Volume: 28, Number: 1, April 2026, pp. 40-48
p-ISSN: 1410-8771, e-ISSN: 2580-4812
https://doi.org/10.37303/likhitaprajna.v28i1.964

LIKHITAPRAJNA Jurnal Ilmiah
Fakultas Keguruan dan Ilmu Pendidikan

THE EFFECT OF THE WORDWALL EDUCATIONAL GAME ON STUDENTS' MATHEMATICAL UNDERSTANDING OF INTEGER ADDITION AND SUBTRACTION

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ARTICLE INFO

Article history:
Received March 2026
Revised March 2026
Accepted April 2026
Publish 2 April 2026

Keywords:
Wordwall Educational Game
Mathematical Understanding
Integers

To cite this article:
Hairunnisa, Z., Badjeber, R., & Elfira, R. (2026). The Effect of The Wordwall Educational Game on Students' Mathematical Understanding of Integer Addition and Subtraction. *Jurnal Likhitaprajna*, *28*(1), 40-48. https://doi.org/10.37303/likhitaprajna.v28i1.964

ABSTRACT

Students' understanding of integer addition and subtraction at the junior high school level is still limited, even though these topics are fundamental in mathematics. Engaging learning media, such as the educational game Wordwall, is believed to support a more effective mathematical understanding. This study aims to examine the effect of the Wordwall educational game on students' mathematical understanding. The method used in this research is a quasi-experimental design with a nonequivalent control group design. The research population consisted of seventh-grade students at SMP Negeri 3 Palu, with two classes selected as the sample: Class VII I as the experimental group and Class VII K as the control group. Data were collected through mathematical understanding tests that had met the standards of validity and reliability. The results indicate that the use of the Wordwall educational game enhances student engagement and participation; however, no significant difference was found between the experimental and control classes in terms of mathematical understanding. The Mann–Whitney U test yielded a p-value of 0.644, which is greater than the significance level ($p > 0.05$). This is believed to be influenced by differences in students' prior knowledge, the relatively short duration of the media's use, and the media's lack of suitability for visualizing mathematical concepts. Consequently, the use of Wordwall did not have a significant effect on students' mathematical understanding of integer addition and subtraction.

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INTRODUCTION

Mathematics is a discipline that should be taught to all students from elementary school through higher education. The goal is for students to be able to think logically, analytically, systematically, and critically (Mulyati & Evendi, 2020). As an exact science, mathematics places greater emphasis on students' understanding than on mere memorization (Simbolon & Harahap, 2021). Conceptual understanding is a fundamental part of the mathematics learning process (Pasha & Aini, 2022). Students must have a solid understanding of mathematical

concepts in order to solve math problems (Rohim & Buchori, 2024). Students who can understand the concepts they have learned and apply them appropriately in various situations demonstrate success in mathematics learning (Darwanto & Paramita, 2025). The development of a person's ability to understand a concept is referred to as mathematical understanding and is one of the goals of the mathematics learning process (Fakhriyana & Riayah, 2021). Mathematical understanding is a skill that plays a crucial role in helping students solve various mathematical problems. Students can solve mathematical problems effectively if they have a solid grasp of basic concepts. This is because mathematical concepts are interconnected and built upon one another; therefore, before tackling more complex concepts, students must have a solid grasp of the fundamentals (Mahtuum et al., 2020). One of the fundamental concepts in mathematics education is the addition and subtraction of integers.

Addition and subtraction of integers are often considered easy topics, but data from a preliminary test at one junior high school suggests otherwise. In fact, many students are still unable to solve these problems correctly (Maulida et al., 2022). Yet the concepts of addition and subtraction of integers are fundamental mathematical topics that students should have mastered as early as elementary school. According to Pratama et al., (2022), most students still struggle with this material because they have not fully grasped the basic concepts of integer operations, even though they have been taught since elementary school. Therefore, it is necessary to emphasize the importance of junior high school students' mathematical understanding of integer addition and subtraction.

According to Yopa et al., (2021), students tend to be more interested in using game-based learning media than in worksheets. Students' understanding of mathematical concepts can be optimally enhanced through the use of game-based learning media, as such media are more effective at boosting students' motivation to learn compared to the use of worksheets alone. In line with this, Mulyati & Evendi, (2020) state that a pleasant learning atmosphere can help students understand the material and boost their motivation to learn. This can be achieved through the application of various teaching methods or models, as well as engaging learning media. Therefore, the use of educational games as a learning medium is relevant for fostering enjoyable learning experiences.

The use of the educational game Wordwall in mathematics instruction can serve as an alternative for creating interactive and enjoyable learning experiences. Wordwall is an application that can be used as a tool for creating interactive and engaging learning materials and assessment tools (Kurnia et al., 2025). As an interactive medium, Wordwall provides various game templates, such as quizzes, matching, pairing, anagrams, word scramble, word search, grouping, and other game features (Pamungkas et al., 2023). Wordwall can be maximally utilized as an interactive learning medium that supports the learning process and encourages increased student interest and motivation, thereby leading to improved learning outcomes (Hadi et al., 2024).

The implementation of the Wordwall educational game has proven successful in fostering learning interest among fourth-grade elementary school students in mathematics. This is evidenced by an increase in the percentage of student interest in learning activities during phases I and II, from 58% to 79% (Ramadhani & Silalahi, 2025). Additionally, Sabiila, (2024) states that the implementation of the Wordwall educational game is capable of fostering fourth-grade students' interest in learning Natural and Social Sciences, as evidenced by students' increasingly active participation during lessons and their positive responses based on the results of a questionnaire distributed after the learning activities concluded. Aluna et al., (2025) state that the use of the Wordwall educational game, combined with learning motivation, can optimize students' learning outcomes in probability and probability theory. Research conducted by Anggriany & Rakhmawati, (2024) on the development of the Wordwall educational game using the 4D R&D model indicates that this medium is valid, highly practical to use, and sufficiently effective for optimizing students' mathematics learning outcomes. Rambe et al.,

(2024) state that elementary school students become more actively engaged in classroom learning activities with the implementation of game-based media. Wildan et al., (2023)also state that the development of Wordwall as an educational game is effective when applied in elementary school learning activities on geometry. Based on this, the application of the Wordwall educational game has the potential to optimize students' mathematical understanding skills.

Based on the previous discussion, the researcher is interested in further examining the impact of using Wordwall as an educational game-based learning medium on students' mathematical understanding skills, particularly regarding the addition and subtraction of integers. This interest stems from Wordwall's potential to create a more interactive and engaging learning environment that enhances student engagement throughout the learning process.

The use of Wordwall is expected not only to increase student engagement but also to foster improved mathematical understanding through enjoyable and challenging activities. With the inclusion of game elements, students are expected to be more motivated to learn and find it easier to grasp the concepts being taught. Additionally, the use of this medium is also expected to assist teachers in presenting material in a more varied and innovative manner.

The findings of this study are expected to make a tangible contribution to the development of mathematics education in schools, particularly regarding the use of technology-based learning media. The results of this study are also expected to serve as a reference for future teachers and researchers in developing more effective learning strategies to improve students' mathematical understanding.

METHOD

This study employed a quantitative approach using a quasi-experimental design in the form of a nonequivalent control group design. The study was conducted from August 19 to 26, 2025, at SMP Negeri 3 Palu, with the population consisting of all seventh-grade students in the 2025–2026 academic year. The sample was selected using purposive sampling, resulting in two classes: Class VII K as the experimental class and Class VII I as the control class. The selection of the two classes was based on their similar characteristics, particularly because they were both taught by the same teacher. Both classes were administered a pretest to measure their initial mathematical understanding skills regarding the addition and subtraction of integers. Subsequently, the experimental class received the treatment, which involved learning using the Wordwall educational game, while the control class used conventional instruction. After the intervention, both classes were administered a posttest to measure students' final proficiency. The research design can be illustrated as follows:

Table 1. The Research Design

Class	*Pretest*	Treatment	*Posttest*
Experimental Class	O_1	X	O_2
Control Class	O_1	–	O_2

Descripsion:

O_1 : *Pretest*
O_2 : *Posttest*
X : Treatment of the experimental group

The research instrument consisted of a mathematical understanding test that met the criteria for validity and reliability. The data were analyzed using a normality test, which indicated that the data were not normally distributed. Therefore, hypothesis testing was conducted using the nonparametric Mann–Whitney U test to determine the differences between the two groups.

RESULTS AND DISCUSSION

Through the research conducted, data were collected from tests administered before the samples received the treatment (pretest) and after the samples received the treatment (posttest). These data were then analyzed to determine whether there were any changes or improvements in ability within each group. Subsequently, the data obtained was analyzed using descriptive statistical tests on the pretest and posttest results for both the experimental and control groups. Descriptive statistical tests were conducted so that the data could be processed and provide a clearer picture of the initial and final conditions of the samples after treatment, while also facilitating the process of drawing conclusions. The results of these descriptive statistical tests are presented in detail in Table 2.

Table 2. Descriptive Statistics

No.	Class	N	Minimum	Maximum	Mean	Std. Deviation
1.	Pretest Experiment Class	23	15	80	42,09	17,435
2.	Posttest Experiment Class	23	66	98	86,04	8,916
3.	Pretest Control Class	23	14	83	54,61	20,329
4.	Posttest Control Class	23	42	100	85,39	14,365

Based on the results of the descriptive statistical analysis presented in the table, it was found that the average pretest score for students in the experimental class was 42,09, while that for the control class was 54,61. This difference in means indicates a tendency for the initial ability of students in the control class to be higher than that of the experimental class. This difference in means indicates that the initial abilities of the two groups are not entirely equivalent. Additionally, the descriptive data also provide a general overview of the distribution of students' scores before and after the treatment.

Subsequently, a normality test was conducted on the posttest data regarding mathematical understanding ability in both classes that were the subjects of the study. This test aimed to determine whether the data obtained from the research sample originated from a population with a normal distribution. Thus, the results of this normality test served as a crucial basis for determining the type of advanced statistical analysis to be used whether parametric or nonparametric statistics. The normality testing process was conducted using appropriate test methods, ensuring the results provide an accurate picture of the data distribution. The detailed results of the normality tests are presented in full in Table 3.

Table 3. Results of the Normality Test for Mathematical Understanding

No.	Class	Statistic	df	Sig.	conclusion
1.	Posttest Experiment Class	.198	23	.162	Normally Distributed
2.	Posttest Control Class	.865	23	.005	Not Normally Distributed

Table 3 shows that the posttest data for the experimental class are normally distributed, with a p-value of 0.162, which is greater than the significance level of 0.05. Conversely, the data from the control class are not normally distributed because they have a significance value of 0.005, which is less than 0.05. Since one of the groups does not meet the criteria for the normality test, hypothesis testing uses a non-parametric statistic, namely the Mann-Whitney U test. The results of this analysis are presented in Table 4.

Table 4. Hypothesis Test Results

	Results
Mann-Whitney U	243,500
Wilcoxon W	519,500
Z	-,462
Asymp. Sig. (2-tailed)	.644

Based on the results of the hypothesis test presented in Table 4, a significance value of 0.644 was obtained. This value is greater than the predetermined significance level of 0.05 ($p > 0.05$), so the decision made is to accept H_0 and reject H_1. These results indicate that, statistically, there is no significant difference between the mathematical understanding abilities of students who participated in learning using the Wordwall educational game and those who participated in learning using conventional methods.

Thus, it can be concluded that the use of the Wordwall educational game has not had a significant effect on the mathematical understanding skills of junior high school students regarding the addition and subtraction of integers. Nevertheless, this medium is capable of creating a more engaging learning atmosphere and increasing student engagement and participation during the learning process. This improvement is evident from the students' enthusiasm in participating in every stage of the learning process.

Figure 1. Learning in The Experimental Class Using The Wordwall Educational Game

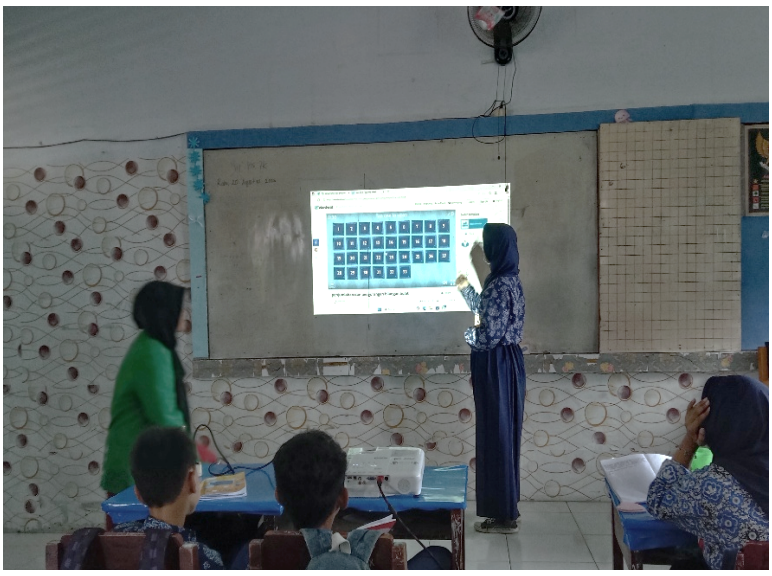

Figure 2. Learning in The Experimental Class Using The Wordwall Educational Game

However, this high level of engagement has not yet been fully accompanied by an optimal increase in conceptual understanding. This situation is likely due to several factors. First, differences in students' initial abilities between the two groups. Based on descriptive statistical

analysis, the average pretest score for students in the experimental class was 42.09, while in the control class it was 54.61. This difference indicates that students' initial conditions prior to instruction were not equivalent. Students with higher initial ability tend to grasp the taught material more easily, so the final learning outcomes are influenced not only by the treatment but also by these initial abilities. Consequently, the differences in posttest results obtained do not fully reflect the influence of using the Wordwall medium. Higher initial ability in one of the groups may contribute more significantly to learning outcomes than the treatment provided. This aligns with the view of Lindawati et al., (2021), who stated in their study that students' initial ability can influence learning outcomes. Students' prior knowledge is the foundational potential they possess before beginning further learning (Wardah et al., 2025). Additionally, according to Aprillia & Sutiarso, (2023), when presented with more complex material through appropriate instruction, students with high prior mathematical ability tend to absorb the material more effectively compared to those with low prior mathematical ability. This is because they have already acquired the necessary foundational mathematical skills, or possess the conceptual understanding required for further learning, given that mathematics is hierarchical, structured, and cumulative in nature. Thus, the lack of significant findings in this study is likely due to differences in students' prior abilities, meaning that the effect of using Wordwall on mathematical understanding has not yet been fully realized.

Second, the relatively short duration of media implementation in this study may also limit its impact on improving students' mathematical understanding. Students are still in the process of adapting to the use of game-based learning media implemented in the classroom. Anggraini et al., (2021) state that game-based learning itself requires more time because not all students can quickly grasp how to use it. The implementation of educational games requires time and practice so that students can balance their engagement in the game with the achievement of optimal learning objectives. The learning process conducted over a relatively short period may be one of the contributing factors, as students lack sufficient experience with game-based learning approaches. At this stage, students' attention tends to be more focused on game mechanics such as rules, gameplay, and competitive aspects rather than on understanding the mathematical concepts being studied. Putri et al., (2025) it is stated that engaging media can divert students' focus from learning, causing their attention to shift toward gameplay rather than understanding scientific concepts. This situation has the potential to result in a less in-depth learning process. Therefore, adequate time and practice are needed so that students can balance their engagement in the game with the optimal achievement of learning objectives.

Third, the gap between the need for visualizing mathematical concepts and the characteristics of the instructional media used. In mathematics education, particularly when teaching integers, students require concrete and visual representations to help them understand concepts more deeply. Meanwhile, Wordwall tends to emphasize the presentation of interactive and repetitive problems, so the aspect of conceptual visualization has not been optimally addressed. Operational understanding of integers cannot develop solely through repeated exposure to problems without adequate conceptual exploration. Students need opportunities to build understanding through meaningful learning experiences, such as observing patterns, conducting simple experiments, and connecting concepts to real-life situations. Without strong visualization support and a conceptual approach, students tend to merely memorize procedures without truly understanding the meaning of the operations being performed. In this context, Wordwall is a web-based digital gamification application designed to provide various game and quiz features (Kurnia et al., 2025). Wordwall's focus on presenting problems in the form of games shifts student interaction toward quiz-taking activities rather than exploring integer concepts through concrete visual representations or manipulatives. According to Nurhasanah, et al., (2025), students' direct interaction with learning objects through manipulatives has a significant impact on their ability to understand mathematical concepts. Additionally, Risnayati, (2021) notes that students' conceptual understanding of integer arithmetic operations

can be optimally enhanced through demonstrations using concrete media, which allow students to observe and experience concrete steps first before grasping abstract symbols. Furthermore, for material requiring analytical skills and deep conceptual understanding, this medium is considered less supportive because its emphasis is greater on the game aspect, so students' attention tends to focus on playing activities rather than understanding the substance of the material (Putri et al., 2025). Therefore, to foster students' conceptual understanding, the use of Wordwall is more appropriate as a tool for reinforcement or evaluation, not as the primary medium.

Based on this, the use of Wordwall in the classroom should be positioned as a supplementary tool designed to reinforce previously taught concepts. Teachers should first build students' conceptual understanding through systematic explanations, the use of visual aids, and learning activities that allow students to explore concepts in depth. Afterward, Wordwall can be utilized as a tool for interactive and enjoyable practice, reinforcement, and assessment. Both theoretically and practically, these results confirm that the effectiveness of instructional media depends not only on its appeal but also on its alignment with student characteristics and the subject matter. The findings of this study serve as a guide for teachers in selecting appropriate instructional media and as a reference for the development of technology-based learning. This study has limitations, namely uncontrolled differences in students' prior abilities, a short treatment duration, and limitations in the media's ability to visualize mathematical concepts. Therefore, future research is recommended to use a more homogeneous sample or control for prior abilities, extend the treatment duration, and develop media that better align with learning needs.

CONCLUSION

In this study, students were actively engaged, and their level of participation increased throughout the learning process. However, the results of the data analysis indicate that the implementation of the Wordwall educational game has not yet had a significant impact on the mathematical understanding skills of junior high school students regarding the addition and subtraction of integers. This outcome was influenced by several factors, such as differences in students' prior abilities, the relatively short duration of the intervention, and the mismatch between the need for visualizing mathematical concepts and the characteristics of the media used. Therefore, teachers need to carefully consider the selection and use of learning media to ensure they align with the need for concept visualization and students' prior abilities. Furthermore, future research is expected to use a more homogeneous sample or control for students' prior abilities, extend the duration of the intervention, and develop instructional media that are better suited to the characteristics of the mathematical material.

ACKNOWLEDGMENTS

The researcher would like to express his deepest gratitude to the Principal of SMP Negeri 3 Palu for granting permission and providing the opportunity to conduct this research and collect data at the school. The support and trust extended were instrumental in ensuring the smooth progress of this research. In addition, the researchers also express their appreciation and gratitude to the seventh-grade mathematics teachers of classes J and K for their assistance, guidance, and cooperation throughout the research process. Their participation and support played a crucial role in the success of this study, ensuring that all activities proceeded smoothly and effectively.

REFERENCES

Aluna, F. N., Rakhmawati, N., & Rahman, F. (2025). Efektivitas Penggunaan Game Edukasi Wordwall dan Motivasi Terhadap Hasil Belajar Peluang Kejadian. *Jurnal Ilmiah*

Soulmath : Jurnal Edukasi Pendidikan Matematika, *13*(1), 67–78. https://doi.org/10.25139/smj.v13i1.9073

Anggraini, H. I., Nurhayati, N., & Kusumaningrum, S. R. (2021). Penerapan Media Pembelajaran Game Matematika Berbasis Hots dengan Metode Digital Game Based Learning (DGBL) di Sekolah Dasar. *Jurnal Pendidikan Indonesia*, *2*(11), 1885–1896. https://doi.org/10.59141/japendi.v2i11.356

Anggriany, N., & Rakhmawati, F. (2024). EFEKTIVITAS PENGGUNAAN GAME EDUKASI BERBASIS WORDWALL DALAM MENINGKATKAN HASIL BELAJAR MATEMATIS SISWA. *JP2M (Jurnal Pendidikan Dan Pembelajaran Matematika)*, *10*(1), 290–302. https://doi.org/10.29100/jp2m.v10i1.6130

Aprillia, A., & Sutiarso, S. (2023). Pengaruh Kemampuan Awal Terhadap Pemahaman Konsep Matematis Siswa. *Euclid*, *10*(2), 325. https://doi.org/10.33603/e.v10i2.8565

Mahtuum, Z. A.-R., Nurhayati, A., Hidayat, W., & Eti Rohaeti, E. (2020). ANALISIS KEMAMPUAN PEMAHAMAN MATEMATIS SISWA KELAS VII SMP BUDI LUHUR PADA MATERI PERBANDINGAN. *JPMI: Jurnal Pembelajaran Matematika Inovatif*, *3*(2), 137–144. https://doi.org/10.22460/jpmi.v3i1.p137-144

Darwanto, & Paramita, D. (2025). *Pengembangan Media Pembelajaran Virtual Reality (VR) Berbantuan Millealab terhadap Pemahaman Konsep Matematis Siswa*. *15*(2). https://doi.org/10.47637/eksponen.v15i2.1898

Fakhriyana, D., & Riayah, S. (2021). Optimalisasi Pembelajaran dalam Jaringan (Daring) dengan Media Pembelajaran Video Interaktif Terhadap Pemahaman Matematis Siswa. *Jurnal Pendidikan Matematika (Kudus)*, *4*(1), 19. https://doi.org/10.21043/jmtk.v4i1.10147

Kurnia, M. D., Febianti, Y. N., & Ambarwati, A. (2025). MEDIA PEMBELAJARAN INTERAKTIF WORD WALL TERHADAP HASIL BELAJAR SISWA PADA MATERI ETIKA PROFESI KELAS X AKUNTANSI SMK PARIWISATA KOSGORO KOTA CIREBON. *Jurnal Visi Ilmu Pendidikan*, *16*(3), 341–349. https://doi.org/10.26418/jvip.v16i3.60192

Lindawati, R., Noervadila, I., & Munawwir, Z. (2021). PENGARUH KEMAMPUAN AWAL DAN MOTIVASI BELAJAR TERHADAP HASIL BELAJAR SISWA KELAS VII DI MTS SARJI AR- RASYID SITUBONDO. *JURNAL PENDIDIKAN DAN KEWIRAUSAHAAN*, *8*(2), 98–109. https://doi.org/10.47668/pkwu.v8i2.95

Maulida, M., Sari, P., & Purwanto, S. (2022). Pengembangan Modul Pembelajaran Matematika pada Materi Penjumlahan dan Pengurangan Bilangan Bulat dengan Menggunakan Model Neutralization on a Number Line (NNL). *Griya Journal of Mathematics Education and Application*, *2*(1), 56–69. https://doi.org/10.29303/griya.v2i1.131

Mulyati, S., & Evendi, H. (2020). Pembelajaran Matematika melalui Media Game Quizizz untuk Meningkatkan Hasil Belajar Matematika SMP. *GAUSS: Jurnal Pendidikan Matematika*, *3*(1), 64–73. https://doi.org/10.30656/gauss.v3i1.2127

Nurhasanah, F. A., Yurniwati, & Zakiah, L. (2025). *Implementasi Model Discovery Learning berbantuan Media manipulative untuk meningkatkan Kemampuan Berpikir Spasial siswa dalam Pembelajaran Matematika di Sekolah Dasar*. https://doi.org/10.20961/shes.v8i3.107318

Pamungkas, D. A., Imron, A., Marzuqi, M. I., & Larasati, D. A. (2023). Pengaruh penggunaan media pembelajaran Word Wall terhadap motivasi belajar IPS. *JIPSINDO (Jurnal Pendidikan Ilmu Pengetahuan Sosial Indonesia) Universitas Negeri Surabaya*, *10*(01), 67–78. https://doi.org/10.21831/jipsindo.v10i1.53199

Pasha, V. F., & Aini, I. N. (2022). DESKRIPSI KEMAMPUAN PEMAHAMAN KONSEP MATEMATIS DITINJAU DARI SELF-REGULATED LEARNING. *Teorema: Teori Dan Riset Matematika*, *7*(2), 235. https://doi.org/10.25157/teorema.v7i2.7217

Pratama, E., Sari, P., & Purwanto, S. (2022). Pengembangan Komik Online Mengenai Operasi Penjumlahan dan Pengurangan Bilangan Bulat dengan Model Neutralization On A Number Line. *Griya Journal of Mathematics Education and Application*, *2*(1), 169–182. https://doi.org/10.29303/griya.v2i1.126

Putri, S. R., Ali, G., & Rahmadhani, A. (2025). The Effect of Educational Game-Based Learning Media on Science Literacy of Grade V Students at SDN 10 Sitiung. *TOFEDU: The Future of Education Journal*, *4*(7), Page. https://doi.org/10.61445/tofedu.v4i7.803

Ramadhani, S., & Silalahi, B. R. (2025). PENERAPAN MEDIA GAME WORDWALL DALAM PELAJARAN MATEMATIKA UNTUK MENINGKATKAN MINAT BELAJAR SISWA KELAS IV SD IT AN-NAFIS TELUK MENGKUDU. *Pendas : Jurnal Ilmiah Pendidikan Dasar*, *10*(02), 383–389. https://doi.org/10.23969/jp.v10i02.28143

Rambe, A. H., Parapat, H. F., Hadinata, R., & Hasratuddin. (2024). PEMANFAATAN MEDIA BERBASIS GAME DALAM MENINGKATKAN AKTIVITAS SISWA PADA PEMBELAJARAN SEKOLAH. *ELSE (Elementary School Education Journal): Jurnal Pendidikan Dan Pembelajaran Sekolah Dasar*, *8*(3), 11–12. https://doi.org/10.30651/else.v8i3.24251

Risnayati, C. (2021). MENINGKATKAN PEMAHAMAN KONSEP MATEMATIKA MATERI OPERASI HITUNG BILANGAN BULAT MELALUI METODE DEMONSTRASI DENGAN MEDIA. *Jurnal Wahana Pendidikan*, *8*(1), 91. https://doi.org/10.25157/wa.v8i1.4710

Rohim, N. M., & Buchori, A. (2024). Efektivitas Media Geogebra Terhadap Kemampuan Pemahaman Konsep Matematis Pada Materi Perbandingan Trigonometri Pada Segitiga Siku-siku. *Eksponen*, *14*(2). https://doi.org/10.47637/eksponen.v14i2.1230

Sabiila, O. P. A. (2024). PENGGUNAAN WORDWALL SEBAGAI MEDIA BERBASIS GAME EDUKASI UNTUK MENINGKATKAN MINAT BELAJAR SISWA KELAS IV SDN POLEHAN 1. *Jurnal Pembelajaran, Bimbingan, Dan Pengelolaan Pendidikan*, *4*(5), 12. https://doi.org/10.17977/um065.v4.i5.2024.12

Simbolon, S., & Harahap, A. (2021). Analisis Proses Pembelajaran Matematika pada Masa COVID-19. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *5*(2), 2020–2028. https://doi.org/10.31004/cendekia.v5i2.646

Hadi, W., Sari, Y., & Pasha, N. M. (2024). Analisis Penggunaan Media Interaktif Wordwall terhadap Peningkatan Hasil Belajar IPA di Sekolah Dasar. *JURNAL PENDIDIKAN MIPA*, *14*(2), 466–473. https://doi.org/10.37630/jpm.v14i2.1570

Wardah, A., Wulandari, K. D., Nurirrohman, S. M., & Bakar, M. Y. A. (2025). Mengidentifikasi Pembelajaran Berbasis Kemampuan Awal: Menyesuaikan Pengajaran Dengan Potensi Siswa. *Jurnal Ilmiah Nusantara (JINU)*, *2*(3), 830–841. https://doi.org/10.61722/jinu.v2i3.4642

Wildan, A., Suherman, S., & Rusdiyani, I. (2023). Pengembangan Media GAULL (Game Edukasi Wordwall) pada Materi Bangun Ruang untuk Siswa Sekolah Dasar. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *7*(2), 1623–1634. https://doi.org/10.31004/cendekia.v7i2.2357

Yopa, Y., Narasiska, D., Nadia, N., & Putra, Y. Y. (2021). Permainan Pangkak Igik Karet Sebagai Media Berhitung. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *5*(1), 148–163. https://doi.org/10.31004/cendekia.v5i1.400