

Analysis of Interactive Learning Media Needs and the Application of Wordwall Based Media in Supporting Elementary School Students' Motivation for Mathematics Learning

Jusriah¹, Baharullah², Andi Mulawakkan Firdaus^{3*}, Fanuel Alem Semere⁴

^{1,2,3}Graduate Program, Master of Mathematics Education, Universitas Muhammadiyah Makassar, Indonesia

⁴Asmara College of Education, Eritrea, East Africa

^{1,2,3}Jl. Sultan Alauddin No. 259, Makassar, South Sulawesi, Indonesia

⁴Maekel Region, Asmara, Eritrea, East Africa

Correspondence Email: andi.mulawakkan@unismuh.ac.id

Received May 24, 2026; Revised June 16, 2026; Accepted June 24, 2026

Available Online June 29, 2026

Abstract:

Mathematics learning motivation is an important factor influencing students' engagement and participation in elementary classrooms. However, students often experience low motivation during multiplication learning due to limited interaction and the dominance of conventional instructional approaches. This study aimed to explore the implementation of Wordwall based interactive media in mathematics learning and describe students' responses during its use in multiplication learning. This study employed a descriptive qualitative approach involving 24 fourth-grade students and one classroom teacher at an elementary school. Student informants were selected through purposive sampling with variation based on motivation levels. Data were collected through semi structured interviews, classroom observations, and documentation, and analyzed using the Miles and Huberman interactive model. The findings revealed that students needed more interactive and participatory learning experiences to support their engagement in multiplication learning. Classroom observations indicated a more active and responsive learning environment during the implementation of Wordwall based activities. Students demonstrated attention, participation, confidence, persistence, and peer interaction during learning activities. Responses varied according to motivation levels, with low motivation students becoming more willing to participate, medium-motivation students showing better focus, and high motivation students displaying greater persistence in completing tasks. The findings suggest that Wordwall based learning activities have the potential to support students' motivational engagement in mathematics when aligned with learning objectives, student needs, teacher facilitation, and classroom conditions.

Abstrak:

Motivasi belajar matematika merupakan faktor penting yang mempengaruhi keterlibatan dan partisipasi siswa di kelas dasar. Namun, siswa sering mengalami motivasi yang rendah selama pembelajaran perkalian karena interaksi yang terbatas dan dominasi pendekatan instruksional konvensional. Penelitian ini bertujuan untuk mengeksplorasi implementasi media interaktif berbasis Wordwall dalam

pembelajaran matematika dan mendeskripsikan respon siswa selama penggunaannya dalam pembelajaran perkalian. Penelitian ini menggunakan pendekatan kualitatif deskriptif yang melibatkan 24 siswa kelas empat dan satu guru kelas di sekolah dasar. Informan siswa dipilih melalui purposive sampling dengan variasi berdasarkan tingkat motivasi. Data dikumpulkan melalui wawancara semi terstruktur, observasi kelas, dan dokumentasi dan dianalisis menggunakan model interaktif Miles dan Huberman. Temuan mengungkapkan bahwa siswa membutuhkan pengalaman belajar yang lebih interaktif dan partisipatif untuk mendukung keterlibatan mereka dalam pembelajaran perbanyakan. Pengamatan kelas menunjukkan lingkungan belajar yang lebih aktif dan responsif selama pelaksanaan kegiatan berbasis Wordwall. Siswa menunjukkan perhatian, partisipasi, kepercayaan diri, ketekunan, dan interaksi teman sebaya selama kegiatan pembelajaran. Tanggapan bervariasi sesuai dengan tingkat motivasi, dengan siswa dengan motivasi rendah menjadi lebih bersedia untuk berpartisipasi, siswa dengan motivasi sedang menunjukkan fokus yang lebih baik, dan siswa dengan motivasi tinggi menunjukkan ketekunan yang lebih besar dalam menyelesaikan tugas. Temuan menunjukkan bahwa kegiatan pembelajaran berbasis Wordwall berpotensi mendukung keterlibatan motivasi siswa dalam matematika jika diselaraskan dengan tujuan pembelajaran, kebutuhan siswa, fasilitasi guru, dan kondisi kelas.

Keywords:

Mathematics Learning, Elementary School, Interactive Learning Media,
Learning Motivation, Wordwall

How to Cite: Jusriah, Baharullah, Firdaus, A. M., & Semere, F. A. (2026). Analysis of Interactive Learning Media Needs and the Application of Wordwall Based Media in Supporting Elementary School Students' Motivation for Mathematics Learning. *MaPan: Jurnal Matematika dan Pembelajaran*, 14(1), 133-155. <https://doi.org/10.24252/mapan.2026v14n1a8>.

INTRODUCTION

The development of digital technology in education has encouraged changes in elementary school learning practices. Learning can no longer rely only on conventional content delivery, but needs to provide interactive and engaging experiences that actively involve students in the learning process (Firdaus & Oschar, 2025). However, classroom practice in elementary schools still often depends on lecture-based instruction and limited learning media. This condition can reduce students' attention, participation, and learning motivation (Azhari, Khadijah, & Rif'iyati, 2023).

Mathematics is one of the fundamental subjects in elementary school that often presents learning challenges for students. Many students perceive

mathematics as difficult, abstract, and less interesting, which may reduce their learning motivation and classroom participation. These conditions indicate the need for innovative and interactive learning media that can help students understand mathematical concepts while increasing their motivation to learn.

Learning motivation is an important factor in supporting students' engagement and success in learning (Windiyani, Sofyan, Novita, & Patricia, 2024). Students with high motivation usually show stronger attention, enthusiasm, persistence, and participation in classroom activities (Rahmadhani & Rahmi, 2025). In contrast, students with low motivation often show limited attention, weak interest, and passive involvement during learning activities (Monica & Fathoni, 2025). These problems indicate that teachers need learning media that can attract students' attention, create meaningful interaction, and encourage students to participate actively.

Interactive digital media can support mathematics learning by providing visual representations, immediate feedback, and opportunities for repeated practice. These characteristics are important because mathematics learning requires students to pay attention, participate actively, practice continuously, and receive feedback on their answers. Various digital media can be used to support interactive mathematics learning, such as Quizizz, Kahoot, Educandy, Liveworksheets, and Wordwall. These media provide different forms of learning activities, including quizzes, games, matching tasks, worksheets, and feedback based exercises.

The selection of interactive media should be based on classroom needs, students' characteristics, and learning objectives. Digital media should not be chosen only because they are interesting or popular. It needs to help students understand the task, participate actively, receive feedback, and become more confident in learning mathematics. Therefore, an initial understanding of classroom conditions is important before determining the most relevant media to use.

Previous studies have shown that interactive digital media can support students' motivation and participation in learning. Interactive media can create a more engaging learning atmosphere because students not only listen to explanations, but also respond, try, receive feedback, and participate directly in learning activities (Hidayat & Nugroho, 2022). The use of digital media is also relevant to the characteristics of today's students who are familiar with technology based activities (Firdaus & Oschar, 2025; Irham & Firdaus, 2024; Wijayanti & Firdaus, 2024). From a pedagogical perspective, learning media can

help teachers connect learning content with students' cognitive, affective, and behavioral engagement (Firdaus & Oschar, 2025).

Preliminary classroom observation and teacher interview indicated that students needed mathematics learning activities that were more interactive, engaging, and participatory. The learning process was still dominated by teacher explanation, textbooks, and written exercises, so students had limited opportunities to receive immediate feedback and participate actively. Several interactive media could respond to this need. Among these alternatives, Wordwall was selected because it provides quizzes, matching activities, direct feedback, scores, and repeated attempts that are suitable for multiplication learning in elementary school.

Several previous studies have examined the use of Wordwall in learning. Khairunnisa, Ifrianti, and Erfayliana (2025) found that Wordwall assisted learning can support elementary school students' learning motivation through interactive activities. Azmi, Winarni, and Yulisetiani (2025) reported that Wordwall can contribute to students' motivation and learning outcomes. Fatkhulla and Sahabuddin (2024) showed that Wordwall educational games can increase students' intrinsic motivation and learning enthusiasm. Similar findings were reported by Suwanto (2025), who stated that Wordwall can create a more enjoyable and competitive learning experience. These studies show that Wordwall has the potential to support students' motivation. However, most previous studies focused on measuring the effect of Wordwall quantitatively and did not explain how Wordwall was selected based on classroom needs, how it was implemented in authentic mathematics learning, and how students with different motivation levels responded to it.

Table 1. Synthesis of Previous Studies on Wordwall and Learning Motivation

No	Author(s)	Research Focus	Method	Main Findings	Research Gap
1	Khairunnisa, Ifrianti, and Erfayliana (2025)	Wordwall-assisted learning and students' motivation	Quantitative	Wordwall increased elementary students' learning motivation through interactive activities.	Did not explore how students with different motivation levels experience Wordwall-based learning.

No	Author(s)	Research Focus	Method	Main Findings	Research Gap
2	Azmi, Winarni, and Yulisetiani (2025)	Wordwall, learning motivation, and learning outcomes	Experimental	Wordwall contributed positively to motivation and learning outcomes.	Focused on effectiveness testing rather than learning processes and students' needs.
3	Fatkhullah, Sahabuddin, and Hartoto (2024)	Educational games and intrinsic motivation	Quantitative	Wordwall educational games increased students' intrinsic motivation and enthusiasm.	Did not investigate classroom implementation and interaction processes.
4	Suwanto (2025)	Wordwall as interactive game media	Classroom-based research	Wordwall created enjoyable and competitive learning experiences.	Limited explanation of the mechanisms through which Wordwall influences motivation.
5	Juraidah, Diana, and Akbar (2025)	Interactive learning media and motivation	Quantitative	Wordwall positively affected students' learning motivation.	Focused on outcomes rather than students' experiences and learning needs.
6	Susilowati, Sa'diyah, Islahuddin, and Noviana (2025)	Wordwall and Arabic learning motivation	Quantitative	Students' motivation improved after using Wordwall.	Did not examine differences in students' motivational responses.
7	Syahyadi, Fajariyanto, and Ash-shiddiqy (2024)	Literature review on Wordwall and motivation	Literature Review	Wordwall was reported to support motivation in science learning.	No empirical classroom investigation and no qualitative evidence.

As shown in table 1, previous studies have consistently reported the positive contribution of Wordwall to students' learning motivation and learning outcomes. However, most studies focused on effectiveness testing through quantitative or experimental approaches. These studies provide useful evidence about the impact of Wordwall, but they give limited attention to the process of selecting Wordwall based on classroom needs, the way teachers implement it in real mathematics learning, and the different motivational responses shown by students with high, medium, and low motivation.

Based on this gap, further research is needed to explore Wordwall not only as a digital learning tool but also as an interactive medium that is selected and implemented according to classroom needs. A qualitative approach is important because it allows a deeper understanding of teacher strategies, classroom interaction, student participation, feedback processes, and motivational responses during Wordwall based mathematics learning.

The novelty of this study lies in explaining how Wordwall-based interactive media was selected based on preliminary classroom needs and implemented in authentic elementary mathematics learning. Unlike previous studies that mainly measured the effect of Wordwall on motivation or learning outcomes, this study provides qualitative evidence of how Wordwall supports students' attention, participation, confidence, persistence, and peer interaction during multiplication learning. Therefore, this study aims to explore the implementation of Wordwall-based interactive media and its role in supporting elementary school students' motivation in mathematics learning.

METHODS

This study used a descriptive qualitative approach to analyze mathematics learning media needs and the application of Wordwall-based interactive media in supporting elementary school students' motivation in mathematics learning. This approach was chosen because the study did not aim to measure the statistical effect of Wordwall, but to describe students' needs, classroom interaction, teacher strategies, and students' motivational responses during the use of Wordwall in a real learning context.

The study was conducted at an elementary school in Kutai Timur, Kalimantan Timur, Indonesia. To maintain research ethics and participant confidentiality, the school was coded as School A. The participants consisted of 24 students and one classroom teacher. The participants were fourth-grade elementary school students, as multiplication is one of the core mathematics

topics taught at this level. All students were involved in classroom observation during the learning process, while selected students became interview informants.

The selection of informants used purposive sampling combined with maximum variation sampling. Students were grouped into high, medium, and low motivation categories based on initial classroom observation and the teacher's recommendation. The categorization was based on students' classroom attention, participation, persistence, confidence in answering questions, and teacher confirmation. From each category, two students were selected as key informants, so there were six student informants in total. This selection aimed to obtain varied information about students' experiences and responses to Wordwall-based learning.

The implementation of Wordwall was conducted during mathematics learning activities on multiplication topics in elementary school. The implementation was carried out in three meetings, with each meeting lasting approximately 70 minutes. The first meeting focused on identifying the initial classroom condition and students' responses to conventional multiplication learning. The second and third meetings focused on the implementation of Wordwall through interactive quizzes, matching activities, and multiplication exercises. Students were asked to read multiplication questions, select answers, respond to feedback, and try again when they made mistakes. Classroom observation was conducted during the learning activities, while teacher and student interviews were conducted after the implementation. The multiplication topic was selected because it is one of the fundamental mathematical concepts that requires repeated practice, active participation, and immediate feedback.

Data were collected through semi structured interviews, classroom observation, and documentation. Interviews with the teacher focused on learning conditions before the use of Wordwall, mathematics learning media needs, media availability, implementation strategies, and students' responses during learning. Interviews with students explored their attention, interest, participation, confidence, learning enthusiasm, and experiences in using Wordwall during mathematics learning activities. Classroom observation was conducted to record students' behavior during mathematics learning, including attention to mathematical concepts, active involvement in solving mathematics tasks, responses to questions, interaction with peers, and responses to feedback

provided through Wordwall activities. Documentation included learning materials, Wordwall activities, student work, and classroom activity records.

The research instruments consisted of interview guidelines and observation sheets. The teacher interview guideline included questions about learning media used before Wordwall, problems in student motivation, the need for interactive media, the process of implementing Wordwall, and challenges during learning. The student interview guideline included questions about students' interest in learning, perceived difficulty, attention during learning, participation in Wordwall activities, and motivation after using the media. The observation sheet was developed based on indicators of motivation in mathematics learning, namely attention, interest, active participation, persistence in completing mathematics tasks, confidence in answering mathematical questions, and interaction during learning.

Data were analyzed using the Miles and Huberman interactive model, which consists of data condensation, data display, and conclusion drawing. In the data condensation stage, interview transcripts, observation notes, and documentation were read repeatedly to identify information relevant to mathematics learning media needs and students' motivation. The data were then coded based on recurring patterns, such as limited mathematics learning media, student boredom during mathematics lessons, the need for interactive mathematics learning, increased attention, active participation in mathematics activities, direct feedback, peer interaction, and confidence in answering mathematics questions. These codes were grouped into broader categories and themes. In the data display stage, the findings were organized into descriptive narratives supported by selected interview quotations and observation evidence. In the conclusion drawing stage, the themes were interpreted to explain how Wordwall based interactive media supported students' learning motivation.

To ensure data trustworthiness, this study used source triangulation, technique triangulation, and member checking. Source triangulation was conducted by comparing data from the teacher and students with different motivation levels. Technique triangulation was conducted by comparing interview data, observation results, and documentation. Member checking was carried out by confirming the main interview results with informants to ensure that the researcher's interpretation was consistent with their responses. These procedures were used to strengthen the credibility and accuracy of the findings.

RESULTS AND DISCUSSION

The results of this study describe the implementation of Wordwall based interactive media and its role in supporting students' learning motivation in mathematics learning. The initial classroom condition before Wordwall implementation is presented as supporting data to explain the relevance of using interactive media in multiplication learning. The findings were obtained from teacher interviews, student interviews, classroom observations, and documentation.

1. Initial Classroom Conditions Before Wordwall Implementation

Before Wordwall was implemented, mathematics learning was mainly conducted through teacher explanation, question and answer activities, textbooks, and written exercises. This condition was identified through teacher interviews, classroom observation, and documentation of learning activities. In multiplication learning, students mostly listened to the teacher's explanation and completed exercises from the textbook.

The teacher stated, *"I have mostly used lecture and question and answer methods because the only available media are books and the blackboard"*. This initial condition indicated that the classroom still had limited use of interactive media. Therefore, a further needs analysis was conducted to understand students' motivational problems, learning preferences, content difficulties, teaching needs, technological readiness, and contextual factors before selecting the learning medium.

2. Needs Analysis for Selecting Interactive Mathematics Learning Media

The needs analysis showed that students' motivation in mathematics learning was influenced by boredom, limited interaction, perceived difficulty, and low involvement in classroom activities. Classroom observation showed that several students were less focused, less active in answering questions, and tended to wait for teacher direction. In multiplication learning, this condition became more visible because students had to practice repeatedly, while the learning format remained dominated by written exercises.

To make the needs analysis more explicit, the findings were grouped into several aspects, namely motivational factors, learning difficulties, learning preferences, teaching needs, technological needs, and contextual needs. The summary of the needs analysis is presented in table 2.

Table 2. Summary of Needs Analysis for Selecting Interactive Mathematics Learning Media

Aspect of Needs Analysis	Evidence from Data Sources	Interpretation	Implication for Media Selection
Motivational factors	Teacher interviews and classroom observations showed that several students were less focused, less active in answering questions, and tended to wait for teacher direction during multiplication learning.	Students' low motivation was related to boredom, limited interaction, and low involvement in conventional learning activities.	The selected media needed to attract students' attention and encourage direct participation.
Learning difficulties	Student interviews indicated that multiplication was perceived as difficult because students had to remember number facts, understand procedures, and answer accurately.	Multiplication learning required repeated practice, but written exercises alone made some students feel tired and less interested.	The selected media needed to support repeated practice in a more engaging and less intimidating format.
Learning preferences	Students tended to prefer activities involving pictures, colors, quizzes, challenges, direct responses, and opportunities to try again.	Students preferred visual, interactive, game-based, and feedback-based learning experiences.	The selected media needed to provide visual display, interaction, feedback, and repeated attempts.
Teaching needs	The teacher needed a medium that could support multiplication practice while keeping students focused on the learning objectives.	The media had to match the characteristics of multiplication material and the curriculum objective of strengthening basic number operations.	The selected media needed to provide structured multiplication tasks, immediate feedback, and opportunities to correct mistakes.

Aspect of Needs Analysis	Evidence from Data Sources	Interpretation	Implication for Media Selection
Technological needs	Learning media were limited, but classroom facilities allowed simple teacher-guided digital activities. Students were familiar with digital displays and game-like activities, but still needed guidance.	The implementation required a medium that was simple, accessible, and easy to operate in classroom learning.	The selected media needed to be usable with teacher guidance and suitable for classroom-based digital activities.
Contextual needs	Classroom learning was still teacher-centered, and students were not fully accustomed to active participation in mathematics activities.	The media needed to help shift the classroom atmosphere from passive listening to active participation.	The selected media needed to support classroom interaction, peer discussion, and teacher facilitation.

The data in table 2 show that the need for interactive media was not only related to the limited availability of learning media. It was also related to students' motivational problems, perceived difficulty in multiplication, learning preferences, technological readiness, and classroom context. These findings became the basis for selecting Wordwall as the learning medium. Wordwall was considered relevant because its features, such as quizzes, matching activities, visual display, scores, direct feedback, and repeated attempts, were aligned with the needs identified in the classroom.

Students' low motivation was also related to perceived learning difficulties. Some students considered multiplication difficult because they had to remember number facts, understand procedures, and answer questions accurately. For students with low motivation, multiplication tasks were often perceived as tiring and less interesting when presented only through written exercises. This indicates that students needed learning activities that could reduce anxiety, provide guidance, and make repeated practice more meaningful.

The interviews also revealed students' learning preferences. Students tended to prefer learning activities that included visual displays, game-based tasks, direct responses, and opportunities to try again. Several students stated that they were more interested when learning involved pictures, colors, quizzes, and challenges. Students also showed interest in interactive activities because they could answer questions directly and see whether their answers were correct or incorrect. These preferences indicate that students needed media that combined visual, interactive, and feedback based learning experiences.

From the teacher's perspective, the selected media needed to match the characteristics of multiplication material and curriculum objectives. Multiplication learning requires repeated practice, accuracy, attention, and gradual mastery of basic number operations. Therefore, the media needed to provide structured exercises, immediate feedback, and opportunities for students to correct mistakes. The teacher also expected a medium that could help students participate actively without reducing the focus on mathematics learning objectives.

The needs analysis also identified technological considerations. Although learning media were limited, the available classroom facilities allowed the teacher to conduct simple teacher guided digital activities. Students were familiar with digital displays and game-like activities, although they still needed teacher guidance in using learning platforms. Therefore, the selected media needed to be simple, accessible, easy to operate, and suitable for classroom use.

Contextual factors also influenced the selection of learning media. The classroom learning culture was still strongly teacher centered, so students were not accustomed to participating actively in mathematics activities. The teacher needed media that could gradually shift students from passive listening to active participation. Institutional support, classroom management, internet access, and the teacher's readiness to facilitate digital learning were also important conditions for successful media implementation.

Based on these findings, Wordwall was selected as a relevant interactive medium because it matched the identified needs. Wordwall provides visual displays, quizzes, matching activities, direct feedback, scores, and repeated attempts. These features were considered suitable for multiplication learning because they supported repeated practice, encouraged participation, and helped students receive immediate responses to their answers. Therefore, Wordwall was not selected only because it is a digital game, but because its

features were aligned with students' motivational needs, learning preferences, mathematics content characteristics, technological conditions, and classroom context.

3. Implementation of Wordwall-Based Interactive Media in Multiplication Learning

Wordwall was implemented in mathematics learning through interactive quizzes, matching activities, and multiplication exercises. The teacher began the activity by explaining the rules, showing the Wordwall display, and guiding students on how to answer the questions. Students were then asked to read multiplication questions, select answers, respond to the displayed feedback, and discuss possible answers with their peers.

Classroom observation showed that students became more attentive during Wordwall-based learning. They looked at the screen, followed the questions, responded to teacher prompts, and showed interest in completing the multiplication tasks. The teacher stated, *"Students become more active and interested when using Wordwall compared to before"*.

This finding shows that Wordwall changed students' roles in mathematics learning. Students were not only listening to the teacher's explanation. They were directly involved in answering multiplication questions, checking their responses, and trying to correct mistakes. The learning atmosphere became more active because students had opportunities to participate directly in the activity.

4. Wordwall and Students' Learning Motivation in Mathematics

The use of Wordwall supported students' learning motivation through several visible aspects. First, the visual and game based display attracted students' attention. Students became more focused on the multiplication questions because the activity was presented in a more engaging format. Second, the quiz format encouraged students to participate actively. Students were more willing to answer questions because the activity felt less monotonous than ordinary written exercises.

Third, direct feedback helped students recognize their mistakes immediately. When students gave incorrect answers, they could see the result and try to improve their responses. One student stated, *"If I make a mistake, I want to try again until I can do it"*. This response shows that feedback and repeated attempts supported students' confidence in mathematics learning.

Fourth, Wordwall encouraged peer interaction. During the activity, students discussed answers, compared responses, and encouraged classmates to participate. Observation showed that students interacted not only with the teacher, but also with their peers. This interaction made the mathematics learning atmosphere more collaborative and responsive.

Table 3. Evidence of Students' Motivational Responses During Wordwall Based Learning

Motivation Aspect	Condition Before Wordwall	Condition During Wordwall-Based Learning	Evidence Source
Attention	Several students were less focused during the teacher's explanation and the written multiplication exercises.	Students paid closer attention to the screen, followed the questions, and responded to teacher prompts.	Classroom observation
Participation	Only several students actively answered questions, while others waited for the teacher's direction.	Students became more willing to answer multiplication questions and take part in quiz-based activities.	Classroom observation and teacher interview
Confidence	Some students hesitated to answer because they were afraid of making mistakes.	Students became more willing to try again after receiving feedback from Wordwall.	Student interview and observation
Persistence	Students tended to lose interest when multiplication practice was presented only as repeated written exercises.	Students showed willingness to repeat activities and improve their answers.	Student interview
Peer interaction	Interaction among students was limited during conventional learning.	Students discussed answers, compared responses, and encouraged classmates to participate.	Classroom observation
Learning enthusiasm	Multiplication learning was perceived as monotonous when dominated by textbooks and written tasks.	Students showed more enthusiasm because the activity involved quizzes, scores, visual displays, and challenges.	Student interview and observation

The evidence in table 3 indicates that Wordwall supported students' learning motivation through changes in attention, participation, confidence, persistence, peer interaction, and learning enthusiasm. These changes were observed during multiplication learning when students were involved in interactive quizzes, matching activities, direct feedback, and repeated attempts.

5. Different Motivational Responses Based on Students' Motivation Levels

Students' responses to Wordwall differed based on their initial motivation levels. Students with high motivation showed strong enthusiasm, persistence, and interest in challenges. They were motivated by scores, immediate results, and opportunities to improve their answers. One student stated, *"If there is a quiz like this, I want to keep trying until I get it right."* This response indicates that Wordwall strengthened challenge and persistence among students who already had high motivation.

Students with medium motivation showed better focus and participation. They became more willing to follow the lesson because the multiplication questions were presented in a visual and game based format. These students did not always show strong initiative during conventional learning, but they became more involved when the activity included questions, feedback, and peer interaction.

Students with low motivation also showed positive responses. At the beginning of the activity, they still needed teacher guidance. However, they gradually became more willing to participate after observing their classmates and understanding how the activity worked. One low motivation student stated, *"If there is a game like this, I am more willing to join in learning."* This finding indicates that Wordwall helped reduce reluctance and encouraged participation in mathematics learning.

Overall, the findings show that Wordwall based interactive media supported students' learning motivation in mathematics through attention, active participation, direct feedback, repeated attempts, peer interaction, and teacher facilitation. The initial needs data helped explain why Wordwall was relevant to the classroom context, while the main finding shows how Wordwall was implemented and how it supported students' motivation during multiplication learning.

The findings show that Wordwall based interactive media supported students' learning motivation in mathematics by changing the learning situation from teacher-centered instruction to more active, participatory, and responsive

learning. Before Wordwall was used, multiplication learning was mainly delivered through explanation, textbooks, and the blackboard. This learning pattern gave students limited opportunities to interact directly with mathematical tasks. As a result, several students were less focused, less willing to answer questions, and tended to wait for teacher direction. The initial needs data helped explain why Wordwall was relevant to the classroom context. However, the needs analysis in this study was not intended as an independent research focus. It functioned as contextual evidence to support the main analysis of how Wordwall was implemented and how it supported students' learning motivation in mathematics.

The needs analysis provides an important basis for understanding why Wordwall was selected as the learning medium. The initial data showed that students' motivation was affected by boredom, limited interaction, perceived difficulty in multiplication, and low involvement in conventional learning activities. These findings indicate that students did not only need additional exercises, but also needed a different learning experience that could attract attention, provide feedback, and support active participation.

Students' learning preferences also strengthened the rationale for selecting Wordwall. Students tended to prefer visual, interactive, and game-based activities because these formats made mathematics learning less monotonous. Their expectation for quizzes, challenges, immediate responses, and opportunities to try again showed that the selected medium needed to support active engagement and repeated practice. This is relevant to multiplication learning because students need frequent practice, correction, and confidence-building experiences.

The teaching needs also supported the selection of Wordwall. Multiplication is a basic mathematics topic that requires procedural fluency, accuracy, and continuous practice. Therefore, the learning medium needed to align with curriculum objectives and help students practice multiplication without losing interest. Wordwall met these needs because its features allowed the teacher to present multiplication tasks in a structured, interactive, and feedback-based format.

Technological and contextual needs also influenced the implementation. The use of digital media depends on device availability, internet access, students' digital readiness, and teacher facilitation. In this study, Wordwall was considered appropriate because it was relatively simple to use and could be integrated into classroom activities with teacher guidance. However, the

findings also show that technology alone is not sufficient. The teacher still needed to explain instructions, manage classroom interaction, guide students who had difficulty, and connect game-based activities with multiplication concepts.

These findings suggest that the selection of learning media should be based on a careful analysis of student needs, content characteristics, technological readiness, and classroom context. Wordwall became relevant because its features matched the needs identified in the classroom. Thus, the needs analysis was not merely a formal step, but an important basis for selecting and implementing the learning medium.

The needs analysis also shows that media selection in mathematics learning should not be based only on the availability or popularity of a digital platform. The data indicated that students needed a medium that could respond to several classroom problems at the same time: boredom during written exercises, difficulty in remembering multiplication facts, limited participation, the need for visual and interactive activities, and the need for immediate feedback. Therefore, Wordwall was selected because its features were consistent with these needs. This finding strengthens the argument that the use of digital media should be preceded by an understanding of students' motivational conditions, content characteristics, technological readiness, and classroom context.

The motivational support provided by Wordwall did not come merely from the use of digital technology. A more important factor was the learning design embedded in the media. Wordwall provided challenges, scores, direct feedback, and opportunities for repeated attempts. These features encouraged students to stay involved in multiplication activities because they could see their responses and progress immediately. This finding suggests that digital media can support motivation when it is connected with clear mathematical tasks, meaningful interaction, and teacher facilitation. Therefore, Wordwall should not be viewed only as a digital game, but as a pedagogical tool that can help teachers create more active mathematics learning experiences.

The findings also show that students responded to Wordwall differently based on their initial motivation levels. Students with low motivation showed the most visible change in classroom participation. Before Wordwall was used, they tended to be passive and less interested in mathematics activities. During Wordwall based learning, they became more willing to join the lesson because the activity was visual, game based, and less intimidating. This indicates that

Wordwall can reduce students' reluctance to participate in mathematics learning. However, Wordwall does not automatically solve low motivation. Teacher guidance remains important, especially for students who need support in understanding multiplication questions and using the media.

Students with medium motivation showed better focus and interest during Wordwall based learning. These students did not always show strong initiative during conventional instruction, but they became more involved when the activity included visual stimuli, challenges, and peer interaction. For students with high motivation, Wordwall strengthened persistence and challenge. They were motivated by scores, immediate results, and opportunities to improve their answers. These findings indicate that the same media can support learning motivation in different ways depending on students' motivational characteristics.

The findings are consistent with previous studies reporting that Wordwall can support students' learning motivation, participation, and enthusiasm (Fatkhulla & Sahabuddin, 2024; Khairunnisa, Ifrianti, & Erfayliana, 2025; Suwanto, 2025). However, this study extends previous findings by explaining how Wordwall supported motivation in an elementary mathematics classroom. The motivational support appeared through four main mechanisms: attracting students' attention, providing direct feedback, allowing repeated attempts, and encouraging interaction among students. These mechanisms helped students become more engaged in solving multiplication tasks during learning.

From the perspective of the ARCS motivation model, Wordwall attracted students' attention through interactive and visual activities. It supported relevance because students experienced mathematics learning in a format that was closer to their familiarity with digital activities. It strengthened confidence because students could try again after making mistakes. It also created satisfaction when students completed tasks and received immediate results. From the perspective of Self Determination Theory, Wordwall supported students' sense of competence through scores and feedback, relatedness through peer interaction, and autonomy through active participation in learning tasks.

Nevertheless, the use of Wordwall needs to be viewed critically. Game-based mathematics learning can increase enthusiasm, but it may also shift students' focus from understanding multiplication concepts to merely getting high scores. Competition can motivate some students, but it can create pressure

for others if not managed carefully. In addition, the use of Wordwall depends on device availability, internet access, students' digital readiness, and the teacher's ability to manage classroom activities. Without proper facilitation, Wordwall may become an entertaining activity without sufficient connection to mathematical understanding.

Therefore, the usefulness of Wordwall depends on how teachers integrate it into mathematics learning. Teachers need to select tasks that match learning objectives, provide clear instructions, guide students during activities, and discuss answers after the game. Reflection after the activity is important so that students not only play, but also understand the multiplication material being learned. In this sense, Wordwall is most useful when it becomes part of a planned learning strategy, not a stand alone digital activity.

Overall, this study shows that Wordwall-based interactive media can support elementary school students' learning motivation in mathematics through active participation, feedback, repeated attempts, and classroom interaction. Its contribution lies in showing that students with different motivation levels respond to Wordwall in different ways. However, the success of Wordwall-based learning depends on the teacher's ability to align the media with students' needs, mathematics learning objectives, and classroom conditions.

Theoretical and Practical Implications

Theoretically, this study strengthens the view that learning motivation in mathematics is shaped by the interaction between students' needs, learning media features, teacher facilitation, and classroom context. The findings show that interactive media can support motivation when its features are aligned with students' learning preferences and the characteristics of mathematics content. This study also contributes to qualitative evidence on how game-based interactive media can support attention, participation, confidence, persistence, and peer interaction in elementary mathematics learning.

Practically, the findings suggest that teachers should not select digital media only because it is attractive or popular. Teachers need to identify students' motivational problems, learning preferences, content difficulties, technological readiness, and classroom conditions before choosing a medium. For multiplication learning, media that provide visual display, repeated practice, direct feedback, and opportunities to correct mistakes are useful for supporting students' motivation. Wordwall can be used as an alternative

medium when teachers provide clear instructions, guide students during activities, and discuss answers after the game based tasks.

Limitations of the Study

This study has several limitations. First, the study was conducted in one elementary school with 24 students and one classroom teacher, so the findings cannot be generalized to all elementary school contexts. Second, this study used a descriptive qualitative approach and did not measure the statistical effect of Wordwall on students' mathematics learning outcomes. Third, the needs analysis was based on interviews, observations, and documentation, so the findings depended on the depth of students' and teachers' responses as well as the classroom situations observed. Fourth, the implementation focused only on multiplication learning, so the findings may differ when Wordwall is applied to other mathematics topics. Fifth, technological conditions such as internet access, device availability, and students' digital readiness may influence the implementation of Wordwall in other schools.

Future studies are recommended to involve more schools, longer implementation periods, and different mathematics topics. Further research may also use mixed method or experimental designs to examine the relationship between Wordwall based learning, students' motivation, and mathematics achievement.

CONCLUSION

This study suggests that Wordwall based interactive media may support elementary school students' motivational engagement in mathematics learning when it is implemented through interactive tasks, direct feedback, repeated attempts, peer interaction, and teacher facilitation. The initial classroom condition showed that mathematics learning, especially multiplication learning, was still dominated by teacher explanation, textbooks, and the blackboard. This condition became supporting evidence that students needed more interactive and participatory learning activities.

The application of Wordwall-based interactive media helped create a more active and responsive mathematics learning atmosphere. Through quizzes, matching activities, direct feedback, repeated attempts, and peer interaction, students demonstrated attention, interest, participation, confidence, and willingness to engage in multiplication learning activities.

The findings also show that students responded to Wordwall differently based on their motivation levels. Students with low motivation became more

willing to participate, students with medium motivation showed better focus and interest, and students with high motivation became more challenged and persistent. Therefore, Wordwall has the potential to support students' motivation in mathematics learning when it is aligned with learning objectives, students' needs, and teacher facilitation.

This study contributes to the understanding of how Wordwall supports motivation in elementary mathematics learning from a qualitative perspective. However, this study did not measure the statistical effect of Wordwall on students' mathematics learning outcomes. Future studies are recommended to examine the long term use of Wordwall and its relationship with students' mathematics achievement through mixed-method or experimental designs.

ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to the principal, classroom teacher, and fourth grade students of School A in Kutai Timur, Kalimantan Timur, Indonesia, for their permission, support, and participation during the data collection process. The authors also gratefully acknowledge all student informants who shared their learning experiences during the implementation of Wordwall based interactive media in mathematics learning. Their cooperation contributed significantly to the completion of this study.

DECLARATIONS

- | | |
|------------------------|--|
| Author Contribution | : J, B, AMF, and FAS: The Conception and Design of the study, Instrument development, Data collection, Data analysis, Interpretation of findings, Manuscript Drafting, Critical revision of the manuscript, and Approval of the final version for publication. |
| Funding Statement | : The authors received no financial support for the research, authorship, and/or publication of this article. |
| Conflict of Interest | : The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. |
| Additional Information | : Additional information is available from the corresponding author upon reasonable request. |

REFERENCES

- Azhari, A. F., Khadijah, F., & Rif'iyati, D. (2023). Inovasi media pembelajaran berbasis game melalui aplikasi Wordwall untuk meningkatkan motivasi belajar peserta didik di sekolah dasar. *AKSELERASI: Jurnal Pendidikan Guru MI*, 4(2), 50–59. <https://doi.org/10.35719/akselerasi.v4i2.529>.
- Azmi, M. F., Winarni, R., & Yulisetiani, S. (2025). Enhancing short story writing through experiential learning integrated with wordwall budaya: unveiling the role of learning motivation. *International Journal of Elementary Education*, 9(2), 282–291. <https://doi.org/10.23887/ijee.v9i2.94393>.
- Fatkhulla, E. S., & Sahabuddin, H. (2024). Wordwall educational games and increasing students' intrinsic motivation in learning natural sciences in elementary school. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 10(1), 306–312. <https://doi.org/10.23969/jp.v10i01.23084>.
- Firdaus, A. M., & Oschar, E. (2025). Pengaruh penggunaan media pembelajaran powerpoint terhadap motivasi belajar siswa mata pelajaran PAI kelas VIII. I di SMP negeri 7 Makassar. *Advances in Education Journal*, 2(2), 592–597.
- Hidayat, R., & Nugroho, A. (2022). Digital interactive media and student motivation in elementary education. *Jurnal Pendidikan Indonesia*, 11(2), 210–219.
- Irham, N. H., & Firdaus, A. M. (2024). Penggunaan media roda putar dalam meningkatkan minat dan hasil belajar matematika pada siswa. *Jurnal Penalaran Dan Riset Matematika*, 3(1), 17–23.
- Juraidah, J., Diana, N., & Akbar, P. R. (2025). The influence of wordwall-based interactive learning media on students' learning motivation in mathematics subjects for grade III elementary school. *Journal of Educational Sciences*, 9(4), 2573–2581. <https://doi.org/10.31258/jes.9.4.p.2573-2581>.
- Khairunnisa, F., Ifrianti, S., & Erfayliana, Y. (2025). Problem based learning model assisted by wordwalls: learning motivation at elementary school students'. *ETDC: Indonesian Journal of Research and Educational Review*, 4(4), 1444–1455. <https://doi.org/10.51574/ijrer.v4i4.3842>.
- Monica, N., & Fathoni, A. (2025). The implementation of the problem-based learning model with the Wordwall application on students' mathematics learning motivation. *Journal of Educational Sciences*, 6(3), 444–458. <https://doi.org/10.31258/jes.6.3.p.444-458>.

- Rahmadhani, A., & Rahmi, L. (2025). The influence of wordwall educational games on learning motivation in pancasila education in elementary school. *Inovasi Kurikulum*, 22(4), 2103–2114. <https://doi.org/10.64014/jik.v22i4.170>.
- Susilowati, R., Sa'diyah, Z., & Noviana, I. (2025). Implementation of wordwall as a learning medium to enhance Arabic learning motivation among fourth grade students. *JTP-Jurnal Teknologi Pendidikan*, 27(2), 684–693. <https://doi.org/10.21009/jtp.v27i2.58696>.
- Suwanto. (2025). Utilization of wordwall as an interactive game media to improve the motivation and learning outcomes of asmaul usna of elementary school students. *Research Journal on Teacher Professional Development*, 3(2), 27–37. <https://doi.org/10.21580/rjtpd.v3i02.24632>.
- Syahyadi, D., Fajariyanto, S. D., & Ash-Shiddiqy, A. R. (2024). Penggunaan wordwall untuk meningkatkan motivasi belajar pada mata pelajaran IPA di sekolah dasar: literature review. *Journal of Contemporary Issue in Elementary Education*, 2(1), 67–72.
- Wijayanti, A., & Firdaus, A. M. (2024). Pemanfaatan media papan kotak dalam meningkatkan hasil belajar matematika pada materi satuan panjang kelas III UPTD SDN 104 inpres Makkaraeng. *Jurnal Guru Pencerah Semesta*, 2(4), 721–730. <https://doi.org/10.56983/jgps.v2i4.1209>.
- Windiyani, T., Sofyan, D., Novita, L., & Patricia, R. (2024). Utilizing wordwall puzzles as teaching materials for theme 3 in fifth grade. *Jurnal Prima Edukasia*, 12(1), 73–82. <https://doi.org/10.21831/jpe.v12i1.57979>.