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Wordwall on the effectiveness, motivation, and interest in learning fraction: Voice from student version

Rizka Tri Wahyuni, Nafisyatul Azizah, Galuh Eko Nugroho, Siti Muslikhatul Tsaniyah, Patriya Camarasari, and Hasan Subekti

Mathematics Education, Surabaya State University, Magetan, Indonesia

ABSTRACT

Wordwall is a web-based interactive learning medium that has the potential to enhance students' motivation, interest, learning outcomes, and technological skills. This research aims to examine the impact of using Wordwall on the effectiveness, motivation, and interest in learning fractions among fifth-grade students from an elementary school in Magetan Regency, East Java. The study employed a descriptive research approach with participants consisting of fifth-grade elementary students in Magetan Regency, East Java. Data were collected by administering questions related to the fractional material taught using Wordwall. The analysis showed that Wordwall demonstrated fairly good effectiveness (72.2%), particularly in students' understanding (88.9%) and recall of fractional concepts (100%), although their problem-solving speed remained low (33.3%). Student motivation was relatively low (66.7%), with only 55.6% choosing Wordwall and acknowledging its implementation. However, the level of interest was high (100%), indicating that Wordwall successfully captured students' attention and encouraged active learning. In conclusion, this study found that Wordwall is effective in improving students' understanding and interest in learning, although its impact on learning motivation was not optimal.

KEYWORDS

Wordwall; fraction; learning interest; motivation

CORRESPONDING AUTHOR

Nafisyatul Azizah ✉ 24111754011@mhs.unesa.ac.id 🖃 Mathematics Education, Surabaya State University, Magetan, Indonesia

INTRODUCTION

Many students perceive mathematics as a difficult and confusing subject (Guner, 2020), and some even try to avoid learning mathematics (Inganah et al., 2023). The perception of difficulty in mathematics is influenced by various factors, such as low motivation and enthusiasm (Zakariya et al., 2020), ineffective teaching methods (Chand et al., 2021), high academic pressure (Musa & Maat, 2021), and limited student engagement (Cevikbas & Kaiser, 2021). Research also shows that students' motivation, self-confidence (Suren & Kandemir, 2020), and performance in mathematics are relatively low (Wu & Cai, 2023).

At the same time, the literature emphasizes that mathematics plays an important role in developing logical (Oljayevna & Shavkatovna, 2020), analytical (Purba & Azis, 2022), and creative thinking (Yayuk et al., 2020). Moreover, most people believe that mathematics is essential for future research and career development (Szucs & Toffalini, 2023). Therefore, a

learning process that simplifies mathematics for students and provides meaningful experiences is crucial. One such approach is the use of digital learning platforms like Wordwall.

Wordwall is a web-based interactive learning medium that has been proven effective in various contexts. Research indicates that it can improve student engagement (Alfiah, Santosa, & Kusuma, 2024), learning motivation (Gandasari & Pramudiani, 2021), interest in learning (Rahayu & Utami, 2023), learning outcomes (Elhefni et al., 2023), and digital literacy (Hartono et al., 2025). Wordwall provides interactive, engaging, and educational activities (Hajar et al., 2024), allowing teachers to create quizzes, puzzles, word searches, matching games, and sentence correction tasks (Ariyani et al., 2025). It also supports interactive assessments through built-in templates (Habib et al., 2025), which can be shared via Google Classroom, WhatsApp, or other platforms (Fitrani et al., 2023). These features make the learning process more interesting and dynamic (Hajar et al., 2024).

Fractions are an essential topic in fifth-grade mathematics (Fazilla et al., 2024). A solid understanding of fractions is fundamental (Zhang et al., 2020), because it underpins mastery of many other mathematical concepts (Makhubele, 2021). However, many students struggle with fractions, often due to unengaging teaching methods that fail to connect abstract concepts with real-life experiences. In Indonesia, teachers have considerable autonomy to select interactive learning media that meet students' needs.

Findings from classroom observations show that the use of interactive media can significantly increase students' interest and motivation to learn mathematics (Liliana et al., 2020). In this study, researchers applied Wordwall, an online game-based platform, as interactive learning media accessible through quizzes (Fitria, 2023). The goal was to improve students' interest and motivation in learning mathematics, particularly fractions. Wordwall was implemented by teachers to provide a fun and engaging learning experience, encouraging students to develop a stronger desire to learn (Safitri et al., 2022). The platform also helps illustrate abstract concepts and offers varied exercises (Huda & Kusumawanti, 2024). Compared to other online learning platforms, Wordwall has unique features that enhance interactivity and reduce boredom during lessons (Aprilia et al., 2024), Its engaging elements make it a promising tool to foster students' enthusiasm for learning mathematics.

The use of learning media such as Wordwall has a positive impact on increasing students' interest in learning (Zunidar & Suwandi, 2025) and and improving their understanding of the material (Widyasari et al., 2024). Interactive features—such as quizzes,

matching games, and puzzles—make learning with Wordwall (Fitria, 2023) more engaging, enjoyable, and meaningful (Fatkhullah et al., 2025), thereby encouraging students to be more active in the mathematics learning process. It also helps learners grasp the material more easily through engaging visual presentations (Widyasari et al., 2024), direct interaction (Annisa et al., 2025), and instant feedback (Widodo et al., 2025), which enhances their ability to absorb information effectively. In addition, Wordwall provides teachers with flexibility to customize content according to students' needs (Yustin et al., 2025) and to strengthen their understanding of basic concepts (Adawiyah et al., 2024). Wordwall also creates a fun, competitive atmosphere (Medina et al., 2024), fostering healthy competition that motivates students to learn more diligently.

This study investigated the impact of using Wordwall in enhancing engagement and understanding of fractions among nine fifth-grade students at an elementary school in Magetan Regency, East Java. By using Wordwall, students were expected to participate more actively in the learning process and improve their comprehension of fraction concepts. The aim of this investigation was to provide valuable insights for educators regarding effective teaching strategies and the use of digital resources to strengthen mathematical understanding in primary education.

METHODS

This research employed a quantitative descriptive method with a survey research design. The survey was conducted to collect data from respondents regarding students' perceptions (Al-Kahtani, 2022), in order to systematically describe their knowledge, attitudes, attributes, practices, and experiences (AlWorafi et al., 2021) related to individual or group behavior. The sampling technique used was saturated sampling, meaning that all members of the population were included as the sample. The sample in this study consisted of nine fifth-grade students from an elementary school in Magetan Regency, East Java.

The research instrument was a closed questionnaire with a dichotomous scale (agree/disagree). It measured ten aspects: (1) learning interest, (2) learning outcomes, (3) learning efficiency, (4) concept comprehension, (5) learning motivation, (6) material retention, (7) curiosity, (8) learning comfort, (9) satisfaction with the learning media, and (10) enthusiasm in using Wordwall to understand fractions. Effectiveness was assessed using questionnaire items 2, 3, 4, and 6; motivation was assessed using items 1, 5, and 7; and interest was assessed using items 8, 9, and 10. A questionnaire is defined as a series of predetermined questions administered to respondents (Jamieson, 2016).

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The data were analyzed in a quasi-quantitative (or semi-quantitative) manner, which "involves numerical calculations, but remains qualitative in the sense that the numbers are narrated in text to explain their meaning" (Borich & Blanchette, 2022). Data analysis was conducted using percentages, calculated with Equation (1):

$$\text{Percentage} = \frac{(\text{Number of students who answered "Yes" or "No"})}{(\text{Total number of students who filled out the questionnaire})} \times 100\% \quad (1)$$

Students' responses to the use of Wordwall in learning fractions were categorized as effective if the positive response rate was ≥ 80%, which falls into the 'good' category (Borich & Blanchette, 2022). The criteria for categorizing participant responses, adapted from Borich and Blanchette (2022). are presented in Table 1.

Table 1. Categorization of Learner Responses

Score Interval	Assessment Criteria
90–100	Very Good (A)
80–89	Good (B)
70–79	Fair (C)
60–69	Low (D)
≥60	Very low (E)

RESULT AND DISCUSSION

Based on the analysis of student response data regarding the use of Wordwall in learning fractions, the researcher conducted observations and distributed questionnaires to fifth-grade students. The purpose of this data collection was to measure students' responses to Wordwall in terms of effectiveness, motivation, and interest in learning fractional material. The questionnaire results are presented in graphical form to provide a visual representation of students' responses to the use of interactive media, as summarized in Figure 1.

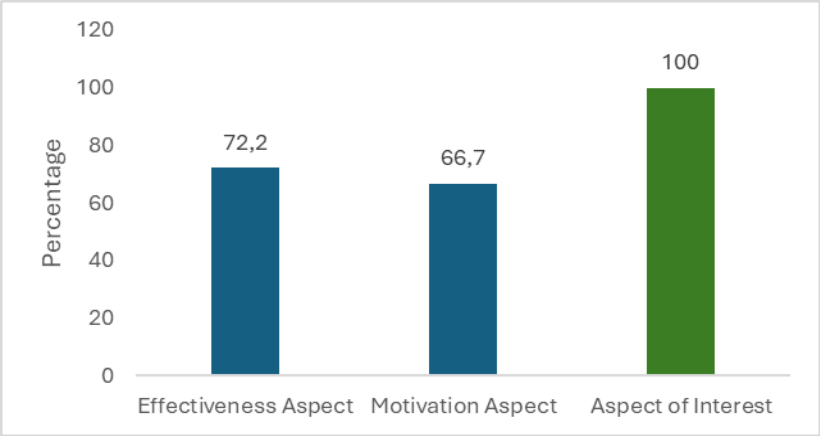

Figure 1. Average Student Response Percentage

Based on Figure 1, the research results show that the use of Wordwall in learning

fractions has a positive impact on students' effectiveness, motivation, and interest in learning. The effectiveness aspect obtained an average percentage of 72.2%, indicating that most students found Wordwall helpful in understanding the material. The motivation aspect reached 66.7%, suggesting that Wordwall can enhance students' enthusiasm for learning, although there is still room for improvement. Meanwhile, the learning interest aspect obtained the highest average score of 100%, demonstrating that Wordwall successfully attracted students' attention and encouraged active participation in learning.

These findings align with previous studies, which reported that the use of Wordwall contributes to increased learning effectiveness (Escobar, Lepe, & Parraguez, 2023) and has a positively influences learning motivation (Widhiatama & Brameswari, 2024), and significantly enhances students' interest in the learning process (Swari, 2023).

Furthermore, data were collected through questionnaires to evaluate students' perceptions of effectiveness, motivation, and interest in using Wordwall for learning fractions. Each indicator was categorized into specific rating levels, ranging from *very low* to *very good*, to facilitate interpretation. The detailed results of students' responses are presented in Table 2.

Table 2. Student Responses to the Use of Wordwall Learning Media

Aspect	Description	Persentase	Category
Effectiveness	Can solve problem well	66,7	Low
	Can solve problems faster	33,3	Very low
	Can understand the material well	88,9	Good
	Can remember fractions well	100	Very Good
Average Effectiveness Score		***72,2***	***Fair***
Motivation	Prefer learning with Wordwall	55,6	Very low
	More motivated to learn	88,9	Good
	Can be applied in everyday life	55,6	Very low
Average Motivation Score		***66,7***	***Low***
Interest	Can overcome boredom while studying	100	Very Good
	Interesting for teachers to implement	100	Very Good
	Make students more active and energized	100	Very Good
Average Aspect Score		***100***	***Very Good***

Based on Table 2, the effectiveness of using Wordwall showed fairly positive results, with an average score of 72.2%. Most students reported that they could understand the material well (88.9%) and remember fractional concepts very well (100%). However, only 66.7% of students felt that they could solve problems well, and just 33.3% felt they could solve problems more quickly. This indicates that Wordwall still has limitations in improving students' problem-solving speed. These findings support previous studies suggesting that Wordwall can enhance students' conceptual understanding (Widodo et al., 2025). Therefore, Wordwall can be considered an effective medium for teaching similar mathematical concepts.

For the aspect of motivation, the data show that students' average motivation was

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relatively low (66.7%). Although most students (88.9%) reported feeling more motivated to learn, only 55.6% preferred learning with Wordwall, and the ability to apply the material to daily life remained low. This suggests that while Wordwall is engaging, it does not fully meet the motivational needs of all students. These findings are consistent with research stating that Wordwall can improve students' learning motivation (Safitri et al., 2022). However, content adaptation is needed to make Wordwall activities more relevant and meaningful for students, such as integrating learning materials with real-life contexts (Oviliani & Susanto, 2023).

In terms of interest, students demonstrated very high results, with an average of 100%. All students agreed that Wordwall helped reduce boredom, made learning more engaging, and increased their activity and enthusiasm. This high level of interest indicates that Wordwall successfully created a fun and interactive learning experience. These results are consistent with studies highlighting Wordwall's effectiveness in attracting students' interest (Oviliani & Susanto, 2023) and encouraging active participation in mathematics learning (Zaen et al., 2022).

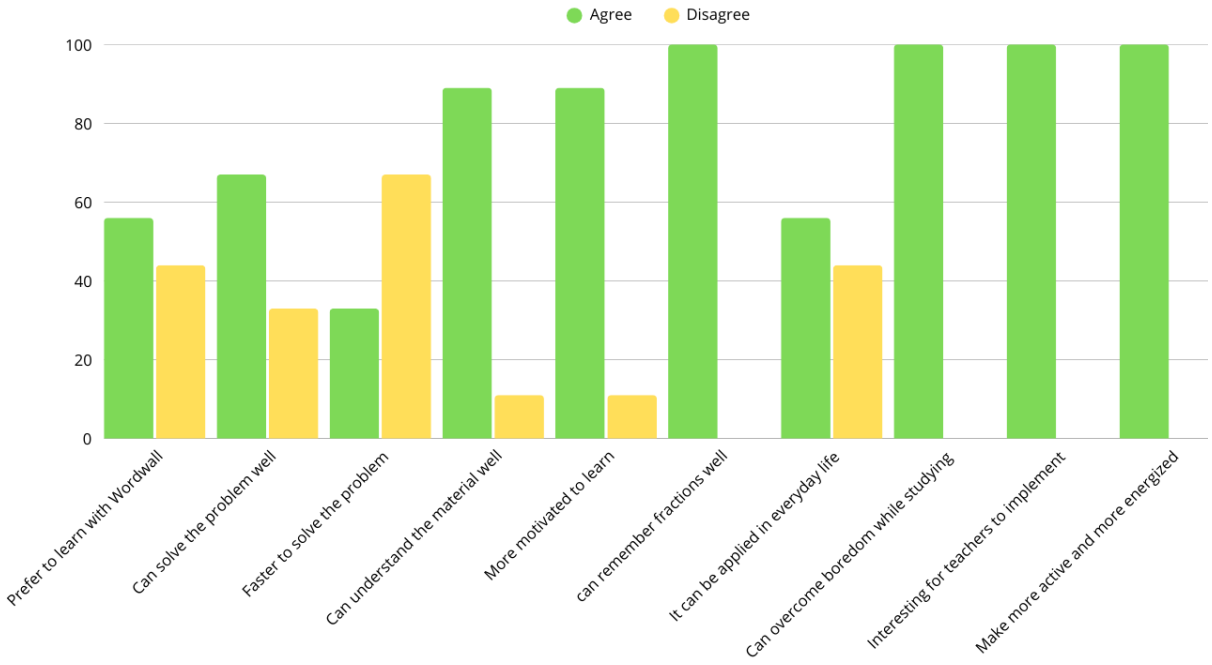

Figure 2. Graph of learner response

Furthermore, students' responses covered ten aspects: (1) learning interest, (2) learning outcomes, (3) learning efficiency, (4) concept comprehension, (5) learning motivation, (6) memory of the material, (7) curiosity, (8) learning comfort, (9) satisfaction with learning media, and (10) enthusiasm in learning with Wordwall. This data provides

valuable insights into students' perceptions of the strengths and weaknesses of Wordwall as a learning tool. A visual summary of students' responses to using Wordwall in learning fractions is presented in Figure 2.

Based on the data in Figure 2, most students gave positive responses to the use of Wordwall media in learning fractions. A total of 89% of students stated that they could understand the material well, and 100% reported that Wordwall helped them remember fractional concepts. In addition, all respondents agreed that Wordwall can reduce boredom, is interesting for teachers to implement, and makes students more active and enthusiastic (100% for each indicator). These findings indicate that Wordwall can create a fun and engaging learning experience.

However, several indicators showed less optimal results. Only 33% of students felt they could solve problems more quickly with Wordwall, and 44% disagreed that they preferred learning with this medium. Similarly, only 56% of students reported being able to apply the material in daily life. This suggests that although digital game-based media such as Wordwall are visually and interactively engaging, their effectiveness in improving problem-solving efficiency and connecting learning content with real-world contexts still needs to be enhanced.

The results confirm that the success of gamification in education largely depends on the design characteristics of the media, as well as students' behaviors and needs (Zaen et al., 2022). Thus, Wordwall has great potential to enhance students' interest and understanding in mathematics learning, particularly in fractions. Nevertheless, optimizing features and content that are more relevant to real-life contexts could further improve motivation and overall learning effectiveness. Efforts to integrate game elements with context-based learning strategies should be considered in future development.

This study also affirms that Wordwall is one of the effective interactive learning media for fostering students' interest and understanding of fractions (Agrullina et al., 2023). Its use has a significant positive impact (Widhiatama & Brameswari, 2024), including increasing student interest (Widhiatama & Brameswari, 2024), enhancing motivation (Sufraini et al., 2024), and building confidence (Mazelin et al., 2022). Wordwall also allows students to learn independently by repeating the games until they fully understand the material. With its visual approach and game-based activities, Wordwall makes abstract fraction concepts more concrete and easier to grasp. This enjoyable learning experience further helps students build confidence, particularly in solving fraction problems. Integrating

technology into learning through platforms like Wordwall is therefore an effective alternative for creating high-quality and engaging learning experiences.

In addition, this study examined the effect of Wordwall technology on students' interest and understanding of fractions. The data show that 79% of students felt more motivated and interested in learning fractions when using Wordwall. This finding is supported by classroom observations, which revealed increased active participation during lessons. Wordwall enables students to interact directly with the subject matter through educational games, which not only enhances engagement but also improves understanding and learning outcomes. With its variety of educational game features, Wordwall allows students to practice fraction concepts repeatedly, positively impacting their test performance. These results demonstrate that Wordwall is effective in creating interactive, engaging, and meaningful learning experiences.

By utilizing Wordwall, students gain a deeper understanding of fraction concepts while finding learning more enjoyable. This medium allows teachers to customize content according to students' needs, whether for reinforcing basic concepts or as an evaluation tool. Wordwall-based activities can also foster a healthy, competitive atmosphere that motivates students to learn more diligently. Such an approach encourages critical thinking, collaboration, and problem-solving in a non-monotonous way.

The positive impact of Wordwall on mathematics learning is highly relevant to the demands of modern education, where technology plays a vital role in improving learning quality. Wordwall helps students overcome difficulties in understanding fractions by providing engaging visuals, direct interaction, and instant feedback. It also supports memorization of formulas, recognition of patterns, and creative practice of mathematical concepts. With interactive features such as quizzes, puzzles, and matching games, Wordwall offers a fun yet effective way to reinforce students' understanding. In the context of fifth-grade students in Magetan Regency, East Java, the findings of this study show that Wordwall significantly increases engagement in learning fractions. As a learning medium, Wordwall not only helps students grasp mathematical concepts but also improves overall learning outcomes. This reinforces the importance of implementing technology-based media to create an active, engaging, and supportive learning environment.

Overall, Wordwall is a learning tool that is not only aligned with curriculum requirements but also meets the demands of technological development in education. Its application positively influences students' conceptual understanding, learning motivation, and

self-confidence. With Wordwall, mathematics is no longer perceived as a daunting subject but rather as an activity to look forward to—helping students build a strong foundation for future academic success. These findings highlight that integrating technology into learning, such as through Wordwall, is a strategic step toward improving the quality of basic education, especially in mathematics.

CONCLUSION

This research concludes that the use of Wordwall media effectively improves students' understanding and retention of fraction concepts and is highly successful in fostering interest and active participation in learning. However, its effectiveness is still less optimal in increasing problem-solving speed and sustaining motivation. Based on the analysis of research data, Wordwall showed an overall effectiveness of 72.2%, with particularly strong results in understanding (88.9%) and remembering fraction concepts (100%). In contrast, problem-solving speed remained low (33.3%), and motivation was relatively modest (66.7%), with only 55.6% of students expressing a preference for using Wordwall. Nonetheless, the interest aspect was very high (100%), reflecting that Wordwall can successfully capture students' attention and enhance learning engagement.

As a recommendation, further research should be conducted to examine the impact of Wordwall across different subjects, educational levels, and diverse groups of students. In this way, the benefits of educational technology such as Wordwall can continue to be optimized to support the development of a more inclusive and adaptive education system.

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