Enhancing Fourth-Grade Students' Mathematics Achievement through Wordwall-Based Teaching at the Right Level (TaRL): A Classroom Action Research Study

Alfi Nur Khafidhoh[1], Adna Arum Ambarwati[2], I Ketut Suastika[3]*

[1] Universitas PGRI Kanjuruhan Malang
[2] SDN Tanjungrejo 2 Malang
[3] Universitas PGRI Kanjuruhan Malang
*Corresponding author's email: suastika@unikama.ac.id

Abstract

Mathematics remains a challenge for most children. The difficulty in understanding abstract concepts and applying them in practice often results in declining student learning outcomes, especially in subjects that require conceptual understanding and unit conversion, such as volume measurement. This study aims to improve mathematics learning outcomes among fourth-grade elementary school students through the application of the Teaching at the Right Level (TaRL) strategy. This research employed a Classroom Action Research (CAR) design, which consisted of two cycles. Each cycle comprised four stages: planning, implementation, observation, and reflection. The participants were 28 students from SDN Tanjungrejo 2 Malang. The findings showed that the proportion of students achieving the success criteria increased from 43% to 89%, with an average score of 86. The application of the TaRL strategy, supported by Wordwall media, proved effective in improving students' mathematics learning outcomes.

Keywords: *Teaching at the Right Level (TaRL); Wordwall; Mathematics Learning; Elementary Students*

INTRODUCTION

Education is one of the important aspects in developing quality human resources. As a conscious and planned process, education aims to pass on culture, values, and knowledge from one generation to the next (Rahman et al., 2022). In the context of elementary school education, mathematics plays a strategic role because it is the basis for developing logical, analytical, and systematic thinking skills. Therefore, strengthening mathematics education from an early age is very important to shape a critical and structured mindset in students. The goal of mathematics learning in elementary school is to equip students with the ability to solve problems related to mathematical concepts and to communicate mathematical ideas and reasoning processes effectively (Hidayat, 2019; Kenedi et al., 2019). However, the reality in the field shows that mathematics is still a challenge for most students. Difficulties in understanding abstract concepts and their

application in everyday life result in low student learning outcomes, especially in materials that require conceptual understanding and conversion, such as volume units.

Initial observations conducted in class 4C of SDN Tanjungrejo 2 Malang, Malang City, showed that most students had difficulty understanding the concept of volume unit conversion in mathematics. Based on the pre-cycle test results, it was found that the average student score was only 67 with a learning completeness rate of 43%, far below the learning objective achievement criteria, which is 80. In addition, during the learning process, students appeared passive and lacked active involvement. They tended to memorize formulas without understanding the relationship between units, such as liters, milliliters, and cubic decimeters. This condition shows that the learning strategies used previously were not able to accommodate differences in students' learning abilities. As a result, there was a gap in learning outcomes among students in one class, where a small number of students were able to understand the concepts well, while the majority still experienced difficulties. This problem highlights the need to implement a more adaptive learning approach that is centered on students' learning needs.

One relevant approach is Teaching at the Right Level (TaRL). According to (Lakhsman, 2019), the TaRL approach is carried out by grouping students based on their ability levels so that they can learn the material in a more targeted manner and in accordance with their individual learning needs. Based on the findings of (Ismail et al., 2024; Suharyani et al., 2023), the TaRL approach enables educators to design learning activities that are adaptive to the heterogeneity of students' abilities. (Siswaningsih et al., 2023) also argue that the application of TaRL contributes to improving the quality of students' understanding of learning material in greater depth, as well as fostering confidence and optimism in achieving optimal competence.

In its application, the TaRL approach can also be combined with the use of interactive learning media. Singh & Hashim (2020) state that learning media is an important element in the learning process because it can help teachers deliver material and make it easier for students to understand the content of the lesson. In this study, the researchers used the interactive media Wordwall to increase students' interest and engagement during the learning process (Widhiatama & Brameswari, 2024). Wordwall is an effective digital platform for educators in designing interactive and varied learning. In addition, Wordwall has advantages in terms of accessibility, as it can be easily used through digital devices connected to the internet (Rizki et al., 2023). Wordwall makes it easy for teachers to design various educational activities such as quizzes, word games, and puzzles, which can be tailored to the needs and level of understanding of students (Maryanti et al., 2022; Rodriguez-Escobar et al., 2023).

This study also refers to several relevant previous studies. Research conducted by Mustafa et al. (2024) and Ningrum et al. (2023) on the application of the TaRL approach with the Project Based Learning model showed significant results in improving the learning outcomes of 10th grade students. A similar study by Rahmayanti et al. (2023) also proved that the TaRL approach is effective in improving the learning outcomes of first-grade elementary school students. In addition, research related to Wordwall media by Maghfiroh (2018) shows that the use of this media can improve students' mathematics learning outcomes.

Based on this description, the researcher was interested in conducting Classroom Action Research (CAR) with the title "The Application of the TaRL Approach with the Support of Wordwall Media to Improve Mathematics Learning Outcomes in Grade 4 Elementary School." This study aims to determine the extent to which the application of the Teaching at the Right Level approach combined with Wordwall media can improve

students' mathematics learning outcomes in volume unit conversion material, as well as create more effective, enjoyable, and meaningful learning.

The importance of this research lies in its effort to provide real solutions to the differences in learning abilities among elementary school students through learning that focuses on individual needs and the use of interactive digital media. It is hoped that the results of this study will not only improve the learning outcomes of students in class 4C of SDN Tanjungrejo 2 Malang, but also serve as a reference for other teachers in implementing adaptive, innovative, and relevant learning strategies in line with developments in educational technology.

METHODS

This research is included in the category of Classroom Action Research (CAR). Asrori & Rusman (2020) describe CAR as a type of reflective research that is deliberately focused on real-world issues in the classroom and aims to improve and improve the quality of learning. CAR is focused on analyzing the relationship between interventions and the changes they cause (Arikunto, 2021). In this study, researchers used descriptive qualitative techniques. This method allows researchers to explain the strategies used in detail and assess the results based on predetermined success indicators. Researchers in this CAR use the Kemmis Stephan & Mc. Taggart model described in Arikunto (2021). This model is structured with four sequential steps: planning, action, observation, and reflection. The purpose of this four-step procedure is to continuously intervene and improve the learning process. We carried out this CAR throughout the second half of the 2024-2025 school year. The research involved 28 fourth-grade students from SDN Tanjungrejo 2 Malang, consisting of 12 male and 16 female students.

The research instruments used included learning outcome tests and student activity observation sheets. Learning outcome data were analyzed by calculating the average score and percentage of learning completeness, while observation data were analyzed descriptively to determine student activity and teacher learning implementation. Student responses were analyzed using percentages to determine their level of interest and motivation to learn. Two key metrics will be used to establish the feasibility of this Classroom Action Research. As the first requirement, at least 80% of the time, researchers and students must agree on the outcomes of the learning activities. In addition, according to the relevant criteria for achievement of learning objectives standards, at least 75% of students must score 80 or higher for the learning outcomes related to volume unit conversion in math classes to be considered complete. The success in carrying out the action and the completion of the research is marked by the presence of these two markers.

RESULTS AND DISCUSSION

Researchers observed the learning practices of fourth grade teachers at SDN Tanjungrejo 2 Malang at the pre-cycle stage. After observing 28 students in class IV-C, it was found that only 12 students (42.86%) had completed learning and 16 students (57.14%) had not reached the criteria for achieving learning Objectives. With a maximum score of 90, some students showed good mastery of the material. Conversely, students who obtained a score of 0 indicated that students had not mastered the material well. Overall, 43% of students need more effective learning techniques based on the percentage of completed learning at the pre-cycle stage. This finding confirms the need for structured educational interventions to improve students' conceptual understanding and overall learning outcomes, as detailed in Table 1.

Table 1. Pre-Cycle Learner Learning Outcomes

No.	Aspect	Description
1	Number of students in class 4-C	28
2	Number of students who achieve learning completeness	12
3	Number of students who have not reached learning completeness	16
4	Maximum score	90
5	Minimum value	30
6	Average class score	67
7	Percentage of completeness	43%

Cycle I

The actions in cycle I were carried out based on the results of observations and data obtained at the pre-cycle stage. The following is a detailed explanation of the results of cycle I research

Planning

In the planning phase, researchers systematically designed all aspects that support the implementation of the Discovery Learning model. This process begins with the collection of various essential elements that become the basis for developing a learning strategy that is structured and oriented towards developing learner competencies. The main elements of this phase consist of creating a learning strategy with achievable goals, creating an aligned flow of learning objectives, determining the appropriate learning methodology, creating contextualized student worksheets, and designing formative assessment tools to continuously check the achievement of goals.

Furthermore, the researcher also developed learning materials designed to attract interest and facilitate learners' active engagement in the process of independent concept discovery. The materials were created to do more than just impart knowledge; they also inspired inquiry, analysis and problem solving. Therefore, this planning stage is a deliberate attempt to establish a positive, learner-centered learning environment as well as an initial basis for learning.

Implementation

Learning took place over two sessions during the action stage of Cycle I. The instruction in the first meeting was based on a combination of the Discovery Learning model and the Teaching at the Right Level strategy. Starting with watching a video recording to build students' initial understanding, the learning process proceeded to a question and answer session to further embed the meaning of the material. In addition, the researcher divided the students into three groups according to their cognitive skill level: advanced level, developing level, and early developing level. The next step was to assign each group a student worksheet that they could use for group work and discussion. In the process of completing this a student worksheet, the principle of differentiated learning was applied to the process aspect, by providing intensive assistance to the early developing groups to accommodate their different learning needs.

In addition to facilitating the discussion process, the researcher also observed the development of students' behavior and attitudes during the activity. The attitude observation sheet instrument that had been created earlier in the lesson was used methodically to conduct this observation. Each group shared their findings with the whole class after completing the a student worksheet. Learners who were not presenting were given space to respond in the form of responses, questions, or additional information to

other groups' presentations, as part of strengthening communication and collaboration skills.

As the study nears completion, the researcher gives students the opportunity to reflect on what they have learned and provides them with more relevant explanations of the information. Students' metacognitive knowledge of their learning achievements and thought processes during the exercise is the purpose of this reflection.

Observation

The observation stage is carried out systematically during the learning process, focusing on learner activities both individually and in groups. Data collection is done through assessment of group performance in completing learning tasks, as well as the active involvement of each individual during the activity. This observation aims to obtain empirical information that supports the evaluation of the learning process and results as a whole. After the data from the implementation of Cycle I was collected, we reviewed it to find things that needed to be improved in the next meeting. The data showed an increasing trend in student learning outcomes.

At the end of Cycle I, the results showed that student learning outcomes had improved significantly, as evidenced by the increasing number of students who met the Criteria for Achieving Learning Objectives, as detailed in Table 2. Students of class 4-C SDN Tanjungrejo 2 Malang experienced a significant increase in learning outcomes compared to the conditions of the previous cycle. This increase confirms the effectiveness of the learning intervention applied, and shows that the learning model used is able to encourage students' academic achievement more optimally.

Table 2. Cycle I Student Learning Outcomes

No.	Aspect	Description
1	Number of students in class 4-C	28
2	Number of students who achieve learning completeness	17
3	Number of students who have not reached learning completeness	11
4	Maximum score	100
5	Minimum value	50
6	Average class score	76
7	Percentage of completeness	61%

The implementation of Cycle I of learning in class 4-C at SDN Tanjungrejo 2 resulted in a significant increase in student learning achievement. There were a total of 28 students who participated in the learning process; 17 of them successfully completed the learning according to the set criteria, while the other 11 did not. There was a wide range of scores (50-100), with 100 being the best and 50 being the worst. From this distribution, we can conclude that 61% of the course was successfully completed. This result shows that most students have grasped the concepts, but it also shows that some students still need more help. All things considered, these results give credence to the idea that the combined strategies of Teaching at the Right Level and Discovery Learning improve learning outcomes. But these results also show how important it is to help students who have not finished by using differentiation of learning or remedial tactics.

Reflection

In cycle I, the implementation of the Teaching at the Right Level (TaRL) approach proved to be quite effective in improving the learning outcomes of students in class 4C at SDN Tanjungrejo 2 Malang. The learning process showed an increase in student

participation and engagement compared to the initial conditions before the intervention. However, based on observation and assessment results, the level of student learning completeness only reached 61%, with 11 students not meeting the minimum score of 80 as stipulated in the learning objective achievement criteria.

This achievement shows that the research success criteria, namely a minimum of 75% of students obtaining a score of ≥80, has not been fully met. Nevertheless, in terms of process, more than 80% of the learning time showed consistency between the researcher's and students' perceptions of the success of the learning activities. This indicates that the TaRL strategy is on the right track but still needs reinforcement in terms of learning methods and media.

Based on these reflections, improvements in cycle II focused on increasing learning interactivity through the integration of the educational game media WordWall. The use of this media is expected to increase learning motivation, strengthen conceptual understanding through a more enjoyable experience, and help students who still experience gaps in understanding volume conversion material. With this modification, it is hoped that student learning outcomes in the next cycle will improve and meet the predetermined success criteria.

Cycle II

As a follow-up to improve student learning outcomes, activities in Cycle II were carried out based on the results of the reflection in Cycle I.

Planning

The planning stage of Cycle II was methodically organized using the data and insights gained from the review and implementation of Cycle I. Lesson plans, student worksheets, and evaluation instruments tailored to the needs and abilities of each student were part of this planning process. Wordwall, an educational game, is also a powerful tool to enhance learning media by encouraging more student engagement and better understanding of course concepts. The rationale behind this media choice is Wordwall's ability to foster an engaging, entertaining, and intellectually stimulating classroom environment that is anticipated to better accommodate students' varying levels of understanding. This method emphasizes on creating more relevant and significant learning experiences during cycle II planning, in addition to improving learning outcomes.

Implementation

The implementation of the second cycle followed the same systematic pattern as the first cycle, but with a greater focus on improving students' learning processes and outcomes. The researcher started the learning activities by giving the learning objectives to the students. This way, everyone knows what to expect at each step of the learning process. The researcher also emphasized the importance of students' active involvement in their own learning in this early part.

Material delivery using the pre-designed PowerPoint presentation media was the first stage of the main activity. Researchers guided the interactive process by asking students to answer questions about the concepts presented in the slides. They also discussed some sample questions to help students better understand the material. In addition, the academic ability levels identified in the previous cycle were used to divide students into groups. Maximum application of the process differentiation technique was made possible by this grouping strategy.

The ability level of each group informs the development of the Student worksheet used for group discussion exercises. Students in the advanced group worked on their problems in small groups with little supervision from the instructor, while those in the

development group received periodic feedback and suggestions. While working on the Student worksheet in groups, students began to receive close guidance from the researcher to ensure they learned what they needed to learn.

The researcher used pre-made observation sheets to track students' engagement and attitude during the sessions. Using Wordwall interactive digital media, which included questions directly related to the course content, and educational game activities such as snowball games were incorporated into the learning process to keep students engaged and motivated. In addition to its evaluation purpose, the exercise served as a catalyst for the development of an engaging and constructively competitive learning environment.

Once everyone has finished speaking in their groups, it is everyone's turn to present. Participation in this exercise will help students hone their skills in group work, analysis, and presentation. During the final class, the instructor asks students to reflect on the unit content and come to a common understanding. Furthermore, to gauge the extent to which the learning outcomes were achieved, an individual formative evaluation is administered. The learning activity ends with a joint reflection, by both the researcher and the learners, to review the learning process and strengthen the overall understanding of the concepts.

Observation

In cycle II, learning activities were used to carry out observations. Students' engagement in the learning process increased, which indicated an increase in students' interest in learning, according to the observation findings. With an average score of 86 and 89% of students completing the course, the evaluation of class 4-C learning outcomes showed good achievement. The findings provide strong evidence that the implemented learning strategy significantly improved learning outcomes. Unfortunately, three students still needed extra help and support to fulfill the completion requirements. Table 3 presents a detailed comparison of student learning outcomes from the pre-cycle through cycle II, while Figure 1 provides a graphical visualization of this progressive improvement in achievement.

Table 3. Comparison of Student Learning Outcomes

No.	Aspect	Pre - Cycle	Cycle I	Cycle II
1	Number of students in class 4-C	28	28	28
2	Number of students who achieve learning completeness	12	17	25
3	Number of students who have not reached learning completeness	16	11	3
4	Maximum score	90	100	100
5	Minimum value	30	50	60
6	Average class score	67	76	86
7	Percentage of completeness	43%	61%	89%

The pre-cycle stage was characterized by low levels of achievement of student learning outcomes. With only 43% of the subject matter covered, the average score was 67. This indicates that 57% of all students failed to meet the Learning Objective Achievement Criteria benchmark for completion. A more adaptive learning intervention effort that is in line with the children's initial skills is needed to address this issue. There was a marked improvement after the implementation of Cycle I actions using the Teaching at the Right Level (TaRL) method.
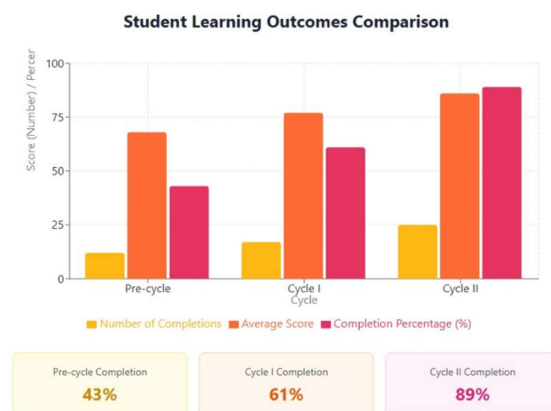
Figure 1. Comparison of Student Learning Outcomes

Both the average score of students and the proportion of learning completed increased to 76% and 61% respectively. Thus, there was a decrease in the number of learners who were not yet complete from 57% to 39%. Although these results show positive progress, the proportion of learners who have not yet achieved mastery is still quite high, so further optimization is needed in the next stage.

In the implementation of Cycle II actions combined with WordWall interactive learning media showed more optimal results. The average score of students increased to 86, and the percentage of completed learning increased to 89%. The majority of students had shown an improved understanding of the material, as only 11% had not completed the course. The basic idea of the TaRL approach is to adapt learning materials and activities according to students' ability levels, and this improvement in learning strategies is demonstrated in this growth.

A continuous and statistically significant improvement trend was observed when comparing learning outcome data between cycles, i.e. from pre-cycle to cycle II. The implementation of the TaRL approach, which focuses on grouping learners based on the level of mastery of the basic material, proved to be able to answer the challenges of heterogeneity in the classroom. The use of Wordwall media as a visual and interactive tool also contributed positively in increasing learners' motivation and active involvement during the learning process.

The research presented shows that improvements in each learning cycle correspond to better assessments in all respects. The research shows that when teachers use the Teaching at the Right Level (TaRL) method, students become more engaged in their own learning, gain confidence, and are motivated to grow as individuals while still contributing to the collaborative group. This confirms the findings of previous research (Harahap et al., 2024; Pamuji & Anggoro, 2025) which found that the TaRL method significantly improved students' mathematics performance in grade one. Ndraha (2024) found that fifth grade students at Primary School 071057 Hiliweto could benefit greatly from using the TaRL method to improve their science education.

The use of Wordwall as a teaching tool also helps students become more engaged in their own learning. By engaging students and keeping their attention, it can make the classroom a more fun, interesting and productive place to learn. Wordwall has been proven in classroom action research as an effective learning media (Pratiwi et al., 2024; Sukma & Handayani, 2022). This study found that the use of Wordwall media in elementary science learning can improve learning outcomes and increase student engagement. Students'

learning outcomes improved when studying human respiratory system material, according to similar research (Surahmawan et al., 2021). Students with varied abilities can benefit from an engaging and relevant learning experience when the Teaching at the Right Level (TaRL) method is used in conjunction with Wordwall interactive learning materials. Research findings show that the use of Wordwall application in class VIII F SMP N 42 Semarang supported by TaRL approach, can improve learning outcomes and active student involvement in the learning process (Nafisah et al., 2024). This finding aligns with the synergy between the TaRL approach and Wordwall as a learning medium. It indicates that the TaRL strategy, when supported by Wordwall, is more effective in practice.

CONCLUSION AND SUGGESTIONS

Grade 4-C students at SDN Tanjungrejo 2 Malang experienced a significant increase in math learning outcomes after applying the Teaching at your Right Level (TaRL) approach with the help of Wordwall interactive media, based on the results of a two-cycle classroom action research. Previously insurmountable learning obstacles have been successfully overcome with the TaRL approach, which emphasizes adjusting the delivery of learning materials to the actual skill level of each student. The research findings show that in each cycle of implementation, students' learning outcomes improved steadily. This suggests that students can benefit from a more successful and meaningful learning experience when their tactics are tailored to their own needs. Given this, the TaRL method offers a viable alternative to traditional classroom teaching that can help students, particularly those in primary school, acquire and apply basic math skills.

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