Journal of Educational Sciences
Journal homepage: https://jes.ejournal.unri.ac.id/index.php/JES

P-ISSN 2581-1657
E-ISSN 2581-2203

The Effect of Wordwall Media with Interactive Boards on Students' Learning Outcomes in the Classification of Living Things

Dedek Azura*, Khairuna
Biology Education, Universitas Islam Negeri Sumatera Utara, Medan, 20371, Indonesia

ARTICLE INFO

Article history:

Received: 05 Aug 2025
Revised: 12 Aug 2025
Accepted: 03 Sept 2025
Published online: 10 Sept 2025

Keywords:

Wordwall Media
Interactive Board
Learning Outcomes
Classification of Living Things
Quasi-Experiment

* *Corresponding author:*

E-mail: dedekazura2@gmail.com

Article Doi:

https://doi.org/10.31258/jes.9.5.p.3777-3787

A B S T R A C T

This study aims to examine the effect of using wordwall interactive board-based media on student learning outcomes in the subject of classification of living things. The study used a quasi-experimental design with two groups, namely an experimental class that used interactive wordwall media and a control class that applied conventional learning methods. The research subjects consisted of 64 students who were divided evenly into two classes, 32 students in each class. The research instrument was a multiple-choice test administered at the pretest and post-test stages. The data were analyzed using an independent t-test after fulfilling the assumptions of normality and homogeneity. The results showed that the average post-test score of the experimental class (86.67) was higher than that of the control class (71.67). The independent t-test produced a t-value of 6.073 with a significance of 0.000 (< 0.05), indicating a significant difference between the two groups. Thus, it can be concluded that the use of interactive wordwall media contributes positively to improving student learning outcomes.

1. Introduction

Education is the foundation for national development, and in the era of globalization, technology has become the main driver of change in educational paradigms (Jenita et al., 2023). Education is a fundamental pillar for shaping future generations with values, knowledge, and skills that benefit society and the nation. In the digital era, technology transforms education by creating both opportunities and challenges for educators to design more meaningful, engaging, and effective learning experiences (Nursella, 2024). In education, the use of learning media facilitates material delivery, enhances student motivation, and promotes interactive learning with active feedback between educators and students (Audie, 2019).

The wordwall website offers various types of interactive games and quizzes provides facilitating student participation and active involvement in learning (Khairunisa, 2021). Wordwall is a instructional media grounded in interactive approaches application that offers a new learning experience with various interesting and diverse features, without being limited by space (Sinaga & Soesanto, 2022). Examples of activities that can be created on wordwall include quizzes, word matching, crossword puzzles, and word search games. These activities require direct interaction from students, thus increasing their engagement levels compared to conventional teaching methods (Lestari & Rohmani, 2024). The success of wordwall in enhancing learning interest is not only supported by data but also by several contributing factors. It allows students to learn through play, especially when integrated with the Team Games Tournament (TGT) model (Hidayaty et al., 2022).

Wordwall provides various game-based quiz templates such as multiple choice, crosswords, card sorting, matching pairs, and find the match that make learning more interactive and motivating. Its flexibility allows the tool to be used for both daily and semester evaluations (Nadia & Desyandri, 2023). According to (Pratiwi & Prastyo, 2025) There are three key aspects of using wordwall as a learning medium. It is easy to use across multiple devices, and its attractive design with diverse game options makes it engaging for students while stimulating their creativity.

Interactive whiteboards, or smartboards, are large touch-sensitive screens connected to computers. With the aid of a projector, visual content is displayed on the surface, enabling users to operate the computer using a pen, finger, stylus, or similar device (Belinda et al., 2023). According to (Baharudin et al., 2021) the use of Android apps and interactive whiteboards (IWBs) brings a new dimension to teaching and learning methods. This technology provides opportunities for children to explore learning independently while also helping them build and structure their understanding of new material.

The learning material related to the taxonomy of living organisms studies the grouping of living things according to their characteristics and similarities. This material discusses the scientific method of classifying living and non-living things, identifying them based on observable characteristics, and naming living things. (Hayati, 2022). In addition to the above, the relationship between the physical classroom and the student learning process is very important, because the school acts as a mediator between the classroom and the student learning process (González & León, 2022). In surah Al An'am verse 141 which explains that there is a diversity of plants based on taste, shape and color (Sari, 2023). Therefore, it is important to understand how student learning outcomes are greatly influenced by how the process of learning is implemented in a classroom setting.

Fundamentally, learning outcomes are the manifestation of changes in a person's behavior after going through the learning process (Irawati et al., 2021). Low student achievement indicates limited learning interest and challenges in teaching quality. At SMP Negeri 2 Perbaungan, interviews showed difficulties in understanding the

classification of living organisms, with an average score of only 70. This is partly due to the limited use of instructional media. Interactive learning media are therefore needed to enhance comprehension, foster active participation, and increase student motivation (Kusnadi & Azzahra, 2024). Using wordwall as a learning tool can be a way to contribute to the advancement of students' educational attainment.

Based on observations conducted on April 21, 2025, at SMP Negeri 2 Perbaungan, the use of interactive boards in science learning for class VII-1 was generally very good. The supporting facilities were in excellent condition (score 14/16), including the device's physical state, teacher competence, internet availability, and integration with laptops and speakers. In classroom practice, the interactive board was optimally used to present materials, display visual media, and engage students (score 16, good category). In terms of effectiveness, teachers quickly resolved technical issues, while students showed enthusiasm and reported that the media improved comprehension and made learning more enjoyable (score 14, very good category).

In research by (Nissa & Renoningtyas, 2021) examined the use of wordwall media in elementary school learning. However, studies on its effectiveness at higher levels, such as middle or high school biology classes, remain limited, highlighting the need for further exploration in science education. Research by (Zaitun et al., 2024) the implementation of wordwall positively impacts student interest in learning. This study shows that wordwall effectively enhances student engagement through a classroom action research (CAR) approach. However, its evaluation remains limited to learning interest and has not yet examined its effect on understanding more complex science concepts. Research by (Hidayaty et al., 2022) the use of wordwall as a learning medium has been shown to significantly improve student outcomes, with an increase of 79.4%. While many studies have examined its effect on learning achievement, research connecting wordwall with interactive boards in the context of classifying living things remains limited.

The purpose of this study is to improve student learning outcomes in the topic of classification of living things. This concept is very important in biology, but many students still have difficulty mastering it, resulting in low achievement. To overcome this problem, this study integrates wordwall with interactive whiteboards as innovative learning media. This combination is expected to create a more student-centered and enjoyable learning environment. Students are encouraged not only to absorb knowledge but also to actively build their understanding. This study also aims to evaluate how this approach can improve motivation and learning outcomes in biology.

2. Methodology

In this study, the approach used is quasi-experimental. This approach modifies the true experimental design, which is often less feasible in practice. Although it uses a control group, has limitations in controlling external factors that affect

experimental results (Syahrizal & Jailani, 2023). There were two classes used as research samples, which is designated as the experimental class and the control class. Students are provided with instruction through the use of interactive whiteboards. In this case, wordwall is used as a learning medium, while the control class did not receive treatment using interactive board-based word wall media in the learning process (Sukma & Handayani, 2022). The design of the experimental and control groups is presented in Table 1.

Table 1. Control Group Design

Group	Treat	Pre-test	Post-test
Exsperiment	X1	Y1	Q1
Control	X2	Y2	Q2

Reference: (Ayuanisah, 2023)

Information:
Y1 : Pre-test in the experimental class
Y2 : Pre-test on control class
Q1 : Post-test in the experimental class
Q2 : pre-test in control class
X1 : Use of interactive board-based wordwall media
X2 : Peuse of conventional methods

This study was conducted at SMP Negeri 2 Perbaungan (Galuh City, Perbaungan District, Serdang Bedagai Regency, North Sumatra Province) on Friday, January 9, 2025. In this research, the sample population consisted of students of a total of 64 students were involved in the study, consisting of class VII-1 that was categorized as the experimental group and class VII-2 that was categorized as the control group, with a distribution of 32 students per class. The sampling procedure utilized in this study was random sampling. The data collection instruments used to assess student learning outcomes were interviews with teachers and multiple-choice tests. The data collection stage was conducted through pre-tests and post-tests, with analysis using normality and homogeneity tests, followed by hypothesis testing and conclusion drawing. The processing of data was done using Microsoft Excel and IBM SPSS Statistics 25 software, adapted from previous thesis research (Ayuanisah, 2023).

This study used two research designs: the first in a control class, and the second in an experimental class. The first used a conventional learning model, conducted by a biology teacher in class using the lecture method, The second class used a cooperative learning approach with a Team Game Tournament (TGT) model, using an interactive wordwall board. A scoring assessment was then conducted to determine improvements in student learning outcomes. Differences in student learning outcomes using wordwall media assisted by interactive boards were analyzed by comparing an independent t-test was conducted to examine differences between the pretest and posttest scores. Before conducting the research, to determine the validity of the pretest and posttest questions, it is necessary to test them through a validity test using the correlation formula and a reliability test using the R11 formula, followed by testing the level of difficulty and discrimination

power. The data obtained includes measures such as the amount of data, the highest value, the lowest value, the average value, and other indicators (Ayuanisah, 2023).

3. Results and Discussion

Before discussing the research results in detail, it is essential to describe the initial conditions of the two classes that served as the subjects of this study. Both classes consisted of 32 students. However, their gender composition differed. In the control class, there were 22 female students and 10 male students. This class was taught using a conventional method, in which the teacher played a dominant role in delivering the material through lectures and brief discussions. Such an approach positioned students primarily as recipients of information, with limited engagement during question-and-answer sessions or when the teacher invited them to share their opinions. This condition reflects a teacher-centered learning model, in which students assumed a more passive role and relied heavily on the teacher's explanations, with minimal opportunities to explore the material independently or collaboratively.

Meanwhile, the experimental class consisted of 24 female students and 8 male students. Unlike the control class, this group employed a more innovative learning approach by utilizing Wordwall media supported by interactive boards. This media was integrated with the Teams Games Tournament (TGT) method, which was specifically designed to foster active student engagement through educational games, collaborative group work, and healthy competition. By implementing Wordwall-based TGT, students were not only exposed to the teacher's explanations but also actively participated in learning activities that required involvement, conceptual understanding, and social interaction. This learning environment created a more dynamic classroom atmosphere, where both female and male students had equal opportunities to contribute to discussions and academic games. Such an approach is expected to enhance learning motivation, strengthen conceptual mastery, and optimize student outcomes compared to the conventional method applied in the control class.

In the experimental class, the learning media employed was wordwall, which was integrated with an interactive board. Wordwall as a digital-based learning media presents various interactive activities such as quizzes, puzzles, and educational games designed to increase active student engagement. When wordwall is displayed through an interactive board, with direct interaction with the material, the learning process becomes more lively and dynamic through touching the screen, participating in games, and collaborating with peers in class.

In its implementation, the wordwall media integrated with the interactive board was structured into several stages of games designed to support the achievement of learning objectives. In the first stage, students engaged in the Matching Pairs activity, which consisted of 10 questions. This activity aimed to train their ability to recall and connect basic concepts with the correct answers. In the second stage, students worked on the Wordwall Essay Box containing five short essay

questions.To provide a clearer description of the learning games implemented during the research, their types and applications are outlined in Figure 1, 2, and 3 below:

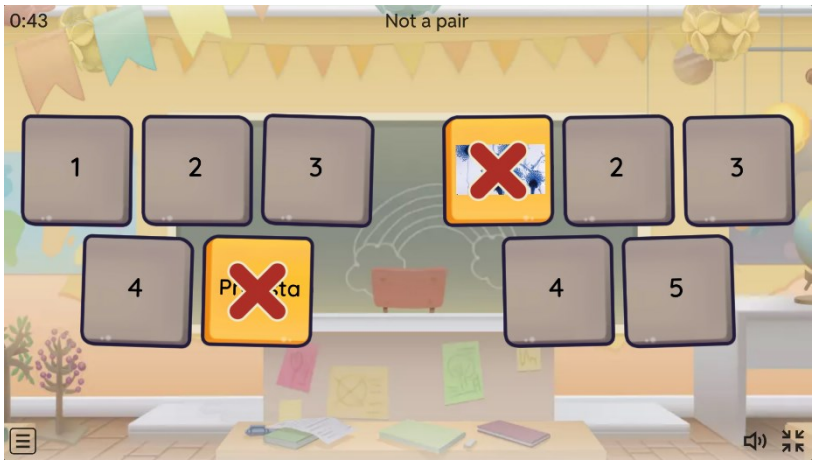

Figure 1. Matching Pairs

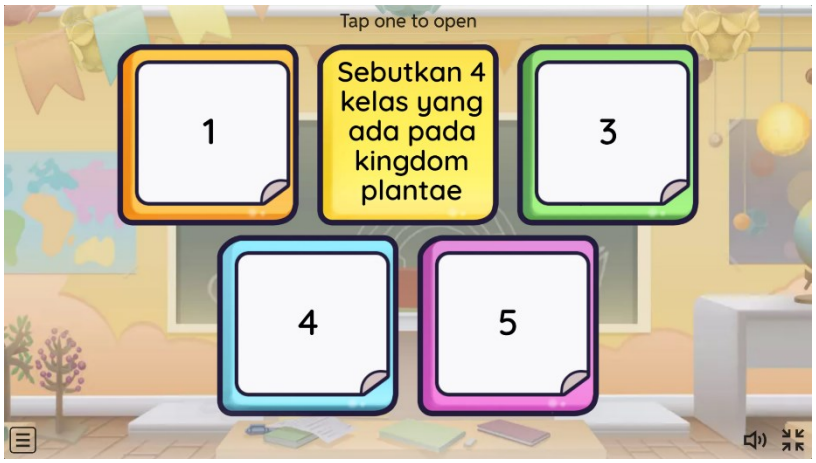

Figure 2. Open the Box Essay

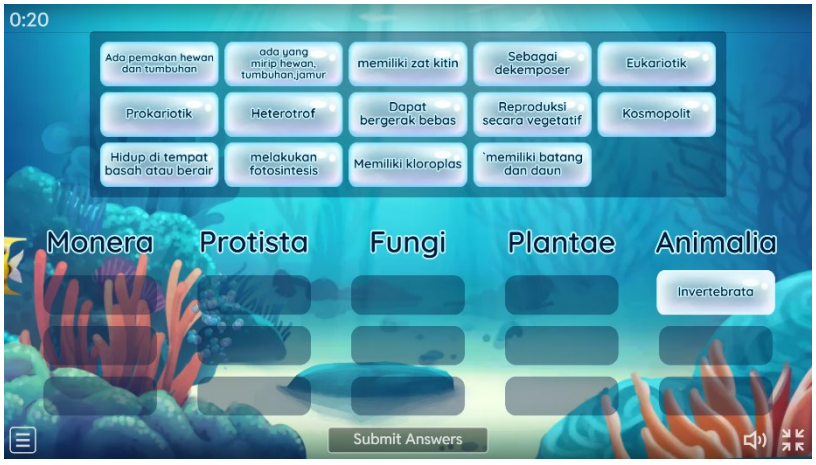

Figure 3. Group Sort

This type of question required students to provide more detailed responses, thereby fostering critical thinking skills and the ability to communicate their understanding. Meanwhile, the third stage utilized the Group Sort activity, where students classified concepts according to specific categories. This activity emphasized analytical skills, as students were required to organize information into appropriate conceptual groups. Through these three stages, the learning process not only focused on mastering the material but also encouraged students to think critically, collaborate, and develop problem-solving skills in an engaging and enjoyable learning environment. After the tests were conducted in the experimental and control classes using the media presented in Figures 1, 2, and 3, the results were analyzed as follows.

Table 2. Post-test Statistict

	Class	N	Mean	Std. Deviation
Posttest	Experimental Class	32	86,67	9,427
	Control Class	32	71,67	10,309

According to Table 2, the results of the post-test analysis show that students in the experimental class obtained an average score of 86.67, while the control class only reached an average of 71.67. These findings clearly indicate that the academic performance of the experimental class is superior compared to that of the control class. The higher score achieved by the experimental group demonstrates the effectiveness of using Wordwall media combined with an interactive board in the learning process. Once the class average scores were obtained, a normality test was subsequently carried out as the next step in the analysis.

Table 3. Normality Test Results

	Class	Kolmogorov-Smirnov[a]		
		Statistic	df	Sig.
Posttest Value	Experimental Class	0.135	32	0.144
	Control Class	0.134	32	0.151

Kolmogorov-Smirnov data normality test table, research data is considered normal if the Sig. value is > 0.05. With an experimental class size of 0.135 and a control class size of 0.134. Therefore, the analysis shows that both data sets originate from a normally distributed population. Then, after the data is declared normal, a homogeneity test is continued. Through homogeneity testing, the similarity of variances between samples can be determined, which forms the basis for determining whether the samples originate from a homogeneous population. The test is conducted using Fisher's test, with the results shown in Table 3:

Table 4. Homogeneity Test

Levene Statistic	df1	df2	Sig.
0.549	1	62	0.462

The statistical homogeneity test performed on the experimental and control groups the analysis returned a significance value of 0.462 indicating that the data met the assumption of homogeneity. According to the criteria, the analysis yielded a

significance level exceeding 0.05 suggests that the data can be regarded as homogeneous.. the samples are assumed to be homogeneous. Consequently, it may thus, the analysis confirms that the variances of the experimental and control classes are homogeneous.The prerequisite test results indicated that both the experimental and control class data conformed to a normal distribution. and homogeneous. Accordingly, the Independent Samples t-test was employed for hypothesis testing, where H0 is accepted when the sig. value exceeds 0.05, and H1 is accepted when the sig. value is below 0.05. Data processing was conducted with IBM SPSS Statistics 25 to obtain solutions to the research questions. The outcomes were drawn from the independent samples t-test was carried out to evaluate whether there was a statistically significant difference in post-test scores between the experimental and control groups, as shown in the table below:

Tabel 5. Independent Samples t-test

		t-test for Equality of Means			
		t	**df**	**Sig. (2-tailed)**	**Mean Difference**
Posttest	Equal variances assumed	6,073	62	0,000	14,997
	Equal variances not assumed	6,073	61,511	0,000	14,997

The statistical analysis using an independent t-test revealed a computed t-value of 6.073. with a significance of 0.000 (< 0.05), which confirms the existence of the results demonstrated a statistically significant disparity in post-test achievement across the student populations in both the experimental and control groups. The average score difference between the two groups is 14.997 with a 95% confidence interval (10.060–19.933). Therefore, in the hypothesis test, the results led to These results support the rejection of the null hypothesis (H0) and provides evidence in favor of the alternative hypothesis (H1). Therefore, the results of the analysis he study illustrates that interactive whiteboard-based wordwall media has an effect on learning performance of students in the subject of classification of living things. The results of the study showed a significant disparity in learning results between the control and experimental classes which occurred due to the different treatments given to each class, namely the experimental class using interactive board-based wordwall media, while the control class did not use interactive board-based wordwall media.

During implementation, Students in the treated class appeared to be very active and motivated. In this process, group bonds occurred between students and teachers, cohesiveness was fostered when solving the learning games given. So that with the bond and activeness of students in participating in learning, students' memory and understanding of the material on the subject matter concerning the classification of living organisms was stronger and left a mark in the memory of each student, because in addition to being fun, students also understood the types, roles, and characteristics of each kingdom, which ultimately had an impact on each student's learning outcomes. It can be seen that this interactive board-based wordwall media offers favorable outcomes for student learning outcomes. Besides being enjoyable, this interactive board-based wordwall media also helps teachers convey learning

materials more easily. Although this implementation has never been done before and was only conducted in an experimental class, it cannot be generalized to other grade levels.

The implementation of wordwall media in the experimental class had a considerable impact on students' engagement in the learning process. The advantages of using wordwall integrated with an interactive board were evident in students' high enthusiasm, active participation during lessons, and the improvement in their learning outcomes. This medium was able to create a more dynamic and enjoyable classroom atmosphere, thereby encouraging students to remain focused and motivated in understanding the material. Nevertheless, the use of this media also presented several limitations. The high level of excitement among students occasionally made it difficult to maintain a conducive classroom environment, and feelings of jealousy or unhealthy competition sometimes emerged among students who won the games. Therefore, while wordwall supported by an interactive board proved effective in enhancing engagement and learning outcomes, its implementation requires proper classroom management to minimize potential negative effects.

4. Conclusion

The results of this study indicate that the use of Wordwall media integrated with interactive boards has a significant positive effect on students' learning outcomes in the topic of classifying living things. The experimental class achieved an average post-test score of 85.16, which was considerably higher than the control class with an average of 71.32. This improvement is further supported by the independent sample t-test, which yielded a significance value of 0.000 (< 0.05), confirming that the difference between the two classes was statistically significant. The application of wordwall activities such as Matching Pairs, Essay Box, and Group Sort not only improved students' test performance but also increased their engagement and motivation during the learning process. These findings support the rejection of the null hypothesis and strengthen the alternative hypothesis that the use of interactive wordwall media enhances student achievement. Thus, it can be concluded that wordwall integrated with interactive boards is an effective instructional tool for improving both participation and learning outcomes in biology classrooms.

References

Audie, N. (2019). Peran Media Pembelajaran Meningkatkan Hasil Belajar. *Posiding Seminar Nasional Pendidikan FKIP*, 2(1), 586–595.

Ayuanisah, P. (2023). *Pengaruh Model Discovery Learning Terhadap Hasil Belajar Siswa Pada Materi Klasifikasi Makhluk Hidup Kelas VII SMP Negeri 1 Darussalam Aceh Besar*. Skripsi. Universitas Islam Negeri Ar-Raniry.

Baharudin, H. H., Abdul Halim, M., & Azizah, Z. (2021). Pembangunan Modul Pembelajaran Menggunakan Aplikasi Teknologi Android Berasaskan

Papan Putih Interaktif Terhada. *Jurnal Pendidikan Bitara UPSI*, 14(1), 1–14. https://doi.org/10.37134/bitara.vol14.1.1.2021

Belinda, L. N., Iskandar, S., & Kurniawan, D. T. (2023). Penggunaan Media Pembelajaran Papan Tulis Interaktif di Kelas Pada Abad 21. *Jurnal Lensa Pendas*, 8(1), 23–31. https://doi.org/10.33222/jlp.v8i1.2555

González, D. P. B., & León, P. del R. R. (2022). El uso de Wordwall Como Estrategia Didáctica Para el Aprendizaje del Idioma Inglés en la Nueva Normalidad. *Dilemas Contemporáneos : Educación, Política y Valore*, 10(58), 1–16. https://doi.org/10.46377/dilemas.v10i1.3329

Hayati, D. K. (2022). Pengembangan Media Pembelajaran Flashcard pada Materi Klasifikasi Makhluk Hidup. *Al Jahiz: Journal of Biology Education Research*, 3(1), 82–93. https://doi.org/10.32332/al-jahiz.v3i1.4910

Hidayaty, A., Qurbaniah, M., & Setiadi, A. E. (2022). The Influence of Wordwall on Students Interests and Learning Outcomes. *Jurnal Penelitian Ilmu Pendidikan*, 15(2), 211–223. https://doi.org/10.21831/jpipfip.v15i2.51691

Irawati, I., Ilhamdi, M. L., & Nasruddin, N. (2021). Pengaruh Gaya Belajar Terhadap Hasil Belajar IPA. *Jurnal Pijar Mipa*, 16(1), 44–48. https://doi.org/10.29303/jpm.v16i1.2202

Jenita, Harefa, A. T., Pebriani, E., Hanafiah, Rukiyanto, B. A., & Sabur, F. (2023). Pemanfaatan Teknologi Dalam Menunjang Pembelajaran: Pelatihan Interaktif Dalam Meningkatkan Kualitas Pendidikan. *Community Development Journal*, 4(6), 13121–13129.

Khairunisa, Y. (2021). Pemanfaatan Fitur Gamifikasi Daring Maze Chase–Wordwall Sebagai Media Pembelajaran Digital Mata Kuliah Statistika Dan Probabilitas. *Mediasi*, 2(1), 41–47. https://doi.org/10.46961/mediasi.v2i1.254

Kusnadi, E., & Azzahra, S. A. (2024). Penggunaan Media Pembelajaran Interaktif Berbasis Wordwall dalam Meningkatkan Motivasi Belajar Peserta Didik Pada Mata Pelajaran PPKN di MA Al Ikhlash Padakembang Tasikmalaya. *JDPP (Jurnal Dimensi Pendidikan Dan Pembelajaran)*, 12(2).

Lestari, R., & Rohmani. (2024). Analysis of the Effectiveness of Pop-Up Book Media on Science Learning in Elementary Schools. *IJORER : International Journal of Recent Educational Research*, 5(4), 919–934. https://doi.org/10.46245/ijorer.v5i4.641

Nadia, D. O., & Desyandri. (2023). Pengaruh Media Pembelajaran Wordwall Terhadap Hasil Belajar Siswa Sekolah Dasar. *Didaktik : Jurnal Ilmiah PGSD FKIP Universitas Mandiri*, 8(02), 17–23.

Nissa, S. F., & Renoningtyas, N. (2021). Penggunaan Media Pembelajaran Wordwall untuk Meningkatkan Minat dan Motivasi Belajar Siswa pada Pembelajaran Tematik di Sekolah Dasar. *Edukatif : Jurnal Ilmu Pendidikan*, 3(5), 2854–2860. https://doi.org/10.31004/edukatif.v3i5.880

Nursella, N. (2024). Pengaruh Penggunaan Media Pembelajaran Interaktif Terhadap Hasil Belajar Siswa SD. *EDUCARE: Jurnal Pendidikan Dan Kesehatan*, 4, 54–66.

Pratiwi, S. S. I., & Prastyo, D. (2025). Pengaruh Penggunaan Media Interaktif Wordwall Terhadap Minat Belajar Peserta Didik Kelas V SDN Dukuh Kupah II, 5(1), 107–115.

Sari, I. (2023). *Pengembangan E-Modul Plantnet Terintegrasi Ayat Al-Quran*

Sebagai Sumber Belajar IPA SMP/MTs Pada Materi Klasifikasi Makhluk Hidup. Skirpsi. Uin Suska Riau.

Sinaga, Y. M., & Soesanto, R. H. (2022). Upaya Membangun Kedisplinan melalui Media Pembelajaran Wordwall dalam Pembelajaran Daring pada Siswa Sekolah Dasar. *Jurnal Basicedu*, 6(2), 1845–1857. Retrieved from https://journal.uii.ac.id/ajie/article/view/971

Sukma, K. I., & Handayani, T. (2022). Pengaruh Penggunaan Media Interaktif Berbasis Wordwall Quiz Terhadap Hasil Belajar Ipa Di Sekolah Dasar. *Jurnal Cakrawala Pendas*, 8(4), 1020–1028. https://doi.org/10.31949/jcp.v8i4.2767

Syahrizal, H., & Jailani, M. S. (2023). Jenis-Jenis Penelitian Dalam Penelitian Kuantitatif dan Kualitatif. *Jurnal QOSIM Jurnal Pendidikan Sosial & Humaniora*, 1(1), 13–23. https://doi.org/10.61104/jq.v1i1.49

Zaitun, Rizal, & Hiola, K. (2024). Penggunaan Media Wordwall untuk Meningkatkan Minat Belajar Pendidikan Pancasila Siswa Kelas I SDN Mangkura II. *Global Journal Education Humanity*, 1(2), 222–230.

How to cite this article:

Azura, D., & Khairuna. (2025). The Effect of Wordwall Media with Interactive Boards on Students' Learning Outcomes in the Classification of Living Things. *Journal of Educational Sciences*, *9(5)*, 3777-3787.