

# ENHANCING FRACTION UNDERSTANDING THROUGH WORDWALL: A PRE-EXPERIMENTAL STUDY IN GRADE V ELEMENTARY SCHOOL

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**Abstract:** Mathematics plays an important role in developing students' logical thinking skills; however, fraction material is often difficult for elementary students due to its abstract nature. Observations at SDN Wonokerto showed low learning outcomes and passive student participation, indicating the need for interactive learning media. This study aimed to determine the effectiveness of Wordwall media in improving fifth-grade students' mathematics learning outcomes on fraction material. A Pre-Experimental design with a One-Group Pretest–Posttest approach was employed. The participants were 24 fifth-grade students of SDN Wonokerto. Data were collected through pre-tests, post-tests, observation, and documentation, and analyzed using descriptive statistics and a paired sample t-test. sample t-test showed a significance value of 0.000 ( $< 0.05$ ), and classical learning mastery reached 79.17%. Wordwall media effectively improves fraction learning outcomes and enhances student motivation through interactive and visual learning experiences.

**Keywords:** Wordwall media, fraction learning, mathematics learning outcomes, elementary school.

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## INTRODUCTION

Basic education plays a fundamental role in shaping students' character, competence, and intellectual development from an early age. At this level, learning experiences form the foundation for students' cognitive, affective, and psychomotor growth, which will influence their academic success in later stages of education. Among the various subjects taught in elementary school, Mathematics holds a particularly important position because it trains students to think logically, analytically, systematically, and critically. Mathematical competence is not only essential for academic achievement but also for solving everyday problems. However, despite its importance, Mathematics is often perceived as a difficult subject by elementary school students, especially when dealing with abstract concepts such as fractions. According to the Ministry of Education and Culture (2017:22), many students

experience learning difficulties in understanding basic mathematical concepts, with fractions being one of the most challenging topics at the elementary level.

Learning difficulties in Mathematics are closely related to how learning is designed and implemented in the classroom. Learning itself is a process of behavioral change that occurs through experience and interaction with the learning environment. Suherman, Prastawati, and Mulyono (2023:381) define learning as a process that brings about changes in students' behavior encompassing knowledge, skills, and attitudes as a result of learning experiences. Therefore, effective learning should actively involve students and provide meaningful experiences that help them construct knowledge. When learning relies solely on conventional teaching methods, such as lectures and textbook-based explanations, students tend to become passive recipients of information. This condition often results in low motivation, limited engagement, and shallow understanding of concepts, particularly in subjects that require conceptual visualization such as Mathematics.

One of the major challenges in teaching fractions is their abstract nature. Fraction concepts require students to understand part-whole relationships, equivalence, and proportional reasoning, which can be difficult to grasp without concrete representations. In many classrooms, fraction material is still taught using traditional approaches that emphasize procedural calculations rather than conceptual understanding. This situation was also observed at SDN Wonokerto, where fifth-grade students demonstrated low learning outcomes in Mathematics and showed limited participation during lessons. Most students were passive, reluctant to ask questions, and easily bored during the learning process. These conditions indicate that the teaching methods and learning media previously used were not sufficient to support students' understanding of fraction concepts in a concrete and engaging way.

In response to these challenges, there is a growing need to integrate interactive and technology-based learning media into the teaching and learning process. Interactive media can transform abstract material into visual and engaging content, allowing students to actively participate in learning activities. One digital platform that has gained attention in recent years is Wordwall. Wordwall is an interactive learning media that allows teachers to create game-based activities, quizzes, and exercises that can be accessed digitally. According to Husna and Dewi (2022:4–50), Wordwall helps teachers design enjoyable and engaging learning activities while making it easier for students to understand learning material through direct interaction with digital

content. The interactive nature of Wordwall encourages students to be actively involved in learning, which can increase motivation and improve learning outcomes.

The use of Wordwall as a learning medium offers several advantages, particularly in Mathematics learning. Through game-based activities, Wordwall can visualize abstract fraction concepts, such as dividing objects into equal parts or comparing fractions, in a way that is more concrete and understandable for students. In addition, Wordwall provides instant feedback, allowing students to immediately know whether their answers are correct or incorrect. This feedback plays an important role in reinforcing learning and correcting misconceptions. Furthermore, the game-like atmosphere created by Wordwall reduces students' boredom and anxiety toward Mathematics, making learning more enjoyable and meaningful.

The implementation of Wordwall at SDN Wonokerto represents an innovative solution to the problems encountered in fraction learning. Unlike conventional methods, this approach shifts learning toward a student-centered and technology-based model. The innovation lies not only in the use of digital media but also in the systematic testing of Wordwall's effectiveness as a direct intervention to improve students' understanding of fractions. By integrating Wordwall into the learning process, students are encouraged to actively explore concepts, participate in problem-solving activities, and engage with learning material in a more meaningful way. This approach aligns with constructivist learning theory, which emphasizes that students build knowledge through active involvement and interaction with learning resources.

The effectiveness of Wordwall media in improving students' learning outcomes was demonstrated by a consistent increase in students' achievement across learning cycles. Research results showed a significant improvement in students' post-test scores compared to their pre-test scores, indicating that students' understanding of fraction material improved after the use of Wordwall. This improvement suggests that Wordwall successfully addressed two major issues in Mathematics learning at SDN Wonokerto: students' boredom and the abstract nature of fraction material. By presenting learning material in an interactive and enjoyable format, Wordwall increased students' motivation and engagement, which in turn positively impacted their learning outcomes.

These findings are consistent with previous research on the use of Wordwall in learning. Siti (2021) found that Wordwall media can increase students' interest in learning by creating a fun

and interactive learning environment. Similarly, Nur (2023) reported that the use of Wordwall significantly increased students' motivation and active participation in learning activities. This was evident from students' willingness to ask questions, their enthusiasm in attending lessons, and their activeness in completing and submitting assignments. In addition, research conducted by Walliyu (2023) showed that Wordwall was effectively used by second-grade teachers in Indonesian language learning during the pandemic, indicating that Wordwall is a flexible and adaptable learning medium across different subjects and educational contexts.

The use of Wordwall media also has important implications for various stakeholders in education. For researchers, this study contributes to the growing body of literature on technology-based learning media, particularly in elementary Mathematics education. It provides empirical evidence on how interactive media such as Wordwall can be used to create an active learning environment and improve students' understanding of abstract concepts. For educators, the findings encourage teachers to be more innovative and creative in designing learning activities. By integrating Wordwall into the learning process, teachers can enhance their instructional skills and provide more engaging learning experiences for students. For students, the use of Wordwall helps improve their understanding of Mathematics, particularly fraction material, by making learning more enjoyable and interactive. Finally, for schools, the implementation of Wordwall can contribute to improving the overall quality of learning and teacher performance, which ultimately leads to better student learning outcomes.

In conclusion, the integration of Wordwall as an interactive learning medium offers a promising solution to the challenges of teaching fractions in elementary schools. By addressing students' learning difficulties, increasing motivation, and enhancing conceptual understanding, Wordwall has proven to be an effective alternative to conventional teaching methods. Its successful implementation at SDN Wonokerto demonstrates the potential of technology-based media to improve Mathematics learning outcomes and supports the need for continued innovation in elementary education.

## **METHODOLOGY**

### **Research Design**

This study employed a Pre-Experimental research design using the One-Group Pretest–Posttest model. This design was chosen to examine the effect of a specific treatment on a single group of participants by comparing learning outcomes before and after the intervention. In this design,

students' learning outcomes were measured prior to the implementation of the treatment ( $O_1$ ), followed by the application of the learning media ( $X$ ), and then measured again after the treatment ( $O_2$ ). The research design can be represented as  $O_1 - X - O_2$ , where  $O_1$  refers to the pre-test scores,  $X$  represents the treatment in the form of Wordwall-based learning media on fraction material, and  $O_2$  denotes the post-test scores. The primary objective of this design was to determine the extent to which the use of Wordwall media influenced the mathematics learning outcomes of fifth-grade students at SDN Wonokerto.

#### Research Subjects, Location, and Time

The research was conducted at SDN Wonokerto, specifically involving fifth-grade students. The study took place during the even semester of the 2025 academic year in Mathematics lessons. The research subjects consisted of 24 students, comprising 12 male students and 12 female students, who were treated as a single experimental group. All participants received the same instructional treatment using Wordwall media.

#### Data Collection

Data were collected through a series of learning assessments and classroom activities. The pre-test was administered before the implementation of Wordwall media to identify students' initial understanding of fraction material. After the treatment was completed, a post-test was given to measure changes in students' learning outcomes. In addition to tests, observations were conducted to examine student participation and engagement during the learning process, while documentation was used to support the research findings.

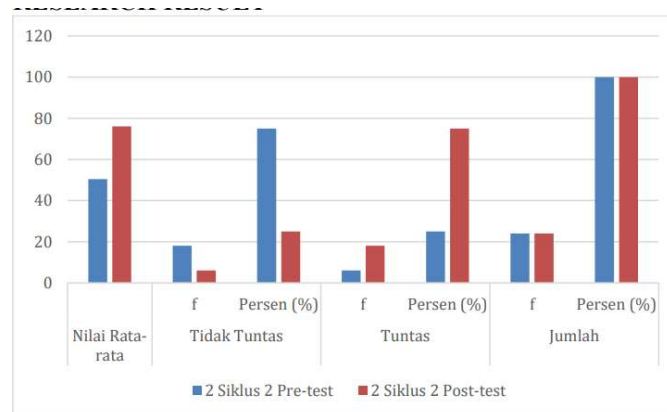
#### Data Analysis

Data analysis in this study involved descriptive and inferential statistical techniques. Descriptive statistics were used to summarize students' learning outcomes from the pre-test and post-test. The mean score was calculated to determine the average achievement of students before and after the treatment. In addition, individual mastery and classical mastery were analyzed to identify the percentage of students who achieved learning completeness. Classical mastery was calculated by comparing the number of students who met the minimum competency standard to the total number of students. The criterion for classical completeness was set at a minimum of 70% of students achieving a score of at least 70.

Inferential statistics were applied to test the research hypothesis regarding the effectiveness of Wordwall media. A paired sample t-test was used to compare the mean scores of the pre-test and post-test, as both sets of data were obtained from the same group of students. The purpose of this test was to determine whether there was a statistically significant difference in students' learning outcomes before and after the implementation of Wordwall media. The decision criterion was based on a significance level of 0.05. If the significance value (2-tailed) was less than 0.05, the null hypothesis ( $H_0$ ) was rejected and the alternative hypothesis ( $H_a$ ) was accepted, indicating a significant improvement in students' learning outcomes.

## RESULT AND DISCUSSION

### FINDING



The results presented in the chart indicate a clear improvement in students' mathematics learning outcomes after the implementation of Wordwall media. Based on the data, the average pre-test score of fifth-grade students was **48.75**, which increased significantly to **76.04** in the post-test. This improvement demonstrates that students' understanding of fraction material increased after the learning intervention.

In terms of learning mastery, the number of students who did not achieve mastery (not complete) decreased substantially after the treatment. In the pre-test, **18 students (75%)** were categorized as not achieving mastery, while only **6 students (25%)** reached mastery. After the implementation of Wordwall media, the post-test results showed a reversal of this condition, where only **6 students (25%)** remained not complete, while **18 students (75%)** achieved mastery.

The percentage of students achieving classical mastery increased to **79.17%**, meeting the predetermined criterion for classical completeness. These findings indicate that the use of

Wordwall media had a positive impact on students' learning outcomes, participation, and mastery of fraction concepts. Overall, the data confirm that Wordwall is an effective interactive learning medium for improving mathematics learning outcomes in fifth-grade elementary students.

## **DISCUSSION**

The findings of this study demonstrate a significant improvement in fifth-grade students' mathematics learning outcomes on fraction material after the implementation of Wordwall as an interactive learning medium. The increase in the average score from 48.75 in the pre-test to 76.04 in the post-test indicates that Wordwall effectively facilitated students' understanding of abstract fraction concepts. This result supports the view of Suherman, Prastawati, and Mulyono (2023), who argue that meaningful learning occurs when students actively engage in learning experiences that promote changes in knowledge, skills, and attitudes. By providing interactive and game-based activities, Wordwall encouraged active student participation, which positively influenced learning outcomes.

The shift in learning mastery further strengthens this conclusion. Prior to the intervention, the majority of students (75%) did not achieve mastery, reflecting difficulties in understanding fraction material through conventional teaching methods. After the use of Wordwall media, 75% of students achieved mastery, and classical completeness reached 79.17%, exceeding the minimum criterion. This finding aligns with the constructivist learning theory proposed by Piaget, which emphasizes that learners build knowledge through active interaction with learning materials. Wordwall allowed students to explore fraction concepts visually and interactively, enabling them to construct understanding more effectively.

In addition, the interactive features of Wordwall, such as instant feedback and game-based challenges, contributed to increased student motivation and reduced learning boredom. According to Husna and Dewi (2022), digital interactive media enhance students' motivation by creating enjoyable learning environments and providing immediate responses to student actions. Increased motivation has been widely recognized as a key factor in improving academic achievement, as stated by Slavin (2018), who notes that motivated learners are more likely to engage deeply with learning tasks.

Furthermore, the findings of this study are consistent with previous research conducted by Siti (2021) and Nur (2023), both of whom reported that Wordwall media increased students'

interest, motivation, and active participation in learning. Therefore, the results of this study confirm that Wordwall is not only effective in improving learning outcomes but also in addressing the challenges of teaching abstract mathematical concepts in elementary schools.

## CONCLUSION

This study concludes that the use of Wordwall as an interactive learning medium has a significant positive effect on the mathematics learning outcomes of fifth-grade students, particularly on fraction material. The implementation of Wordwall successfully addressed students' learning difficulties related to the abstract nature of fractions by presenting concepts through interactive and game-based activities. The research findings showed a clear improvement in students' achievement, as indicated by the increase in the average score from the pre-test to the post-test. In addition, the proportion of students achieving learning mastery increased substantially, and the level of classical completeness met the predetermined criteria. The use of Wordwall also contributed to increased student motivation and active participation during the learning process. Students became more engaged, confident, and enthusiastic in completing learning tasks, which positively influenced their understanding of mathematical concepts. These results confirm that integrating technology-based media into classroom instruction can create a more meaningful and enjoyable learning environment.

Based on these findings, Wordwall can be considered an effective alternative learning medium for teaching fraction material in elementary schools. Teachers are encouraged to integrate interactive digital media into Mathematics instruction to enhance learning outcomes and student engagement. Future research is recommended to involve larger samples, control groups, and different mathematical topics to further validate the effectiveness of Wordwall in diverse educational settings.

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