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Analysis of the Effectiveness of Wordwall Media Use on Science Learning Outcomes in Elementary Schools

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ABSTRACT

Objective: This study aims to evaluate the effectiveness of using wordwall media on science learning outcomes at the primary school level. This research is important to explore the use of interactive technology in improving student understanding and academic achievement in science lessons. **Method:** This study aims to evaluate the effectiveness of using wordwall media on science learning outcomes at the primary school level. This research is important to explore the use of interactive technology in improving student understanding and academic achievement in science lessons. **Results:** The analysis showed that using Wordwall media significantly improved science learning outcomes and learning motivation and created a more interactive and fun learning atmosphere for students. The advantages of Wordwall include active student engagement, increased information retention, personalized learning, collaboration, and real-time feedback. Several studies have shown an increase in the average student score after using Wordwall and increased student activeness and enthusiasm in following the learning process. **Novelty:** The novelty of this study lies in exploring the specific use of Wordwall in the context of science learning in elementary school and its impact on improving student learning outcomes. Although Wordwall has been widely researched in education in general, this study provides new insights into how this interactive media can effectively improve the quality of science learning at the primary school level and provides recommendations for integrating technology in science teaching.

INTRODUCTION

Education is a significant element of nation-building. In this digital era, conventional learning methods are shifting to digital technology for teaching and learning activities (Leandro et al., 2022). One way to integrate technology into teaching is through learning media (Chandra et al., 2024). An increasingly popular teaching tool is the Wordwall, which provides a variety of interactive educational games (Vivi & Rulviana, 2023). In the realm of learning at the primary school level, student learning outcomes are often the main concern (Bai et al., 2020; Huang et al., 2020; Sitopu, 2024; Syawaluddin et al., 2020; Wahono et al., 2020). Science subjects that are often considered complicated and dull by some students require innovation in learning methods to optimize the achievement of student learning outcomes (Chen et al., 2020; Kawuryan et al., 2021; Samsudin et al., 2023; Simeon et al., 2022; Zhai, 2021).

Conventional teaching in the classroom often fails to maintain student interest, resulting in poor concept understanding and a lack of motivation to learn. Limited time and resources are also obstacles to providing optimal learning experiences for students (Duana et al., 2020). Therefore, innovative solutions are needed to overcome these challenges and improve the quality of science learning in primary schools.

Wordwall Media is a promising solution for creating a fun and interactive learning experience. Wordwall features quizzes, puzzles, and games to engage with the science

material (Indah et al., 2023). According to Hasanah et al. (2024), using Wordwall media in science learning is a teaching aid and is also expected to motivate student learning. Wordwall offers a variety of game templates for interactive student engagement, creating interactions that can encourage students to participate more enthusiastically in the teaching and learning process (Arina & Arif, 2023).

Implementing Wordwall in science learning in primary schools significantly improves student learning outcomes as it allows for a more creative and interactive teaching approach. More intensive student participation in the teaching and learning process through interactive Wordwall activities increases their learning motivation (Arsini et al., 2022; Az Zahrah & Anwar, 2023; Fouche & Moodley, 2022; Igir et al., 2024; Perspectives et al., 2023), which in turn contributes to an overall improvement in academic outcomes. Independent learning facilitated by Wordwall also supports improving student learning outcomes (Nana et al., 2023).

Various studies have stated that using interactive media to learn can improve student learning outcomes. Research conducted by Lestari et al. (2024) stated that Wordwall can increase students' understanding and mastery of learning concepts and has face-to-face and online flexibility. Research conducted by Isma and Irwan (2023) found that wordwall media can make students more participatory and enthusiastic in teaching and learning activities so that students can respond actively, ask questions, and show more optimal learning outcomes. Then, research by Savira and Gunawan (2022) suggests that word walls can help students understand the material and make it easier to determine the achievement of student learning outcomes.

The formulation of the problem in this study is how the effectiveness of using Wordwall media on student science learning outcomes in elementary schools. This study aims to measure how much Wordwall media can improve students' science learning outcomes in elementary schools and provide recommendations for teachers in implementing interactive learning media. This study offers a new perspective by exploring the effectiveness of wordwall utilization in science learning at the primary school level. The main focus of this research is to evaluate the impact of using Wordwall on students' interest in learning and their understanding of science concepts, thus optimizing overall learning outcomes. By utilizing the latest technology, this research is expected to provide fresh insights into developing innovative and effective learning methods to be applied.

RESEARCH METHOD

The method applied in this research is a Systematic Literature Review (SLR). SLR is research that focuses on a particular topic by prioritizing one main question that has been identified, evaluated, selected and concluded systematically according to predetermined criteria based on data from quality research that matches the question (Anggraeni et al., 2023; Prahani et al., 2020; Saphira, 2022; Saphira et al., 2023; Setyowidodo et al., 2020). The preparation of a scientific literature review is intended to communicate new ideas and data to the reader, according to previous studies (Matthieu, 2021). The aim is to improve understanding and complement the corpus of literature already available (Latifah & Ritonga, 2020). The stages that must be carried out in compiling a literature review, according to Alphonse (2023), are shown in Figure 1.

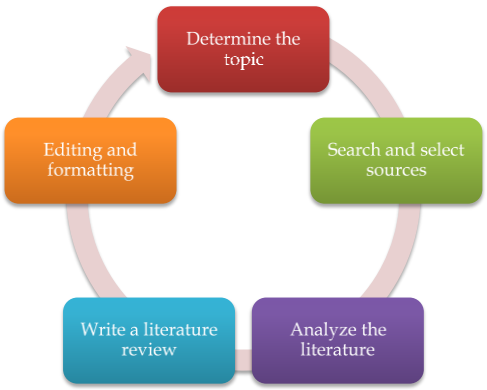

Figure 1. Steps of literature review.

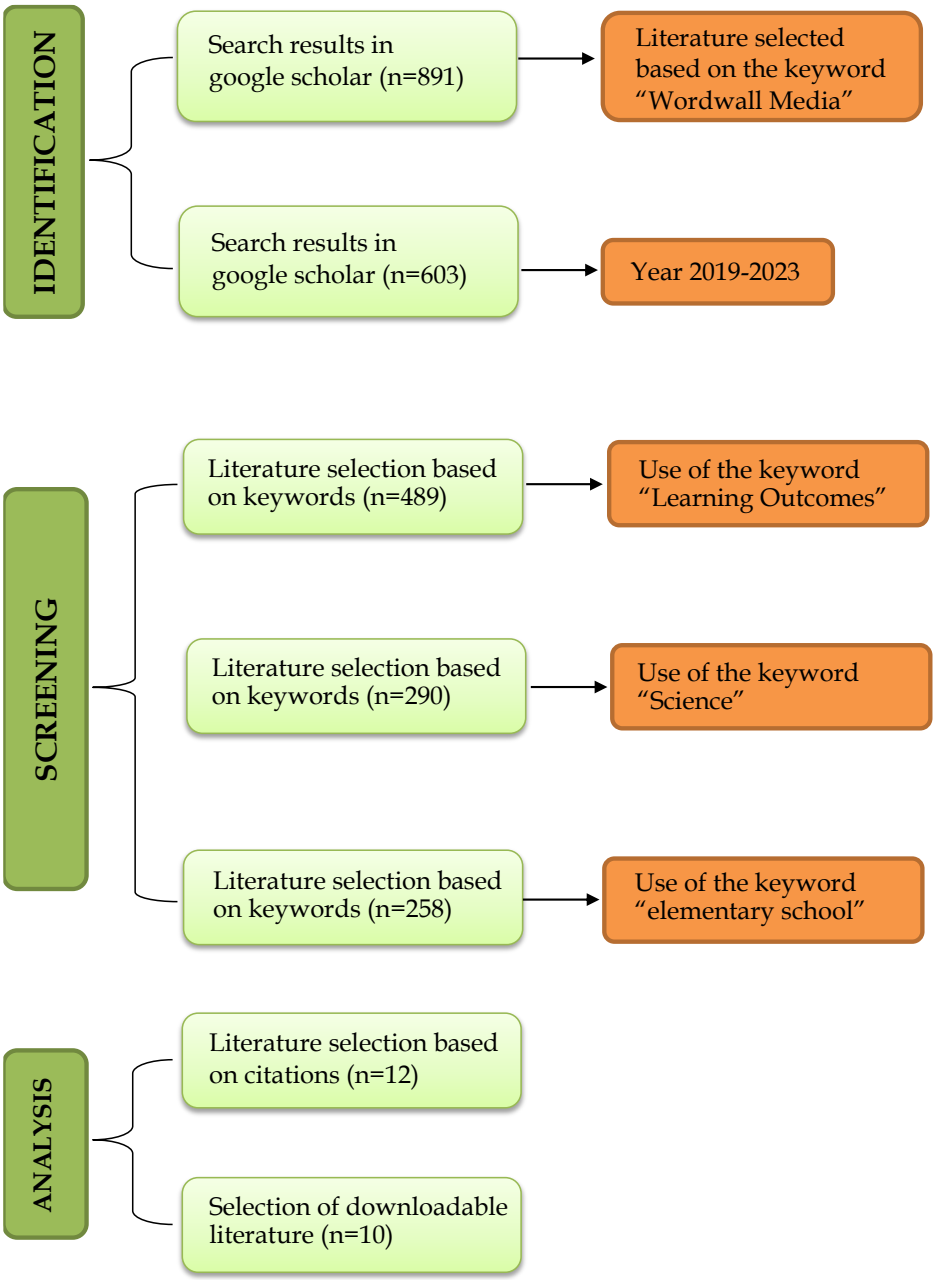

Figure 2. The inclusion criteria stage is related to using Wordwall media on science learning outcomes in elementary schools.

This research focused on a literature review of articles listed in academic databases from 2019-2023 to May 2024. The search was conducted on Scholar.google.com with three main steps: Identification, Screening, and Analysis. At the Identification stage, a search on Google Scholar using the keyword " Wordwall Media " yielded 891 articles. With the 2019-2023 publication year restriction, the number of articles found decreased to 603. The Screening stage involved further selection using specific keywords such as "Learning Outcomes," "Science," and " Elementary School," which resulted in 489, 290, and 258 articles, respectively. At the Analysis stage, articles that could be downloaded and analyzed further were selected, resulting in 10 articles for in-depth review. Each stage in this research aims to narrow down the number of articles until the most relevant and accessible literature is found to be analyzed in this study, which is explained through the illustration in Figure 2.

RESULTS AND DISCUSSION

Results

The first step in the article document search stage is to utilize access to the Google Scholar database through the page https://scholar.google.com/. Eight hundred ninety-one documents were collected through a literature search with the first keyword, "Wordwall Media." This research focuses on articles searched using four keywords: word wall media, learning outcomes, science, and elementary schools for 2019-2023. The results of the calculation of articles obtained over the last five years are described in Figure 3.

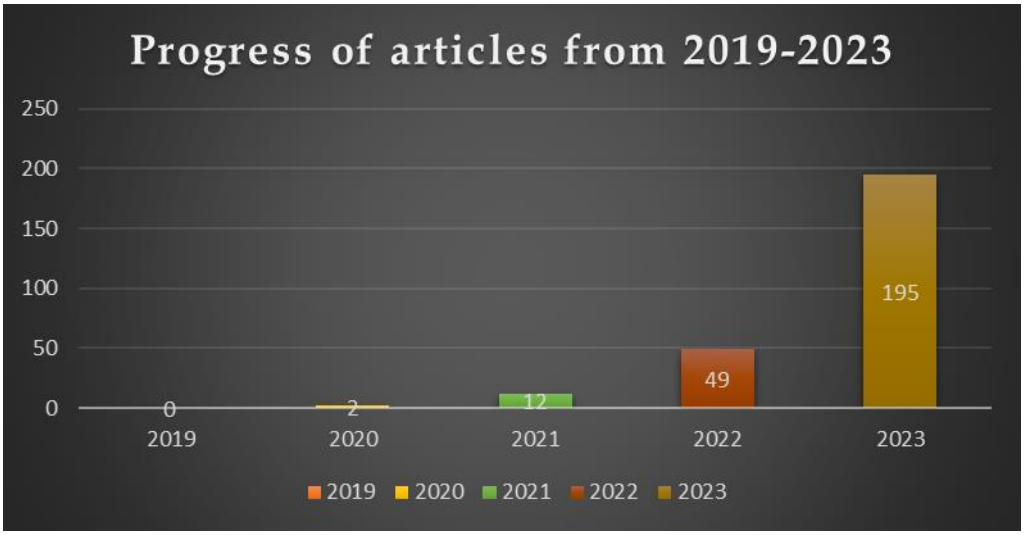

Figure 3. Article progression from 2019 to 2023.

Based on Figure 3, it can be seen that the number of articles published on Google Scholar has increased significantly from 2019 to 2023. Two thousand nineteen no articles were published (total: 0). However, in 2020, there was a slight increase in the publication of 2 articles. This increase continued until 2021, with 12 published articles showing a more significant increase than the previous year. 2022, there was a considerable spike, with 49 articles published, reflecting increased interest and productivity in scientific publications. The culmination occurred in 2023, when the number of articles published reached 195, showing a very drastic and significant increase compared to previous years. Overall, this data shows a consistent and positive increase in the number of articles published in Google Scholar over the five years. The

following is the calculation of the mean or average of articles published in the Google Scholar database.

$$\tilde{x} = \frac{Number\ of\ articles}{Number\ of\ years}$$

$$\tilde{x} = \frac{258\ articles}{5\ years} = 52\ \text{Articles}$$

With this, if rounded up, the average number of articles published each year in the Google Scholar database amounts to about 52 articles. Based on the literature search on using Wordwall media on science learning outcomes in elementary schools, 891 articles were found with the keyword "Wordwall media." Then, the search was limited to the range of 2019-2023, resulting in 603 articles. Next, by adding the keyword "learning outcomes," 489 articles were found, which were then restricted to the keywords "science" and " elementary school," resulting in 290 and 258 articles, respectively. Lastly, after being limited to 12 citations, ten articles were obtained. Ten articles will be reviewed based on the citation restriction results to review the effectiveness of using Wordwall media on science learning outcomes in elementary schools. The ten articles will be reviewed in Table 1.

Table 1. Finding result.

Articles	Research Methods	Research Results
Analysis of the Use of Wordwall Application in Grade IV Science Learning at SDN Ciracas 05 Pagi (Aidah & Nurafni, 2022).	The research applied a qualitative descriptive approach.	The study's results stated that Wordwall, as an interactive media, proved easy to use and offered various other options for delivering questions and materials. Wordwall's application helps students be more active and motivated during online learning.
Application of Problem-Based Learning (PBL) Model with Wordwall Media to Improve Science Learning Outcomes of Fifth-Grade Students of SDN Grudo 3 Ngawi (Octaviana et al., 2023).	The methods applied were Classroom Action Research.	The analysis indicates that applying the PBL model assisted by Wordwall can make learning engaging, interactive, and effective in improving science learning outcomes in elementary schools.
Development of Gasper Wuza Wordwall Media in Learning Science of Changes in the Form of Objects for Grade III Elementary School Students (Andini & Mintohari, 2023).	The research applies a Research and Development (R&D) approach using the ADDIE model.	The development research results showed that third-grade elementary school students were enthusiastic about using Wordwall Gasper Wuza media. Thus, the Wordwall Gasper Wuza platform is feasible for studying changes in the form of objects to improve learning outcomes.
Development of Learning Media Using Wordwall in Science Subjects for Grade V Elementary School (Amril et al., 2023).	The method was applied to research and development (R&D) with the ADDIE model.	The analysis results show that Wordwall increases students' learning motivation and learning outcomes and allows teachers to monitor students' abilities through score achievement. It is safe, easy to use, and meets students' needs.
The Effectiveness of Wordwall Website-Based	This research applied quantitative methods.	The research showed that the experimental class students who used

Articles	Research Methods	Research Results
Learning Media on the Learning Outcomes of Grade V Students in the IPAS Subject of Balanced Ecosystem Material at SDN Batuplat 1 (Koro et al., 2024).		Wordwall media were more enthusiastic and active in learning. They could learn while playing games provided on the Wordwall website, which significantly improved student learning outcomes.
The Effect of Game-Based Learning Model Assisted by Worldwall on Earth Material and Natural Events on Learning Outcomes of Grade V Students of SDN 060934 Medan (Sianturi, 2024).	The method applied is quantitative experimentation.	This research states that using a Game-Based Learning model with the help of a word wall significantly impacts students' learning outcomes regarding earth materials and natural events. Students in the experimental class that applied this teaching model showed superior learning outcomes than those in the control class.
Development of Learning Media Based on Wordwall Application in IPAS Learning to Improve Learning Outcomes of Grade IV Elementary School Students (Hasanah et al., 2024).	The method applied was Classroom Action Research.	Based on the results of the analysis, it was found that teaching aids using the Word Wall application effectively improved the learning outcomes of fourth-grade students in IPAS learning. In addition, student responses to Wordwall media were excellent, with an average satisfaction score of 86.6% and a category of "Very Interesting."
Analysis of the Use of Wordwall Interactive Media to Improve Science Learning Outcomes in Elementary Schools (Waluyo et al., 2024).	This research applies the literature study method.	The analysis indicates that the application of Word Wall as an interactive tool in science subjects in elementary schools has proven successful in optimizing student learning outcomes. In addition, Wordwall can create a more enjoyable classroom atmosphere, help learners explore the material better, and increase their participation in the learning process.
Improved Learning Outcomes of IPAS Class V Using Problem-Based Learning Model and Wordwall Media (Dwi et al., 2024).	The method applied was Classroom Action Research.	The analysis results stated that using word wall learning media can increase active participation and student learning outcomes in IPAS learning with the topic "Environmental Problems Threaten Life." Students can utilize the word wall to learn concepts, interact through questions and answers, and discuss in groups.
Application of Wordwall-Based Media to Improve Student Learning Outcomes in Science Class V Subjects (Lestari et al., 2024).	This research applied qualitative methods.	The analysis showed an improvement in the learning process regarding teacher and learner activities and student learning outcomes.

Discussion

Based on the analysis of 10 articles related to the use of wordwall media to improve science learning outcomes in elementary schools, several findings were obtained that show the effectiveness and benefits of this media in the context of primary education. Wordwall, as an interactive platform, is proven to be easy to use and offers various alternatives for delivering questions and materials, thus helping students to be more active and motivated during online learning (Aidah & Nurafni, 2022). This indicates that the wordwall can generate student participation in teaching and learning activities (Çil, 2021; Dwiningrum et al., 2024; Hidayaty et al., 2022; Jannah & Syafryadin, 2022; Kadwa & Alshenqeeti, 2020). Next, research by Octaviana et al. (2023) shows that using the Problem-Based Learning (PBL) model supported by Wordwall media can create engaging, interactive, and practical learning to improve science learning outcomes for elementary school students. Then, research by Andini & Mintohari (2023) revealed that the Gasper Wuza Wordwall media is feasible for learning the material of changes in the form of objects, improving student learning outcomes, and showing high student enthusiasm. It shows that Wordwall media helps students better understand abstract concepts in science subjects.

Wordwall makes students more enthusiastic about learning, improves learning outcomes, and allows teachers to observe students' abilities through the scores they get (Amril et al., 2023). This media is safe, practical, and adapted to the characteristics of students, making it an effective tool in science learning. Research by Koro et al. (2024) showed that students who used Wordwall media had higher enthusiasm and activeness towards teaching and learning activities, which positively improved student learning outcomes. The students can learn while playing games provided on the Wordwall website, which makes learning more fun and interactive (Hamidah et al., 2023; Saputri et al., 2023; Shabrina & Wahyu Taufiq, 2023; Sufraini et al., 2024; Swari, 2023). Research by Sianturi (2024) shows that the game-based learning model supported by Wordwall media positively impacts student learning outcomes in earth materials and natural events. Student learning achievement in the experimental class that applied the learning model was significantly higher than in the control class, demonstrating the effectiveness of Wordwall in improving science learning outcomes.

Analysis by Hasanah et al. (2024) found that the application of Wordwall media improved the learning outcomes of fourth-grade students on Science and Social lessons, with very positive student responses. In addition, student responses to Wordwall media were excellent, with an average satisfaction score of 86.6% and categorized as "Very Interesting." Research by Waluyo et al. (2024) indicates that interactive wordwall media in science lessons at primary schools can successfully improve students' learning outcomes by aiding their understanding of the material and engagement. Media ini disarankan sebagai sarana untuk mendukung proses pembelajaran dan evaluasi. The following research by Dwi et al. (2024) shows that using Wordwalls correctly can increase student participation and learning outcomes in science and social learning lessons with the material "Environmental Problems Threaten Life." Wordwall plays a role in helping learners understand concepts more deeply through interactive and engaging activities. Research by Lestari et al. (2024) shows that applying wordwall in science learning has significantly improved educator and student activities and learning outcomes. This shows that Wordwall can improve learning effectiveness and student learning outcomes.

The Effectiveness of Using Wordwall Media on Science Learning Outcomes in Elementary Schools

The growing digital era has made technology an integral part of everyday life, including education (Ningrum et al., 2024). Using wordwall media for natural science education at the elementary school level can bring many benefits to improving student learning outcomes (Aeni et al., 2023). Wordwall is an interactive teaching tool that allows teachers to create various games and activities that can be accessed online (Vanessa et al., 2023). Wordwall allows students to engage in teaching and learning through interactive games and activities (Vidnay & Valero, 2023). Examples of activities that can be created on a Wordwall include quizzes, word matching, crossword puzzles, and word search games. These activities require direct interaction from students, thus increasing their level of engagement compared to conventional teaching methods. This high engagement is vital because research shows active student engagement positively affects learning outcomes.

Learning media is essential in supporting learners in understanding new concepts (Hasan et al., 2021). In science learning, students must memorize and understand many concepts and terminologies. The Wordwall helps improve the retention of information by allowing students to repeatedly practice these concepts in various forms of play (Alla, 2023). As an example, a word-matching game can help students remember the definitions of various science terms, while repeated quizzes can develop their understanding of the concepts learned (Herkes et al., 2021; Lei & Reynolds, 2022; Purba et al., 2023; Sevigny et al., 2024; Slemrod et al., 2022). Repetition in a fun and interactive context makes students more likely to remember the information in the long term.

Wordwall allows teachers to customize the difficulty level and type of activity according to each student's needs (Tatsa & Pradani, 2022). This is especially important in science learning, where students' level of understanding can vary greatly. Teachers can create more straightforward activities for students who need additional support while providing more complex challenges for more advanced students (Olga, 2021). This personalized learning ensures that each student gets the optimal opportunity to understand and master the material. Activities on Wordwalls are often designed to be done in groups. For example, games such as crossword puzzles can be solved together by a group of students, encouraging them to collaborate and discuss the correct answers (Cooney & Darcy, 2020; Dugnol-Menéndez et al., 2021; Mshayisa, 2020; Qutieshat et al., 2022; Shohib, 2024; Vidergor, 2021). This collaboration not only helps in understanding the material but also develops social skills and teamwork. Students are taught to consider the views of others, brainstorm, and collaborate to achieve a common goal (Faith et al., 2019).

One of the advantages of Wordwall is its ability to provide immediate feedback to students (Annisa & Rudyanto, 2022). After completing the activity, students can immediately see their results and understand the mistakes they made. This real-time feedback is invaluable, allowing students to correct their understanding and learn from mistakes immediately. In learning science, where misunderstood concepts can lead to continued errors, this immediate feedback is essential to ensure correct understanding.

Using Wordwalls for primary school science learning can improve learning outcomes through active engagement, improved memory and retention, personalized learning, collaboration, real-time feedback, and ease of access (Listiana et al., 2023). By utilizing this medium's full potential, educators can build a more productive and enjoyable learning environment for students.

CONCLUSION

Fundamental Finding: This study found that using Wordwall interactive media in science learning in elementary schools proved effective in significantly improving student learning outcomes. Wordwall facilitates students' active engagement, increased information retention, personalized learning, collaboration, and real-time feedback, all contributing to improved learning outcomes. **Implication:** These findings imply that primary school teachers can adopt interactive media such as Wordwall in science teaching to create a more engaging, interactive, and practical learning environment. Wordwall can assist teachers in delivering science materials more interestingly and increase students' motivation and participation in learning. **Limitation:** Although research results show the effectiveness of Wordwall, it should be noted that using this media is highly dependent on proper design and management by the teacher. If not well designed or not effectively integrated into the learning process, the use of Wordwall may not provide maximum benefits. **Future Research:** Further research can be conducted to explore the impact of using Wordwall on students' academic achievement in the long term. In addition, research can be conducted to identify best practices in designing and integrating Wordwall into the elementary school curriculum to maximize its benefits.

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