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Effectiveness of Using Wordwall Digital Learning Media in Improving Students' Understanding of History Learning

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ABSTRACT

Background: The background of this research is based on students' low interest and understanding of history lessons due to the dominant conventional learning methods.
Objectives: This study aims to examine the effect of using Wordwall as an interactive learning medium on students' history learning outcomes.
Method: This research employed a quantitative approach with a quasi-experimental design. The study involved two classes of eleventh-grade students at SMA Negeri 1 Cimarga. One class served as the experimental group, which received instruction using Wordwall-based learning media, while the other class acted as the control group and was taught using conventional lecture methods. Data were collected through pre-test and post-test instruments and analyzed using a t-test and N-Gain analysis to measure differences in learning outcomes and learning effectiveness.
Result: The research results showed a significant difference between student learning outcomes in the experimental class and the control class, with a significance value of 0.006 < 0.05. Furthermore, the average N-Gain value in the experimental class of 57.08 is included in the quite effective category, while the control class only reached 33.74 (less effective). These findings indicate that Wordwall is effective in improving students' understanding of history learning.
Conclusion: Therefore, interactive digital media such as Wordwall are recommended for use in history learning to create a more engaging and meaningful learning atmosphere.

INTRODUCTION

Education is an activity carried out through various processes and struggles that are very important in improving human resources related to the environment;

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the environment is very closely related to the human resource process. According to Law No. 20 of 2003, education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, the nation, and the State. In the current digital era, the development of information and communication technology has had a significant impact on various aspects of life, including the world of education. Technology has become a very important tool in increasing the effectiveness of the teaching and learning process. According to Arsyad (2019), the use of digital learning media can help increase student involvement in learning and make the material easier to understand. Therefore, the utilization of technology in learning has become a necessity that cannot be ignored.

In the current learning process, the teacher writes and explains, and then students take notes on the material written by the teacher. Certainly, this will create an atmosphere that is less supportive for students during the teaching and learning process, so the understanding or mastery of the material obtained is not optimal (Usmaedi et al., 2020). According to Latuheru (1988: 14), media are materials, tools, and methods or techniques used for teaching and learning activities, with the intention that the process of educative communication interaction between teachers and students can take place appropriately and usefully. This is supported by Mudhofir's (1993: 81) opinion on learning media, where, according to him, learning media, apart from being a learning resource, can also be interpreted as humans, objects, or events that create conditions for students to be more likely to acquire attitudes and skills (Hasan et al., 2021).

According to Anthonysamy (2020), digital experts highly recommend the use of digital technology in learning; the reason is to develop users' knowledge and skills in utilizing digital learning media. Learning using digital media can help educators innovate in packaging learning materials so they are not monotonous, thereby attracting students' interest in learning (Agustian & Salsabila, 2021).

History learning is often considered a less interesting subject by some students. This is caused by the delivery of material that is more textual and lacks interaction, making students tend to be passive in following the lesson. Sanjaya (2016) states that one of the challenges in history learning is how to make narrative and chronological material more interesting and easier for students to understand. The lecture method, which is still dominant in history learning, often makes students feel bored and less motivated in understanding the material taught. According to Sampurna (2019), in learning History, teachers should provide and

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also overcome students having strong motivation and learning problems by discussing with peers (peer group). Considering good and efficient learning methods is another thing that can affect it.

According to Mayer (2020), the use of multimedia in learning has great potential for improving student understanding. Multimedia-based learning allows the presentation of information in various formats such as text, images, audio, and animation, which can help students with various learning styles. In this case, the use of digital learning media becomes an innovative solution to increase the effectiveness of history learning. One of the digital learning media that can be utilized in history learning is Wordwall. The Wordwall application can also be used as an interactive medium that teachers can use to clarify the provision of the material being taught; the Wordwall application can increase student learning motivation and help students improve their learning outcomes (Lubis & Nuriadin, 2022).

Wordwall is a digital platform that provides various kinds of educational and interactive games that can be used as teaching aids in learning. According to Munir (2017), Wordwall allows teachers to create quizzes, puzzles, and various other interactive activities that can help students understand the material better. This media can also increase student involvement in the learning process, due to its interactive and engaging nature. Based on research conducted by Depdiknas (2008), the use of technology-based learning media in the classroom can improve student learning outcomes by up to 30% higher compared to conventional methods. This shows that the integration of technology in learning can have a significant positive impact on student understanding.

By using digital learning media such as Wordwall, students not only passively receive information, but can also actively participate in the learning process. According to Sugiyono (2020), learning methods that involve interactivity and active student involvement can increase their learning motivation. High learning motivation will directly improve student learning outcomes. Therefore, learning media such as Wordwall, which have interactive features, can help create a more engaging and meaningful learning experience for students.

Based on previous research, the use of Wordwall digital learning media has proven effective in improving student learning outcomes and interest in various subjects, including history. Darmawan's (2022) research shows an increase in students' pretest and posttest scores in history learning but has not explored how Wordwall specifically affects the understanding of historical concepts. Several other studies, such as Suryadi (2022) and Mulyani (2022), examined the

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effectiveness of Wordwall in learning other than history, so further studies are still needed regarding its effectiveness on various historical materials, such as local, national, and international events. Furthermore, most studies only focus on Wordwall without comparing it to other digital learning media, such as Kahoot, Quizizz, or Google Forms, so research is needed that compares its effectiveness in improving students' understanding of history.

Therefore, this study aims to fill this gap by specifically analyzing how the use of Wordwall in history learning can improve student understanding. This study will explore the effectiveness of learning activity design and its impact on student involvement and motivation. This research aims to analyze the effectiveness of using Wordwall digital learning media in improving students' understanding of history learning. By understanding the extent to which Wordwall can positively impact student understanding, it is hoped that the results of this research will serve as a reference for educators in designing more innovative and engaging learning strategies. In addition, this study also seeks to uncover the extent to which the use of Wordwall can improve student learning outcomes compared to conventional learning methods. Thus, the results of this study are expected to provide deeper insights into the application of digital learning media in education. Hopefully, the findings of this research can help teachers adopt technology more effectively to create a more engaging and productive learning experience for students.

Based on the thoughts above, using Wordwall as a learning medium to improve student understanding needs to be done by students and educators. This is done so that understanding is created in teaching and learning activities; this application is expected to be useful in the teaching and learning process in the classroom. From this description, the author chose the title "Effectiveness of Using Wordwall Digital Learning Media in Improving Students' Understanding of History Learning".

METHODS

This research is a type of quantitative research with a quasi-experimental research method. Quantitative research is a type of research whose specifications are systematic, planned, and clearly structured from the beginning to the creation of the research design. According to Sugiyono (2020), quantitative methods can be interpreted as research methods based on the philosophy of positivism, used to examine certain populations or samples, data collection uses research instruments, and data analysis is quantitative/statistical in nature, with the aim of describing and testing established hypotheses.

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According to Sugiyono (2020), the Quasi-Experiment method is an experimental design that has a control group but does not fully function to control external variables that affect the experiment. The quasi-experimental research method or quasi-experimental approach is called pseudo (vague and abstract). Its nature is pretend, because it does not fully control the variables being studied; there are two references seen from the control and experimental classes, there is a comparison between those given the pre-test and post-test, the quasi-experimental design research is basically used because in reality, it is difficult to get a control group used for research.

This study involved two classes, where class XI 5 was used as the class that did not receive treatment (control class) and class XI 4 was used as the class that was given treatment (experimental class); both classes were given the same material. Where the class given treatment (experimental class) used Wordwall digital learning media, the class that did not receive treatment (control class) used conventional learning.

RESULTS AND DISCUSSION

Problems related to students' understanding of learning are problems that tend to continue to occur, considering the abilities and needs of students in the learning process, which certainly differ from one another. This condition must certainly be handled through various solutions, one of which is by using effective learning media that can provide space for students to be able to build their knowledge independently, such as using Wordwall learning media in history subjects at SMA Negeri 1 Cimarga.

This study aims to determine the effectiveness of using digital learning media in improving students' history learning outcomes. The data obtained were analyzed using descriptive statistical tests and independent t-tests. Based on the descriptive analysis, it is known that the average posttest score of the experimental group was 77.28, while the control group had an average posttest of 66.00. This indicates a quite significant difference in scores between the two groups after the treatment was given

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Hasil belajar Sejarah	Equal variances assumed	1,969	,167	-2,846	48	,003	,006	-11,280	3,964	-19,250	-3,310
	Equal variances not assumed			-2,846	44,248	,003	,007	-11,280	3,964	-19,267	-3,293

Figure 1. Independent Samples Test Results Source: SPSS (2025)

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Furthermore, the results of the independent samples t-test reveal a significance value (Sig. 2-tailed) of 0.006, which is lower than the threshold value of 0.05. This finding indicates that there is a statistically significant difference between the learning outcomes of students in the experimental group and those in the control group. In other words, the learning treatment implemented in the experimental class produced a measurable effect on students' academic achievement compared to the conventional instructional approach used in the control class.

The mean difference value of −11.280 further confirms this result. This negative value indicates that the average score obtained by the experimental group was higher than that of the control group. Such a difference suggests that students who learned using the Wordwall-based digital learning media achieved better learning outcomes than those who were taught through traditional lecture-based methods. The interactive and engaging features of Wordwall likely contributed to this improvement by encouraging active student participation and enhancing motivation during the learning process.

Overall, these statistical findings demonstrate that the integration of interactive digital media in classroom instruction can significantly influence students' learning performance. Therefore, the use of Wordwall can be considered an effective instructional strategy for improving students' academic achievement, particularly in history learning contexts.

The increase in student learning outcomes in the experimental group shows that the use of Wordwall media is effective in conveying historical material. Interactive Wordwall features, such as quizzes, games, and fun practice questions, make students more motivated and active in participating in learning. This finding is in line with the results of Aini's (2022) research entitled "Effectiveness of Using Wordwall Media in Improving Student Learning Outcomes on Hindu-Buddhist Kingdom Material in Indonesia". In her research, Aini found that students who learned using Wordwall experienced a significant increase in scores compared to students who did not use the media. Similar results were also obtained from the research of Ainishifa et al. (2023), which stated that the use of Wordwall in history learning has a significant influence of Wordwall-based interactive media on student learning outcomes in history subjects. These findings show consistency that Wordwall learning media makes a positive contribution to student learning outcomes, especially in history subjects. Therefore, the integration of digital technology such as Wordwall is highly recommended to support a more effective and interactive learning process.

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The use of Wordwall as a digital learning medium represents an effective strategy for enhancing students' understanding of history subjects. In many classroom settings, history is often taught through conventional lecture-based approaches, which may limit student engagement and reduce opportunities for active learning. Integrating interactive digital media such as Wordwall can help address these challenges by creating a more dynamic and participatory learning environment. Wordwall offers various game-based activities and quizzes that encourage students to actively interact with the learning material, thereby promoting deeper comprehension and sustained attention during the learning process.

The findings of this study provide empirical support for the effectiveness of Wordwall in improving students' learning outcomes in history. The results demonstrate that students who participated in the experimental class using Wordwall achieved significantly higher learning gains compared to those in the control class who were taught using conventional methods. Specifically, the average N-gain score in the experimental class reached 57.08, which falls within the moderately effective category, whereas the control class obtained an average N-gain score of 33.47, categorized as less effective. This difference indicates that the integration of Wordwall contributed positively to students' learning progress and conceptual understanding.

These results suggest that Wordwall not only enhances students' engagement but also facilitates more meaningful learning experiences. By combining elements of interactivity, visualization, and gamification, Wordwall helps students process historical information more effectively. Therefore, the use of digital learning media such as Wordwall can be considered a valuable instructional approach to improve students' understanding and achievement in history education.

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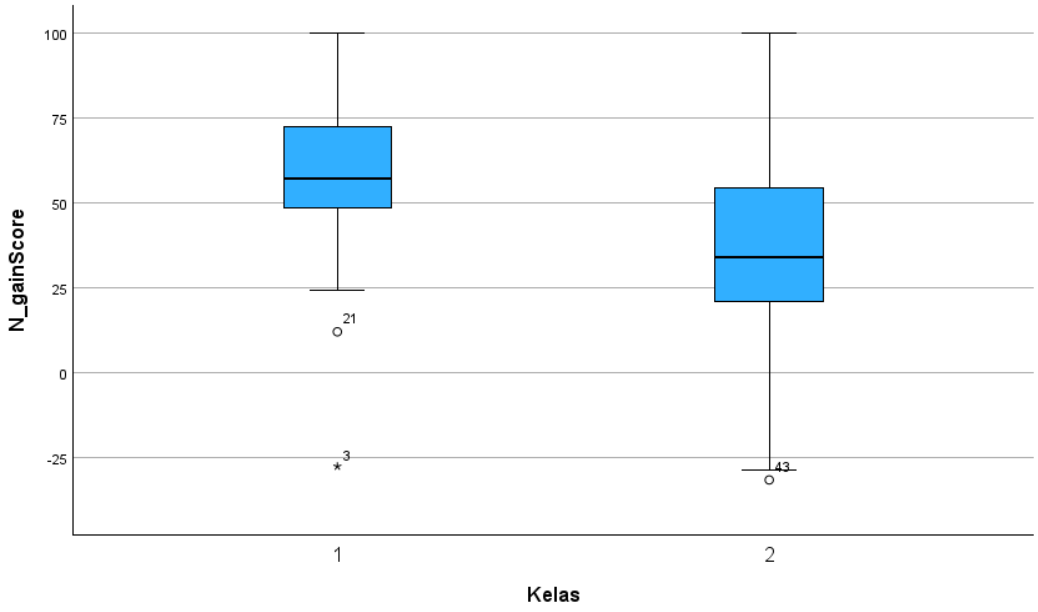

Figure 2. N-gain Test Results Source: SPSS (2025)

These findings are further supported by the study conducted by Ainishifa et al. (2023), which reported that Wordwall-based interactive learning media demonstrate a moderate level of effectiveness in improving students' learning outcomes. This evidence reinforces the idea that the integration of interactive digital media can positively influence students' academic achievement when implemented appropriately in the learning process. The effectiveness of Wordwall can also be explained theoretically through the lens of constructivist learning theory, particularly the perspectives proposed by Jean Piaget and Lev Vygotsky. According to constructivist theory, learning occurs when students actively construct their own knowledge through meaningful experiences, interaction, and engagement with learning materials and their surrounding environment.

In this context, Wordwall provides opportunities for students to participate actively in the learning process through interactive quizzes, games, and problem-solving activities. Such participatory features encourage students to engage cognitively and socially with the learning content. The gamified nature of

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Wordwall, which incorporates elements of play, competition, and immediate feedback, allows students to learn while playing, creating a more enjoyable and motivating learning atmosphere. This approach supports the process of knowledge construction because students are not merely passive recipients of information but active participants who explore and interpret the learning material.

Moreover, the integration of gamification strategies through digital platforms like Wordwall can strengthen students' motivation and attention during lessons. As a result, the internalization of learning material becomes more effective, and students are more likely to retain the concepts they have learned. Therefore, Wordwall-based learning media can be considered a valuable instructional tool that aligns with constructivist principles and supports more meaningful and engaging learning experiences.

However, the use of interactive learning media such as Wordwall requires careful planning and implementation to ensure its effectiveness in the learning process. Teachers need to pay attention to several important aspects, including the design, application, and evaluation of the media. First, the instructional media must be designed appropriately so that it aligns with the learning objectives, instructional materials, and students' learning characteristics. Well-designed digital media can help students understand concepts more clearly and encourage active participation during classroom activities. Second, the use of Wordwall in the learning process must be carried out strategically. Teachers should integrate the media into the teaching process in a way that supports learning activities rather than merely serving as entertainment. When used effectively, Wordwall can function as an interactive tool that strengthens students' engagement and motivation to learn.

In addition, the implementation of digital learning media should be evaluated periodically to ensure that it continues to support the achievement of learning objectives. Evaluation allows teachers to assess whether the media contributes positively to student learning outcomes and to identify aspects that may need improvement. Previous studies have also demonstrated the positive impact of Wordwall-based interactive media on student achievement. For instance, research shows that the use of Wordwall can improve learning outcomes by creating a more engaging and interactive learning environment (Maghfiroh, 2018). Improved learning outcomes indicate that instructional goals are being achieved effectively. In other words, students demonstrate measurable progress in their understanding during the learning process (Mutiah et al., 2020). Furthermore, the improvement of learning outcomes is closely related to the selection of appropriate educational strategies that support effective learning activities (Lestari, 2021).

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In addition, the use of Wordwall is highly compatible with the learning characteristics of Generation Z students, who generally demonstrate a strong affinity for digital technology and prefer learning environments that are visual, interactive, and engaging rather than monotonous. Modern learners tend to respond more positively to technology-based instructional media that provide immediate feedback and stimulating activities. In this study, the integration of Wordwall created a more dynamic learning environment, which was reflected in the increased level of student participation during the learning process. Students appeared more active, enthusiastic, and focused when completing learning tasks presented in the form of digital games and interactive quizzes. These features encouraged students to engage more deeply with the historical material being studied.

Furthermore, the statistical results support these observations. The higher kurtosis value found in the experimental class (4.136) indicates that most students achieved relatively consistent learning outcomes within the moderate to high achievement categories. This pattern suggests that the use of Wordwall not only benefits students with high academic abilities but also supports students with moderate abilities in achieving satisfactory learning outcomes. Thus, the learning media contributes to a more balanced distribution of student achievement. In addition to improving conceptual understanding, Wordwall also supports the implementation of differentiated learning strategies. Teachers can easily adjust the level of difficulty, type of questions, and learning activities according to students' learning needs and abilities. This flexibility allows educators to provide more personalized learning experiences. Consequently, the use of digital learning media such as Wordwall can accommodate individual differences among students more effectively than conventional teaching methods, thereby enhancing both engagement and overall learning effectiveness.

CONCLUSION

Based on the t-test results, there is a significant influence between the use of Wordwall learning media on students' history learning outcomes. This is indicated by a significance value of 0.006 (< 0.05), which indicates that the use of Wordwall has a statistically positive effect in improving student learning outcomes. The N-Gain calculation results show that the increase in student understanding in the class using Wordwall media is in the quite effective category, with an average value of 57.08. Meanwhile, the class using conventional learning methods only showed effectiveness in the less effective category, with an average value of 33.74.

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The results of the statistical analysis indicate that the use of Wordwall as a learning medium has a significant effect on students' history learning outcomes. This finding is supported by the results of the independent t-test, which show a significance value of 0.006 ($p < 0.05$). This value indicates that the application of Wordwall-based learning media provides a statistically significant positive influence on improving students' academic achievement compared to conventional learning methods. The interactive features provided by Wordwall encourage greater student engagement, participation, and motivation during the learning process, which ultimately contributes to better comprehension of historical concepts.

Furthermore, the results of the N-Gain analysis reveal that the class utilizing Wordwall media experienced an improvement in learning outcomes within the "quite effective" category, with an average score of 57.08. In contrast, the class that applied conventional teaching methods demonstrated a lower level of improvement, categorized as "less effective," with an average N-Gain score of 33.74. These results indicate that technology-based interactive learning media can significantly enhance students' understanding and retention of historical material.

Therefore, the integration of Wordwall as a digital learning medium can be considered an effective instructional strategy for improving students' learning outcomes in history subjects, particularly in creating more engaging and interactive classroom environments.

REFERENCES

Agustian, Niar, & Unik Hanifah Salsabila. 2021. "*Peran Teknologi Pendidikan Dalam Pembelajaran."* Islamika 3(1):123–33.

Agustian, N., & Salsabila, U. H. (2021). Peran teknologi pendidikan dalam pembelajaran. *Islamika, 3*(1), 123–133. https://doi.org/10.36088/islamika.v3i1.1047

Aini, L. N. (2022). *Efektivitas penggunaan media Wordwall dalam meningkatkan hasil belajar siswa pada materi kerajaan Hindu–Buddha di Indonesia* (Undergraduate thesis). Universitas Islam Negeri Maulana Malik Ibrahim Malang.

Ainishifa, H., Bunari, & Suroyo. (2023). Pengaruh media interaktif berbasis Wordwall terhadap hasil belajar siswa mata pelajaran sejarah di kelas XI

IPS SMA Negeri 1 Kabun. *Jurnal Pendidikan Ilmu Pengetahuan Sosial Indonesia, 8*(3), 321–331.

Anthonysamy, L., Koo, A. C., & Hew, S. H. (2020). Self-regulated learning strategies and non-academic outcomes in higher education blended learning environments: A one decade review. *Education and Information Technologies, 25*(5), 3677–3704. https://doi.org/10.1007/s10639-020-10134-2

Arsyad, A. (2019). *Media pembelajaran*. Jakarta: Rajagrafindo Persada.

Darmawan, A. (2022). Pengaruh media interaktif berbasis Wordwall terhadap hasil belajar siswa mata pelajaran sejarah di kelas XI SMA Negeri 1 Kabun. *Jurnal Pendidikan Sejarah, 5*(2), 112–123.

Depdiknas. (2008). *Panduan pengembangan bahan ajar berbasis TIK*. Jakarta: Departemen Pendidikan Nasional.

Hasan, M., Milawati, M., Darodjat, D., Harahap, T. K., Tahrim, T., Anwari, A. M., Rahmat, A., Masdiana, M., & Indra, I. (2021). *Media pembelajaran*. Klaten: Tahta Media Group.

Latuheru, J. D. (1988). *Media pembelajaran dalam proses belajar mengajar masa kini*. Jakarta: Departemen Pendidikan dan Kebudayaan.

Lestari, R. D. (2021). Upaya meningkatkan motivasi belajar peserta didik dalam pembelajaran daring melalui media game edukasi Wordwall di kelas IV SDN 01 Tanahbaya tahun pelajaran 2020/2021. *Jurnal Ilmiah Profesi Guru (JIPG), 2*(2), Article 2.

Lubis, A. P., & Nuriadin, I. (2022). Efektivitas aplikasi Wordwall untuk meningkatkan hasil belajar siswa dalam pembelajaran matematika sekolah dasar. *Jurnal Basicedu, 6*(4), 6884–6892. https://doi.org/10.31004/basicedu.v6i4.3402

Jurnal Ilmiah WUNY, Vol 8, No 1 (2026)
Available online at:
http://journal.uny.ac.id/index.php/wuny
DOI: https://doi.org/10.21831/jwuny.v8i1.95037

Maghfiroh, K. (2018). Penggunaan media Wordwall untuk meningkatkan hasil belajar matematika pada siswa kelas IV MI Roudlotul Huda. *Jurnal Profesi Keguruan, 4*(1), Article 1.

Mayer, R. E. (2020). *Multimedia learning* (3rd ed.). Cambridge: Cambridge University Press.

Mulyani, T. (2022). Efektivitas penggunaan media game digital Wordwall dalam pembelajaran IPAS sub tema: Kekayaan hayati flora dan fauna kelas 5 di SDN 89 Palembang. *Jurnal Pendidikan Digital, 3*(3), 75–88.

Munir. (2017). *Pembelajaran digital*. Bandung: Alfabeta.

Mutiah, N., Arafah, K., & Azis, A. (2020). Pengaruh tes objektif terhadap hasil belajar fisika peserta didik kelas XI IPA SMA Negeri 1 Sidendreng Rappang. *Jurnal Sains dan Pendidikan Fisika (JSPF)*, 200–217.

Sampurna, I. (2019). Pengaruh kecerdasan interpersonal dan kedisiplinan terhadap motivasi belajar sejarah. *Bihari: Jurnal Pendidikan Sejarah dan Ilmu Sejarah, 2*(2), 39–47.

Sanjaya, W. (2016). *Strategi pembelajaran berorientasi standar proses pendidikan*. Jakarta: Kencana.

Sugiyono. (2020). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Bandung: Alfabeta.

Suryadi, R. (2022). Efektivitas media Wordwall dalam meningkatkan pemahaman siswa kelas 5 SDN 33 Pontianak terhadap materi rantai makanan. *Jurnal Pendidikan IPA, 4*(1), 33–41.

Usmaedi, Fatmawati, P. Y., & Karisman, A. (2020). Pengembangan media pembelajaran berbasis teknologi aplikasi augmented reality dalam meningkatkan proses pengajaran siswa sekolah dasar. *Jurnal Educatio FKIP UNMA, 6*(2), 489–499.