, 24) = 4.05$, $p = .030$. Students with lower initial ability may benefit particularly from visual presentation, repeated practice, simplified interaction, and immediate feedback, whereas medium-ability students may use Wordwall to consolidate knowledge and correct misconceptions. Higher-ability students may benefit through reinforcement, rapid application, and continued motivational challenge. This interpretation is consistent with Sarifah et al. (2026), who demonstrated Wordwall's effectiveness among fifth-grade elementary students, and Adiansha & Diana (2025), who showed that student-centered Wordwall integration supported problem-solving development. Suparti et al. (2025) additionally emphasized the value of technology-supported

instruction for adaptive and inclusive learning, particularly when feedback and instructional scaffolding are incorporated.

These findings have important pedagogical implications. Wordwall should not simply reproduce identical questions for every learner; its interactive features can be combined with differentiated difficulty levels, scaffolding, feedback, collaboration, and increasingly complex environmental problems. Rahma et al. (2026) emphasize that effective technology integration depends on the interaction between technological resources, pedagogical strategies, and subject content, while Lin (2025) highlights collaborative and game-based activities as mechanisms for accommodating social and academic learning needs. Fajari et al. (2026) similarly underscore the importance of teacher capacity in effectively implementing emerging learning technologies. Thus, the contribution of Wordwall lies not in technology alone but in the instructional design surrounding its use. The present findings therefore extend previous research by positioning Wordwall as a medium connecting academic achievement, multidimensional student engagement, differentiated learning, and environmental value education. Future studies should use larger samples, control groups, and longitudinal designs to determine whether these improvements persist and whether environmental awareness developed through interactive classroom learning translates into sustained ecological practices.

CONCLUSION

Conclusion

This study demonstrates that the use of Wordwall-based interactive games significantly improved students' learning outcomes in Social Studies at the elementary level. The comparison of pretest and posttest scores showed a clear shift from the low category to the medium and high categories, with a statistically significant average increase. These findings indicate that technology-based learning media not only strengthen students' cognitive understanding but also enhance their motivation, focus, and active participation in the learning process. Wordwall proved effective as a medium that presents material in a more engaging and contextual way, enabling students to connect abstract concepts with real-life situations. Beyond cognitive gains, the study also revealed that Wordwall fosters students' emotional, social, and collaborative engagement. The majority of students responded positively to the learning experience with Wordwall, which encouraged the development of environmental awareness through enjoyable and meaningful game-based activities. Teachers also observed that this medium helped create a more interactive and participatory classroom atmosphere, while contributing to the early cultivation of environmental preservation values. Thus, Wordwall can be regarded as an innovative and adaptive learning strategy for students across different ability levels, supporting the achievement of curriculum objectives in knowledge, attitudes, and skills.

Recommendations

Based on the findings, it is recommended that elementary school teachers actively integrate interactive media such as Wordwall into Social Studies as well as other subjects, since it has been proven effective in improving learning outcomes, student engagement, and environmental awareness. Furthermore, schools and educational policymakers are encouraged to provide support through teacher training, technological facilities, and the integration of digital media into the

curriculum to ensure that learning innovations can be implemented optimally, sustainably, and equitably across all levels of elementary education.

REFERENCES

Adiansha, A. A., & Diana, N. (2025). The Impact of Integrating the Wordwall Website in Student-Centered Learning on Numeracy Problem-Solving Skills in Elementary Schools. *International Journal of Information and Education Technology*, *15*(9), 1797–1803. https://doi.org/10.18178/ijiet.2025.15.9.2381

Ambarwati, R. D., Bintartik, L., & Putra, A. P. (2020). The Development of An Interactive E-Module with The Self-Reinforcing Character for Elementary School Students. *Proceedings of the 1 st International Conference on Information Technology and Education (ICITE 2020)*. https://doi.org/10.2991/assehr.k.201214.247

Amelia, R., Zamzani, Mustadi, A., Ghufron, A., Suriansyah, A., & Aslamiah. (2023). Parental Involvement in Digital Learning: Mother's Experiences of Elementary School Students. *International Journal of Interactive Mobile Technologies (iJIM)* (Vol. 17, Issue 10, pp. 118–135). https://doi.org/10.3991/ijim.v17i10.38253

Andayani, A., Saputra, A. H., Irianto, E., & Setiawan, B. (2022). GESAMSU (Gedrik Saruk Memang Seru) Based Environmental: Effectiveness Of Games On Mathematics Communication Ability Of Elementary School Students. *AL-ISHLAH: Jurnal Pendidikan* (Vol. 14, Issue 2, pp. 2359–2368). https://doi.org/10.35445/alishlah.v14i2.1745

Andriningrum, H., Faruqi, R. A., Gunawan, I., Surjono, H., & Latifah, N. (2022). Prototype of Interactive Multimedia Learning About Natural Resources and Energy to Elementary School Students. *2022 2nd International Conference on Information Technology and Education (ICIT&E)* (pp. 65–69). https://doi.org/10.1109/ICITE54466.2022.9759901

Arini, N. K. M., Tegeh, I. M., & Jayanta, I. N. L. (2024). Digital Comic Learning Media Based on Entrepreneurship to Instill an Entrepreneurial Spirit in Elementary School Students. *Mimbar Ilmu* (Vol. 29, Issue 2, pp. 291–301). https://doi.org/10.23887/mi.v29i2.74867

Arrasyid, A. K., Herpratiwi, H., & Yulianti, D. (2022). Instilling Positive Character Values through Project-Based Learning for Private Elementary School Students in Lampung Province, Indonesia. *Jurnal Pendidikan Progresif* (Vol. 12, Issue 3, pp. 1408–1422). https://doi.org/10.23960/jpp.v12.i3.202231

Bang, H. J. (2021). Evaluation of a Personalized Game-Based Program Designed to Improve Early Elementary School Students' Math Performance. *Proceedings of the 2021 AERA Annual Meeting*. https://doi.org/10.3102/1688980

Bujuri, D. A., Muqowim, Baiti, M., Handayani, T., Saputra, A. D., Shawmi, A. N., & Abron, F. (2023). Environmental-Based Character Education: Implementation of Lampung Society Life Philosophy Values (Piil Pesenggiri) In Elementary School. *International Journal of Elementary Education* (Vol. 7, Issue 2, pp. 243–254). https://doi.org/10.23887/ijee.v7i2.59250

Chien, C.-W., & Yu, S.-H. (2026). Influence of integration of assessment as learning into disaster prevention education on Taiwanese sixth graders' knowledge and word recognition. *International Journal of Innovation and Learning*, *39*(2), 202–220. https://doi.org/10.1504/IJIL.2026.151468

Dewi, S. M., DS, Y. N., Sa'diah, T. L., Sa'adah, H. M. R., & Harmawati. (2024). Wordwall Media with a Gameshow-Quiz Type to Increase Students' Interest in IPAS Learning at Elementary School. *MIMBAR PGSD Undiksha* (Vol. 12, Issue 2, pp. 312–320). https://doi.org/10.23887/jjpgsd.v12i2.78681

Fajari, L. E. W., Salimi, M., Apriani, I. F., Hahsa, N., Yudianto, A., Rudiansah, R., Revalina, M., & Az-Zahra, T. (2026). Teachers' Perceptions of the Utilization of Artificial Intelligence (AI)-Based Learning Media in Elementary Schools. *International Journal of Technology in Education and Science*, *10*(3), 529–543. https://doi.org/10.46328/ijtes.6564

Ferdiyansyah, A., Suhartono, S., & Nihayati, N. (2022). Development of Interactive Teaching Materials Based on Android Application for Elementary School Students. *Sekolah Dasar: Kajian Teori dan Praktik Pendidikan* (Vol. 31, Issue 1, p. 13). https://doi.org/10.17977/um009v31i12022p013

Fianto, Z. A., Kawuryan, S. P., Saptono, B., Mujinem, & Putri, G. M. (2024). Perceptions of Elementary School Teacher Education Students on the Use of Wordwall Interactive Media as a Quiz. *Jurnal Ilmiah Sekolah Dasar* (Vol. 8, Issue 1, pp. 101–109). https://doi.org/10.23887/jisd.v8i1.65492

Gustian, U., Sastaman, P., & Nemeth, Z. (2023). Using net games to stimulate the motor competence of elementary school students. *Jurnal Keolahragaan* (Vol. 11, Issue 2, pp. 152–161). https://doi.org/10.21831/jk.v11i2.54555

Handayani, A., & Sari, E. F. (2024). Development of website-based construct 2 interactive multimedia for elementary school students at natural science learning content. *JPPI (Jurnal Penelitian Pendidikan Indonesia)* (Vol. 10, Issue 4, pp. 592–601). https://doi.org/10.29210/020244461

Handayani, T., & Subekti, D. A. (2025). The improvement of student learning outcomes through the problem based learning using wordwall media in science subject. *AIP Conf. Proc.* (Vol. 3333, Issue 1). https://doi.org/10.1063/5.0290228

Hani, D., Sugiatno, S., Rini, R., & Warsah, I. (2020). Active Learning Strategy Through Peer Lesson: An Effort to Instill Positive Behavior in Elementary School. *Pedagogik Journal of Islamic Elementary School* (pp. 1–14). https://doi.org/10.24256/pijies.v3i2.1450

Hardika, N., Asmawi, Moch., & Tangkudung, J. (2020). Analysis of Basic Motion Skill Learning Model of Upper-Class Elementary School Students Based on Games. *Proceedings of the 4th International Conference on Sport Science, Health, and Physical Education (ICSSHPE 2019)*. https://doi.org/10.2991/ahsr.k.200214.099

Herlina, & Melani, H. P. (2022). Development of Learning Materials Based on Processed Plastic Waste Products as an Effort to Instill Environmental Care in Elementary School Students. *IOP Conference Series: Earth and Environmental Science* (Vol. 1075, Issue 1, p. 12053). https://doi.org/10.1088/1755-1315/1075/1/012053

Hermita, N., Alim, J. A., Putra, Z. H., Gusti, P. M., Wijaya, T. T., & Pereira, J. (2021). Designing interactive games for improving elementary school students' number sense. *Al-Jabar: Jurnal Pendidikan Matematika* (Vol. 12, Issue 2, pp. 413–426). https://doi.org/10.24042/ajpm.v12i2.9983

Husna, F., Jamin, H., & Juliandi, R. (2021). The Effects of Mobile Games on Elementary School Students' Achievement in Aceh. *Jurnal Basicedu* (Vol. 6, Issue 1, pp. 308–314). https://doi.org/10.31004/basicedu.v6i1.1879

Indrawan, I. K. O., & Yudiana, K. (2022). Types of Force and Their Utilization: Guided Inquiry-Based Interactive E-LKPD for Fourth Grade Elementary School Students. *MIMBAR PGSD Undiksha* (Vol. 10, Issue 2, pp. 376–385). https://doi.org/10.23887/jjpgsd.v10i2.47364

Julianti, R. R., Suherman, A., Ma'mun, A., Budiana, D., Sari, E. F. N., Ridwan, M., & Festiawan, R. (2024). Implementation of intentionally structured psychosocial through folk games and traditional sports in elementary school students. *Retos* (Vol. 60, pp. 810–815). https://doi.org/10.47197/retos.v60.108208

Khairani, L. A., Djulia, E., & Bunawan, W. (2023). Development Of Stem-Based Interactive Multimedia On Human Digestive System For Elementary School. *ELEMENTARY SCHOOL JOURNAL PGSD FIP UNIMED* (Vol. 13, Issue 2, pp. 205–212). https://doi.org/10.24114/esjpgsd.v13i2.46189

Knorr, N., & Berkling, K. (2020). Comparing pupils and teacher's reflections on iRead tablet-based literacy games in a German elementary school. *CALL for widening participation: Short papers from EUROCALL 2020* (pp. 161–166). https://doi.org/10.14705/rpnet.2020.48.1182

Kristiyawati, D., & Ary, D. da. (2024). Interactive Multimedia Utilizing Adobe Flash for Elementary School Students' Fine Art. *Sekolah Dasar: Kajian Teori dan Praktik Pendidikan* (Vol. 33, Issue 2, pp. 147–159). https://doi.org/10.17977/um009v33i22024p147-159

Lin, M.-A. (2025). Research on Teacher Professional Development for Social-Emotional Learning in Mathematics Education. *Journal of Research in Education Sciences*, *70*(3), 133–166. https://doi.org/10.6209/JORIES.202509_70(3).0005

Maola, P. S., & Irianto, D. M. (2023). Development of Interactive Media Scratch-Based Educational Games on Environmental Conservation Materials in Elementary Schools. *Jurnal Kependidikan: Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran* (Vol. 9, Issue 4, p. 1290). https://doi.org/10.33394/jk.v9i4.9254

Munastiwi, E. (2021). Synergy of Parents and Teachers in Students Learning to Instill Religious and Moral Values in the Pandemic Period. *Jurnal Pendidikan Agama Islam* (Vol. 18, Issue 1, pp. 21–36). https://doi.org/10.14421/jpai.2021.181-02

Nivetiken, Desyandri, Montessori, M., & Zainil, M. (2024). Validity of PBL-Based Interactive Multimedia Teaching Material Development Using Powerpoint in Elementary School. *Jurnal Penelitian Pendidikan IPA* (Vol. 10, Issue 5, pp. 2752–2759). https://doi.org/10.29303/jppipa.v10i5.7006

Nugroho, S. A., Trisniawati, T., & Rhosyida, N. (2022). Developing powerpoint-based interactive multimedia of mathematics learning multiples and factors materials for elementary school. *Advances in Mobile Learning Educational Research* (Vol. 2, Issue 2, pp. 411–420). https://doi.org/10.25082/AMLER.2022.02.00910.25082/AMLER.2022.02.009

Pastaza, R. M. C., & Chirinos, R. A. G. (2026). Gamified Digital Strategies for Learning Basic Concepts in Early Childhood Education Through Virtual Environments. *Journal of Intelligent Decision Making and Information Science*, *3*(4S), 332–344. \https://doi.org/10.59543/jidmis.v3.1032

Putri, D. S., & Ahmadi, F. (2024). Development of ABEL KERINDO Interactive Multimedia based on Articulate Storyline to Learn Social Science for Alpha Generation Students in

Elementary School. *Sekolah Dasar: Kajian Teori dan Praktik Pendidikan* (Vol. 33, Issue 2, pp. 160–176). https://doi.org/10.17977/um009v33i22024p160-176

Putri, W. F. S., & Sutama, S. (2024). SAS-Oriented Pop Up Book Interactive Media: Developing the Beginning Reading Ability of Grade Elementary School Students. *Proceeding ISETH (International Summit on Science, Technology, and Humanity)* (pp. 728–735). https://doi.org/10.23917/iseth.4024

Qomariyah, U. (2022). Conflicts of Women's Role in Utilizing Conservation Values: Critical Examination of Environmental Perspective Works. *Advances in Social Science, Education and Humanities Research*. https://doi.org/10.2991/assehr.k.211125.098

Rahma, F. I., Sa'dijah, C., & Rufiana, I. S. (2026). Transformational teachers' technology, pedagogy, and mathematics content knowledge to stimulate primary school students' critical thinking. *Multidisciplinary Science Journal*, *8*(12). https://doi.org/10.31893/multiscience.2026562

Rezeki, S., & Amelia, S. (2025). Enhancing mathematics learning in phase E: assessing Wordwall effectiveness. *International Journal of Evaluation and Research in Education*, *14*(2), 1246–1252. https://doi.org/10.11591/ijere.v14i2.30051

Sahidullah, A. (2022). Environmental awareness among High School Students: A study in Majuli District of Assam, India. *Ecology, Environment and Conservation* (pp. 347–351). https://doi.org/10.53550/EEC.2022.v28i01.051

Saputra, P. I., Listiani, I., Widiyaningrum, H. K., & Utomo, S. W. (2024). Strengthening Critical Thinking of Elementary School Students through Android-Based iSpring Suite Interactive Media. *EDUKASIA: Jurnal Pendidikan dan Pembelajaran* (Vol. 5, Issue 2, pp. 241–252). https://doi.org/10.62775/edukasia.v5i2.1389

Sarifah, I., Maesaroh, S., Marini, A., Yarmi, G., Safitri, D., Zahari, M., & Dewiyani, L. (2026). Development of interactive multimedia wordwall games to improve mathematic learning outcomes for fifth-grade elementary school students. *AIP Conf. Proc.* (Vol. 3332, Issue 1). https://doi.org/10.1063/5.0328644

Setiawati, I., Wardani, S., & Lestari, W. (2024). Development of Wordwall-based Indonesian Geographical Condition Assessment Instrument in Modipaskogo E-Book for Elementary School Students. *Riwayat: Educational Journal of History and Humanities* (Vol. 7, Issue 1, pp. 48–65). https://doi.org/10.24815/jr.v7i1.36597

Sgrò, F., Coppola, R., Schembri, R., & Lipoma, M. (2021). The effects of a tactical games model unit on students' volleyball performances in elementary school. *European Physical Education Review* (Vol. 27, Issue 4, pp. 1000–1013). https://doi.org/10.1177/1356336X211005806

Souza, J. G. R. de, & Prates, R. O. (2024). Identifying Challenges for Elementary School Teachers in Building Digital Games through a Workshop. *Journal on Interactive Systems* (Vol. 15, Issue 1, pp. 362–374). https://doi.org/10.5753/jis.2024.3951

Sumarwati, Anindyarini, A., Suryanto, E., Hadiyah, Muftihah, N., & Alfien, Moh. F. (2024). The Literacy of Elementary School Students on Food and Environmental Sustainability Values in Local Wisdom. *Mimbar Ilmu* (Vol. 29, Issue 3, pp. 390–400). https://doi.org/10.23887/mi.v29i3.82264

Suparti, S., Milawati, M., & Kholiq, A. (2025). Dynamic Assessment as A Strategy to Enhance Deep Learning in Narrative Writing for Elementary School Students. *Educational Process: International Journal*, *17*. https://doi.org/10.22521/edupij.2025.17.385

Swarmahardika, I. K. P., & Widiana, I. W. (2024). Interactive Learning Media Based on Augmented Reality to Improve Elementary School Grade V Students' Understanding of the Water Cycle Concept. *MIMBAR PGSD Undiksha* (Vol. 12, Issue 2, pp. 351–359). https://doi.org/10.23887/jjpgsd.v12i2.74930

Tiara, Y., Lestari, W., & Widiarti, N. (2024). Development of Assessment Instruments on Technology for Life Materials Based on Wordwall in Typhoon E-Book for Elementary School Students. *Riwayat: Educational Journal of History and Humanities* (Vol. 7, Issue 1, pp. 131–137). https://doi.org/10.24815/jr.v7i1.36697

Tukina, Baderiah, & Firman. (2022). Development of Interactive Learning Model Teams Games Tournament Assisted Media Rolling Ball Game in Elementary School. *Didaktika: Jurnal Kependidikan* (Vol. 11, Issue 1, pp. 37–48). https://doi.org/10.58230/27454312.124

Uly, H. Y. P. (2023). Learning Fun With Games Kahoot For Elementary School Students Grade 1. *JOINCS (Journal of Informatics, Network, and Computer Science)* (Vol. 6, Issue 2, pp. 65–69). https://doi.org/10.21070/joincs.v6i2.1600

Wahyuningsih, A., & Nurdyansyah, N. (2023). Time Unit Interactive Ebook to Improve Logical Thinking Skills for Grade 2 Elementary School Students. *Journal of Islamic and Muhammadiyah Studies* (Vol. 4). https://doi.org/10.21070/jims.v4i0.1547

Yusnidar, Y. (2023). The Impact of Unidentified Elementary School Students' Character Values in the Independent Curriculum Class IV Science Science Teacher's Book. *Journal of Basic Education Research* (Vol. 4, Issue 3, pp. 112–117). https://doi.org/10.37251/jber.v4i3.727