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ENHANCING ELEMENTARY STUDENTS' MOTIVATION AND PARTICIPATION IN MATHEMATICS LEARNING THROUGH WORDWALL: A CASE STUDY

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ABSTRACT

This study aims to enhance students' motivation and participation in elementary mathematics learning by utilising the interactive digital media "Wordwall" as an alternative solution to the low levels of student interest and engagement in a subject often perceived as complex and less appealing. The research employed a qualitative approach with a case study design, using data collection techniques such as observation, interviews, and documentation. The data were analysed descriptively through the stages of data reduction, data display, and conclusion drawing. The informants consisted of the principal, teachers, and fourth-grade students at MI Darus Sholihin, Boto District, Probolinggo Regency. The results of the study indicate that the use of Wordwall media effectively increased students' motivation and participation in mathematics learning. This is evidenced by the increased number of students who actively asked questions, responded, engaged in discussions, and interacted during the learning process. Moreover, the classroom atmosphere became more conducive, enjoyable, and interactive. Thus, the implementation of Wordwall media serves as an innovative strategy to improve the quality of mathematics learning in elementary schools.

Keywords: Wordwall, motivation, participation, mathematics, elementary school

INTRODUCTION

Education is a crucial aspect in developing superior and competitive human resources. Elementary school education serves as the primary foundation for instilling various basic skills, including cognitive, affective, and psychomotor skills. Improving the quality of education is achieved through innovation in the learning process, including the use of appropriate learning media. Facing the challenges of globalisation, educators must innovate in designing and implementing learning media that encourage student motivation and active participation, thereby positively impacting learning outcomes. (Penelitian et al., 2022).

Mathematics is an important subject in elementary school, which plays a role in developing logical, systematic, critical, and creative thinking skills. However, mathematics is often considered a complex and tedious subject by most students. The abstract nature of the material and the monotonous learning process discourage students from actively participating. Negative views of mathematics are still common among students. Some of the reasons often cited include the assumption that mathematics is a complex discipline to understand,

monotonous, and lacking a direct connection to everyday life (Handican et al., 2023). These perceptions can impact students' learning motivation and hinder the achievement of optimal learning outcomes. Therefore, a more contextual and innovative learning approach is needed to change these perceptions and increase students' interest in mathematics.

Based on the results of initial observations at MI. Darus Sholikhin Boto, Probolinggo Regency, it was found that the level of student participation in Mathematics learning was relatively low. Based on interviews with grade IV teachers at MI. Darus Sholikhin Boto Probolinggo, "Some students tend to be passive, only listening, reluctant to ask questions, and less actively involved in discussions and group learning activities." This is undoubtedly a challenge for teachers in achieving optimal Mathematics learning objectives. In fact, student involvement or participation is one of the important indicators of the success of the learning process. The higher the student participation, the greater the opportunity for students to understand the material being taught and develop their thinking skills.

As directed by the Independent Curriculum with its vision of the Pancasila Student Profile, students are expected not only to become intellectually intelligent individuals but also to act as active, creative, and competitive learners (Hamzah et al., 2022; Haq et al., 2023). In this study, students are encouraged to actively participate in the learning process, take initiative, and develop their potential through meaningful interactions with the learning environment. This is in accordance with the basic principle of learning, namely, encouraging comprehensive student involvement, both cognitively, affectively, and psychomotorically. Therefore, learning activities should not be merely informative or one-way; they must be participatory and stimulate learning motivation that originates from within students (intrinsic motivation).

This becomes even more important when applied to subjects like mathematics, which are generally considered challenging and uninteresting by most elementary school students. Therefore, innovative learning strategies and media are needed to attract interest and increase student participation in mathematics learning. One such learning medium is the use of word walls, which are interactive digital platforms that boost student motivation and learning outcomes through various educational activities, including games and quizzes. This medium is not only entertaining but also has pedagogical value, encouraging active engagement in learning (Afnilamsari, 2024; Pramesti et al., 2025; Putra et al., 2024).

In education, word walls serve not only as entertainment but also as a practical pedagogical approach to delivering learning materials and strengthening students' understanding of the concepts being studied. Several studies indicate that educational wordwall games

positively contribute to increasing student motivation and engagement in the learning process, ultimately resulting in optimal learning outcomes. (Fauzi et al., 2023; Supriyaddin et al., 2023)

The research results show that the use of Wordwall media is effective in increasing students' learning motivation. As evidenced in a study by Afnilamsari and Pramesti, the use of this media positively contributed to increased student motivation and learning outcomes, particularly in the topic of arranging letters into words. Furthermore, word walls significantly captured students' attention and encouraged their active involvement in English learning. (Afnilamsari, 2024; Fitria, 2023; Pramesti et al., 2025)

Wordwall is an interactive digital learning medium that effectively increases student engagement and supports the learning process, strengthening the quality of education while reflecting the responsible use of technology. (Salsabila et al., 2023; Sinaga & Soesanto, 2022)(Fitria, 2023; Putra et al., 2024). The use of Wordwall supports flexible learning through digital access, allowing students to learn anytime and anywhere. In the era of technology-based education, this is important considering that students are increasingly familiar with digital devices. Widiami et al. stated that Wordwall positively contributes to improving learning achievement by presenting interactive and varied content. (Widiami et al., 2024).

This research is crucial because low student participation in mathematics learning remains a common challenge in many elementary schools. Active student participation is essential so that mathematics learning is not merely a transfer of knowledge but also fosters critical thinking and problem-solving skills from an early age. Therefore, innovation in learning is needed, including the use of educational game media like Wordwall, which is easy to understand and can stimulate mathematical abilities. Games have also become a modern cultural activity that is popular with students. (Fauzi et al., 2023; Hermawan et al., 2017).

The purpose of this study is to describe and analyse the use of Wordwall media in mathematics learning to increase student motivation and participation in elementary schools. By conducting this research, it is hoped that alternative solutions can be provided for teachers to improve the quality of mathematics learning, enriching the treasure trove of innovative digital-based learning at the elementary school level. Furthermore, this research can contribute to developing more creative learning, making the process less boring and more fun and meaningful for students, thereby serving as input for the development of learning strategies.

LITERATURE REVIEW

Other studies have also shown that Wordwalls are effective in improving students' conceptual understanding at elementary and secondary levels. Besides being an evaluation tool, this media also plays a role in motivating students to participate more actively in learning.

(Azizah et al., 2023; Restu et al., 2023). In general, Wordwalls are a learning innovation that supports the creation of an interactive, efficient, and enjoyable learning process for students. By using features that allow content customisation according to material needs, teachers can design student-centred learning experiences. The effectiveness of this media is also reinforced by various research findings that demonstrate the positive impact of Wordwalls in various educational contexts. (Agusti & Aslam, 2022)(Afriyana et al., 2023; Sari et al., 2021). Several studies indicate that the focus is more on learning outcomes and motivation at the junior high school level, particularly in non-mathematics subjects. Meanwhile, this study is about the wordwall media in an effort to increase motivation and participation in mathematics subjects at the elementary school level.

RESEARCH METHODS

This research employed a descriptive qualitative research method, employing a case study approach. (Hulu, 2021; Rahma & Zulfahmi, 2024). Through a qualitative approach, the researchers aimed to naturally understand and describe the phenomenon of student participation and motivation, based on direct experiences observed during the learning process. This research was conducted in a fourth-grade class at MI Darus Sholikhin Boto, Probolinggo Regency, with 20 students, consisting of 15 boys and five girls. In addition to the students, the fourth-grade teacher also played a supporting role in planning and implementing Mathematics learning using educational games. This location was selected based on initial observations that indicated low student participation in Mathematics learning. The research was conducted over three months, covering the preparation, implementation, and evaluation of the results.

The data collection technique according to the opinion (Adhimah, 2020; Latifah & Ramadan, 2023; Syafila et al., 2019) Used: 1) Participant observation of the mathematics learning process using Wordwall media. 2) Semi-structured interviews were conducted with the principal, fourth-grade teachers, and several students to obtain information regarding changes in motivation and learning participation after using WordWall media. 3) Questionnaires were distributed to students to measure their level of participation, interest, and enthusiasm for mathematics learning before and after using WordWall media. 4) Documentation was conducted to collect additional data in the form of observation notes, activity photos, videos, archives of student grades and assignments, and teacher diaries during the learning process to support and strengthen the data from observations and interviews.

The data analysis technique was carried out through the interactive stages of the Miles and Huberman model. (Amut & Sulistiyowati, 2023; Harfiani, 2021; Wahidi & Prianto, 2024) As follows: 1) Data Reduction, namely sorting, simplifying, and focusing data according to the research problem. 2) Data Presentation, namely compiling it in the form of descriptive narratives, tables, or images to facilitate understanding and drawing conclusions. 3) Drawing Conclusions: formulating the main findings based on patterns that emerge from the data, then verifying or triangulating the data to ensure the validity of the results.

RESULT AND DISCUSSION

Based on preliminary observations conducted by researchers in fourth-grade students at Darus Solokhin Islamic Elementary School in Boto District, Probolinggo Regency, the level of student participation in mathematics learning is still relatively low. This finding is demonstrated through several indicators reflecting a lack of active student involvement in the learning process. First, most students appeared passive and showed minimal attention to the teacher's explanations, indicating weak concentration and emotional attachment to the material being taught. Second, student interaction with the teacher during the learning process was minimal, as reflected in the infrequent asking or answering of questions posed by the teacher. Third, many students failed to complete the assigned exercises, either individually or in groups, indicating low learning motivation and a lack of academic responsibility.

This indicates that the conventional, teacher-centred learning approach applied has not been able to create an engaging learning atmosphere or motivate students to be actively involved. This method often fails to accommodate students' learning needs holistically, particularly regarding participation, interactivity, and emotional involvement in understanding mathematical concepts. Therefore, innovation in learning strategies that are more contextual, fun, and participatory is needed to increase student motivation and activeness in mathematics learning at the elementary school level. Research shows that the use of Wordwall media positively contributes to increasing student interest and participation in mathematics learning. It is considered effective in reducing student boredom while maintaining their interest in the material presented (Denny Pratama et al., 2019; Handican et al., 2023).

Thus, Wordwall Media is seen as a learning medium that can create a more interesting, interactive, and meaningful learning experience for students. Wordwall Media is a game systematically designed to integrate learning elements to both strengthen conceptual understanding and develop specific skills. (Handican et al., 2023; Supriyaddin et al., 2023). In its implementation at the elementary school level, the use of educational games combined with evaluation instruments is designed to create a more interesting and enjoyable learning process.

It encourages student participation and strengthens conceptual understanding while developing students' mathematical skills more effectively. (Handican et al., 2023; Penelitian et al., 2022).

To increase students' motivation and active participation in mathematics learning, researchers collaborated with class teachers to design learning tools. This planning was systematically structured, taking into account the relevance of the subject matter's characteristics to the needs of fourth-grade elementary school students. The first step in this planning was selecting a word wall that aligns with the core competencies and content of the material, specifically addition and subtraction. Word walls were chosen as the primary medium because they provide a visual and concrete representation of number concepts and encourage direct student involvement in the learning process.

Next, a Learning Implementation Plan was developed that integrated the Wordwall Find Match application-based activities into the learning scenario, particularly the core activities. The lesson plan outlined learning steps that were not only oriented towards delivering material but also emphasised active student participation through direct interaction with the game media. As part of measuring the intervention's effectiveness, the researchers designed an observation sheet to evaluate student participation during the learning process. This observation sheet included indicators of active student behaviour, such as involvement in discussions, participation in game activities, and completion of assigned tasks.

To support the implementation of the word wall media, projectors, laptops, and LCDs were prepared. These media were used interactively and in groups to assess student motivation and participation, making learning more concrete, engaging, and tailored to the learning styles of elementary school-aged children. With this careful and collaborative planning, it is hoped that mathematics learning will not only be more enjoyable but will also optimally enhance students' cognitive, affective, and psychomotor engagement.

1. Learning Mathematics Using Wordwalls

Mathematics learning aims to develop numerical abilities and problem-solving skills. However, repetitive and lack-variety learning methods often diminish students' interest in learning. Mathematics is a basic subject. However, many students do not exhibit a positive attitude toward this subject. (Hermawan et al., 2017). In this context, word walls serve as an interactive medium that can increase interest while facilitating a more enjoyable and practical understanding of mathematical concepts.

Figure 1.1. Wordwall Features

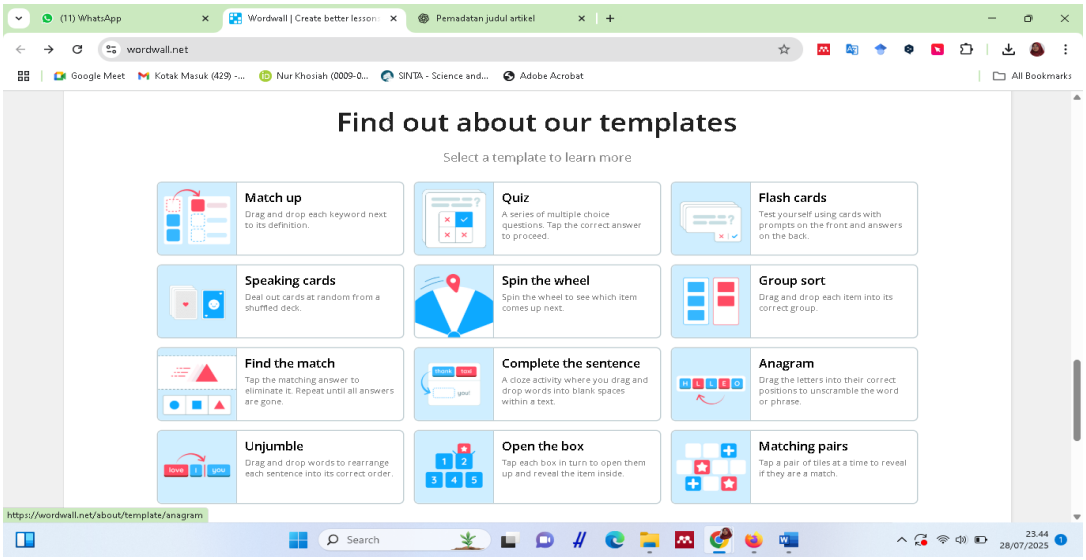
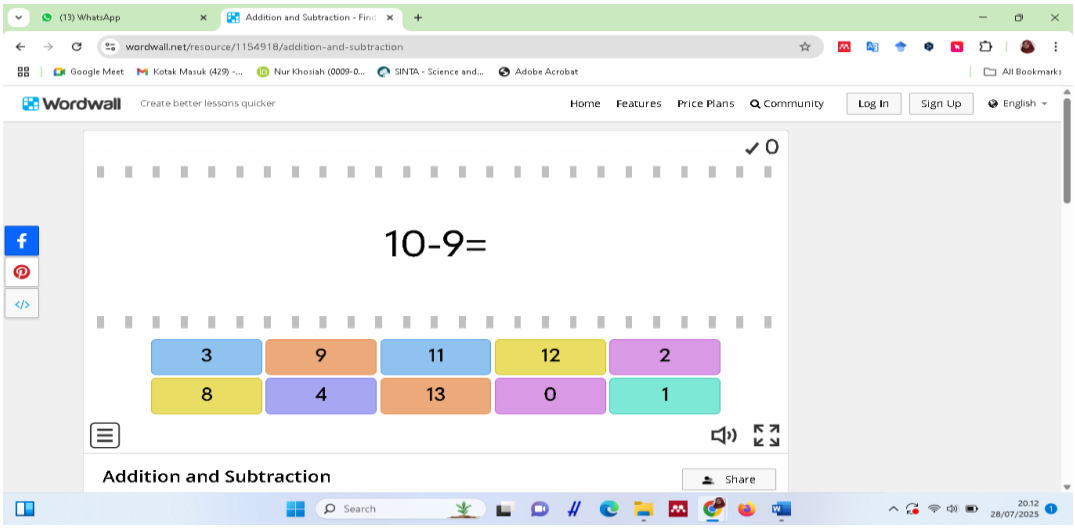


Figure 1.2: Form of digital media workwall Find Match.



Wordwalls have the advantage of encouraging active learning through a gamification approach. Experts have found this medium to be effective in improving reasoning and mathematical problem-solving skills by providing a more engaging learning experience. (Lubis & Nuriadin, 2022; Nafisah et al., 2022; Richardo & Kholifah, 2023). The application of Wordwalls is becoming increasingly significant in the context of digital education. In this situation, the use of technology-based media such as Wordwalls is crucial. This proves that the use of technology can increase active student participation, enabling more flexible mathematics learning and focusing on developing problem-solving skills, rather than solely through conventional approaches.

Based on the results of interviews with class teachers, it was stated that "In the implementation of mathematics learning, it is carried out in stages through several meetings, with an activity structure designed to increase student involvement and understanding of addition and subtraction material." Each stage of learning is systematically arranged according to the syntax of active and fun learning, which includes preliminary, core, and closing activities. In the preliminary stage, the teacher begins the activity by conducting an apperception to link students' prior knowledge with the material to be learned. Next, a pretest is conducted to determine the students' initial understanding level and to serve as a basis for formative evaluation. The teacher then explains the learning objectives to ensure students clearly understand the direction and benefits of the activities to be carried out.

Second, the core activity involves dividing students into small groups to encourage cooperation and active participation among members. The teacher explains the rules and mechanics of the adapted word wall game. During the implementation of the word wall, students use laptops and come to the front of the class to solve math problems interactively and contextually. Throughout this process, the teacher not only acts as a facilitator but also provides ongoing guidance and motivation to maintain a conducive learning environment, ensuring students remain focused and enthusiastic in participating in the activity.

The closing stage concludes with a discussion between the teacher and students about the answers or results to the questions on the word wall. This activity aims to reflect on the learning process and reinforce the mathematical concepts learned. The teacher provides feedback and emphasises key points of the material, allowing students to understand it more profoundly and comprehensively. With this implementation structure, the word wall serves not only as a means of entertainment in learning but also as a strategic tool for developing students' cognitive, affective, and social skills in a balanced manner.

2. Increasing Student Learning Motivation After Using Wordwall Media

Motivation is a fundamental force that drives individuals to act. It emerges from within students, encouraging them to initiate learning activities, maintain engagement in the learning process, and direct learning actions toward achieving higher-order goals. Motivation is the basic drive that drives a person to behave. (Ikhwandari et al., 2019). Learning motivation is a driving force derived from both internal and external factors within an individual, playing a role in arousing enthusiasm and encouragement to engage actively in the learning process. (Nisa & Susanto, 2022). Another opinion states that learning motivation encompasses both internal and external drives that actively stimulate students to participate in the learning process. One practical approach to increasing intrinsic motivation is through the use of learning media such as word

walls, which can create feelings of joy, satisfaction, and accomplishment during gameplay. (Hidayat et al., 2024; Wa Souvi Raaziqal Ningtyas, 2024).

Based on field observations, the mathematics learning conditions before the use of Wordwall media showed that most students experienced a decrease in learning motivation. This was reflected in behaviours such as reluctance to complete assignments, lack of concentration during the learning process, a passive attitude in class discussions, and minimal response to teacher explanations. However, after the implementation of interactive Wordwall media, there was a significant increase in student motivation in participating in learning. This change was evident in the increased enthusiasm of students during the learning process, marked by cheerful facial expressions, a willingness to work on problems independently, and active participation in answering quiz questions.

In an interview, a student said that he started to enjoy math because the learning was now packaged in a fun and challenging game. He stated, "Now I like math because I can play quizzes while doing it, it is fun and challenging." The fourth-grade teacher also said that "there was a change in learning behaviour in several students who previously tended to be passive. After implementing Wordwall-based learning, these students showed increased activeness and self-confidence in participating in class activities." This finding indicates that using Wordwall media can stimulate students' intrinsic motivation through an interactive and fun game-based learning approach, thereby creating a more participatory and engaging learning atmosphere.

Analysis of data obtained through observation, interviews, and questionnaires revealed a significant increase in student engagement after the implementation of the wordwall-based mathematics learning model. This increase was evident in various aspects of student motivation, as measured by specific indicators according to (Candra et al., 2023) As detailed in the following description:

Table 1.1

No	Indicator	Observed behavior	Before Wordwall	After Wordwall
1	Enthusiasm	Students are more enthusiastic and active	30%	80%
2	Interest	Students are interested during the quiz	40%	80%
3	Diligent	Students are willing to try until they succeed	30%	80%
4	Initiative	Students are brave enough to ask questions	40%	85%

The analysis shows that learning mathematics using Wordwall media significantly increases student motivation. The enthusiasm indicator increased from 30% to 80%, indicating that students are more focused and enthusiastic in the learning process. Interest increased from

40% to 80%, reflecting interest during the quizzes in the learning process. Perseverance also increased from 30% to 80%, indicating that students are more willing to try until they succeed. Finally, initiative increased from 40% to 85%, indicating enthusiasm and courage to ask and answer quizzes to achieve the best results during the game process. Wordwall media can create fun learning while motivating students to be more active, collaborative, communicative, and independent.

3. Increasing Student Learning Participation After Using Wordwall Media

Student participation includes active engagement in learning activities. According to Slavin (1995), student engagement is a key indicator of successful learning. It enables students to think, act, and collaborate to solve problems. Research shows that wordwall games in the learning process can increase student motivation and active engagement, both of which are crucial components in supporting optimal learning outcomes(Ismila & Iskandar, 2023; Retnasih et al., 2024). Active student participation is one indicator of successful learning, especially at the elementary school level, which emphasises enjoyable learning. Based on initial findings in fourth grade, low student participation in mathematics learning is a significant challenge that requires a solution.

The use of Wordwall media has been proven to impact active student participation in the learning process positively. Before integrating this media, students tended to be passive, acting only as listeners and not interacting effectively with class dynamics. However, after Wordwall was implemented as part of the learning strategy, student engagement increased both individually and in groups. They actively discussed questions to find the best answers on quizzes, supported friends who achieved high scores, and showed enthusiasm while waiting for their turn to participate.

The teacher said that "the classroom atmosphere became more interactive and enthusiastic, with the creation of a competitive learning process but still emphasising the values of cooperation and collaboration". As experts say, student participation in learning can be demonstrated by being active in the learning process, focusing when the teacher explains in class, asking questions confidently, and communicating effectively. (Ketut Sudarma, 2007)(Rejeki et al., 2024; Solihati, 2024) . This section describes the results of increasing student participation based on the indicators below:

Table 1.2

No	Indicator	Observed behavior	Before Wordwall	After Wordwall
1	Actively asking questions	Students are more confident and share their opinions	20%	80%

2	Group discussions	Students discuss actively and in a focused manner	40%	80%
3	Frequency of answers	Students answer more quickly and with focus	40%	80%
4	Collaborative	Students work together and interact positively with each other	40%	80%

The data shows a significant increase in all student participation indicators after the implementation of word walls in mathematics lessons. The percentage of student questioning activity increased from 20% to 80%, indicating that students were more confident and shared their opinions. Group discussions increased from 40% to 80%, and the frequency of responses also rose, indicating that students were faster and more focused in their responses. Meanwhile, collaborative learning also increased from 40% to 80%, reflecting positive cooperation and interaction between friends. Overall, the use of Wordwall media has been proven to encourage active student participation during the learning process. Based on the documentation of learning activities, researchers noted a positive change in class dynamics, which became lively and interactive. Students were no longer limited to passive recipients of material, but instead took an active role in every stage of the learning process. The quiz format provided by the Wordwall platform, such as Find the Match, offered a variety of engaging activities that aroused students' curiosity and helped maintain focus and engagement throughout the learning session.

The results of this study align with the constructivist approach, which emphasises students' active role in learning through direct experience. The use of Wordwall as an interactive digital medium provides a learning experience that is not only enjoyable but also meaningful. Student activities encompass not only cognitive aspects but also affective and social domains, such as enthusiasm, cooperation, and sportsmanship.

These findings also reinforce previous studies, such as those by Rahayu (2022), which examined the effectiveness of Wordwall in increasing student interest in mathematics learning at the junior high school level, and by Sari and Ananda (2021), which showed an increase in interest in science learning at the elementary school level. However, this study makes a broader contribution by examining not only motivational aspects but also active student engagement, particularly in the context of mathematics learning in Islamic elementary schools. (Evandri, 2024; Khasanah & Suminar, 2023).

4. Student Responses to Wordwall Quizzes

Other researchers argue that the primary function of learning media is to serve as a supporting tool in teaching and learning activities, influencing motivation, the situation, and the learning environment (Aryana et al., 2024). As in this study, the application of word walls in mathematics learning received very positive responses from both students and teachers. Based

on interviews and questionnaires distributed after the learning activity, the majority of students stated that learning using the media was more enjoyable and made it easier for them to understand the concepts of addition and subtraction. Eighty-five per cent of students reported feeling more enthusiastic about learning when accompanied by media and games, and 80% felt more confident in solving problems after using the media.

Students also reported that word wall media, such as Find the Match, helped them understand the material visually and practically. Furthermore, the learning atmosphere became more lively due to the elements of competition and group collaboration, which also increased their engagement in the learning process. As other research studies have shown, the implementation of interactive media can significantly increase student motivation and participation. It also contributes to creating a fun and challenging learning atmosphere, encouraging students to be more active in discussions and collaboration. (Dewi et al., 2024; Wa Souvi Raaziqal Ningtyas, 2024)

The results of interviews with fourth-grade teachers showed that "the use of wordwall media with Find the Match quizzes provides an alternative learning method that is more effective than conventional methods. Teachers feel that "students become more active, motivated, and show improvements in cognitive, affective, and psychomotor aspects." Teachers also said that "wordwall media makes it easier for them to build more dynamic interactions with students, as well as create a conducive and enjoyable learning environment." Overall, both students and teachers gave a positive response to the implementation of Wordwall media in mathematics learning, significantly impacting motivation, conceptual understanding, and student learning participation.

5. Obstacles and Solutions

The application of word walls in mathematics learning has been proven to increase student motivation and participation. Experts argue that games can help students develop problem-solving skills, interaction, and creativity, all of which will increase motivation and educational effectiveness. (Islam et al., 2024). However, various obstacles arise in practice. Interviews with teachers revealed that "one of the main obstacles identified is limited time for learning. Game activities require media preparation and time allocation. To overcome this, teachers need to plan their time more efficiently, such as simplifying game rules without compromising the essence of learning, and prioritising the competency indicators to be achieved."

Other research has revealed several challenges in implementing digital word walls as a learning tool. First, limited technological infrastructure, such as a lack of computer equipment

or a stable internet connection, is a significant obstacle. Second, teachers are sometimes reluctant to use the media due to limited facilities. Third, using digital word walls in learning tends to be more time-consuming, requiring educators to adjust time allocation and lesson planning to maintain effectiveness and efficiency (Solihati, 2024).

CONCLUSION

Based on the research results, it can be concluded that using word walls can increase student motivation and participation in mathematics learning at MI Darus Solikhin Boto, Probolinggo Regency. Students become more active, creative, and enthusiastic in participating in lessons. Word walls can transform boring mathematics learning into something more enjoyable and meaningful. The implementation of word walls in fourth-grade mathematics learning in elementary schools has been shown to impact student motivation and participation positively.

Through a fun, interactive, and contextual approach, students showed significant improvements in enthusiasm, interest, persistence, and initiative. Furthermore, participation indicators such as activeness, group discussions, frequency of answering, and collaboration also experienced significant improvements after using the Find the Match word wall. Although several obstacles were encountered during the implementation process, such as time constraints, media limitations, and teacher readiness, these obstacles were overcome through systematic solution strategies. These included efficient time planning, fostering group collaboration, utilising other digital media, and improving teacher competency through training and collaboration.

Thus, word walls can be an effective alternative learning strategy, not only in improving understanding of mathematical concepts but also in creating an active, collaborative, and enjoyable learning environment for elementary school students. This aligns with the demands of 21st-century learning, which emphasises active student involvement and the application of innovative and adaptive approaches to student characteristics.

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