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Rapulsa Board as Interactive Math Learning Media in Elementary School

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Abstract

Learning mathematics in elementary schools often faces challenges from students, such as students' perceptions that math is a difficult and scary subject, resulting in low learning outcomes. This also occurs in grade III elementary school students where student scores in learning math are still low. This study aims to improve the learning outcomes of third grade elementary school students on the material "Rapulsa Board" (Hundreds, Tens, and Units) by utilizing the learning media of the printed board. The method used is a classroom action research approach consisting of planning, implementation, observation and reflection. The research subjects were 30 grade III elementary school students. Data were collected through observation, learning outcome tests, and documentation, then analyzed descriptively. The results showed that the application of the map board media was able to improve student learning outcomes from cycle 1 which was originally only 9 people who were complete increased to 30 people in cycle 2. The average score of students who were initially only 60 in cycle 1 increased to 84.5 in cycle 2. The application of Rapulsa boards is also proven to increase student understanding and student involvement in learning. The conclusion of this study is that the mapboard media can be an effective and interesting alternative for learning Mathematics in elementary schools.

INTRODUCTION

Mathematics is the study of numbers, structure, space and change using formulas that are the basis of calculations (Mahmuda et al., 2021). Studying mathematics can help students develop critical thinking skills in solving problems, foster self-confidence, interest in learning, perseverance, and flexibility (Andriyani et al., 2024; Dewi & Minarti, 2018; Nasution, 2024). Students in elementary school have not been able to feel the benefits of learning math. This is because many students think that learning math is difficult so that many students are afraid to learn math

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(Marweli, 2024). Other learning problems are students' different learning styles, inappropriate learning techniques and media, and abstract material that makes it difficult for students to learn (Febriani et al., 2022; Haddar & Novianti, 2019; Yulita & Ain, 2021).

This is in accordance with the results of the author's observations in elementary schools, students are afraid to learn math because they do not understand the concept, teachers still use conventional learning methods that tend to use lecture methods and practice problems without relevant supporting media. This causes students to get bored quickly and does not attract students' attention. As a result, students become less active during the learning process which results in low student learning outcomes. Based on the results of daily assessments in mathematics, it can be seen that only 3 students reached the learning completeness criteria while 27 did not reach the predetermined learning completeness with a score range of 70-85 with good criteria. The low student scores in mathematics are an indication of the difficulty of mathematics material for students.

One material that is difficult for students is hundreds, tens and units (RAPUSA). This concept is an important basis in understanding the number system, which functions as a foundation for learning Mathematics at a higher level (Aristiantika & Widiono, 2024; Sidik & Wakih, 2020). The material on hundreds, tens and units is also used as a basis for understanding the decimal number system and for solving arithmetic problems (Risqi, 2023). However, in reality, many students have difficulty understanding this material, resulting in low learning outcomes (Lindström-Sandahl et al., 2024; Powell et al., 2020). This difficulty is not only caused by the abstract characteristics of the material, but also by the lack of use of appropriate learning media to make it easier for students to understand the concept (Hinton & Flores, 2019; Muthma'innah, 2023; Pellegrini et al., 2021).

One of the media that can be used to study hundreds, tens and units is the Rapulsa board media. Rapulsa board media is media that can present concepts visually and interactively (Mau & Helvina, 2023). Picture board media such as the Rapulsa board can present abstract concepts in a concrete and interesting form. The visualization on the Rapulsa board can help students more easily understand the relationship between hundreds, tens and units in a number. This media can also increase student involvement during learning, so that they are more motivated to learn. This approach is in line with constructivist learning theory which emphasizes the importance of direct experience and meaningful learning.

Agusti et al (2018) shows that visual media is effective in improving student learning outcomes, especially in Mathematics subjects. This is in line with research by Halidah et al (2024) which shows that printed board media can present abstract concepts more concretely and easily understood through interesting visualizations and relevant to students' daily lives so as to improve learning outcomes. In general, specific research on the use of checkerboard media in learning building materials at the elementary school level is still very limited. Most of the existing studies focus more on other materials or at higher education levels. This research tries to fill the void by exploring the effectiveness of pictorial checkerboard media on the material of Rapulsa Board in grade III elementary school in improving students' learning outcomes and motivation to learn mathematics as well as increasing students' involvement during learning. It is hoped that the results of this study can contribute to the development of innovative and effective learning methods, and become a reference for teachers in designing learning that is relevant to the needs of students in the modern education era.

METHODS

This research is classroom action research which aims to improve the learning outcomes of class III students at elementary school on the Rapulsa Board material (Hundreds, Tens and Units) by utilizing picture board media. The classroom action research method was chosen because it improves learning in the classroom directly and continuously (Edwards & Burns, 2016; Putra et al., 2022). The subjects of this research were 30 class III students at elementary school. The instruments used in this research consisted of observation sheets, learning results tests, documents and field notes. Observations are carried out to record student involvement and activities during the learning process. This instrument aims to determine the extent to which picture board media is able to attract students' attention and increase their participation in learning. This observation also records the dynamics of interaction between teachers and students during learning. Learning outcome tests are given at the end of each cycle to measure students' understanding of the material being taught (Agusrita et al., 2020; Jaafar et al., 2024; Syaifudin, 2021). Documentation instruments are used to record the learning process, such as photos or videos that show the use of picture board media in learning. This documentation is useful for supporting observation data and providing a visual overview of the learning process. The field note instrument is used to record important things that occur during the learning process, for example changes in students' attitudes, obstacles faced, or other things that influence learning.

The collected data was analyzed using qualitative and quantitative analysis techniques. Data from learning outcomes tests were analyzed using descriptive statistics to determine the development of student learning outcomes from the first cycle to the second cycle. This analysis involves calculating the average student test scores, as well as a comparison between scores before and after the application of picture board media. This quantitative analysis provides an objective picture of the effectiveness of media in improving students' understanding of the material (Lamb et al., 2018; Tong et al., 2022; Zulfadli et al., 2020).

This research was carried out through several stages carried out in two cycles, with each cycle consisting of four stages: planning, implementation, observation and reflection. This stage is designed to enable researchers and teachers to evaluate and improve each cycle in order to improve the quality of learning. At the planning stage, researchers and teachers together design a Learning Implementation Plan which involves the use of picture board media. Researchers also prepare research instruments, such as observation sheets, learning outcomes tests, and documentation. This lesson plan is designed to focus on the application of picture board media as a learning method for Rapulsa Board material. After planning, learning is carried out in accordance with the Learning Implementation Plan that has been prepared. At this stage, the teacher uses picture board media to explain the concept of the Rapulsa Board, by displaying pictures that visualize the relationship between hundreds, tens and ones. Learning is carried out interactively by inviting students to actively participate in the learning process (Joleha et al., 2024).

During the learning process, researchers observed student activities and the overall implementation of learning. Observation sheets are used to record the level of student involvement, as well as changes that occur in their attitudes and understanding. Documentation in the form of photos and videos is also taken to provide a clearer picture of the learning process. After the first cycle was completed, researchers and teachers conducted reflection to evaluate the learning process and the results obtained. Based on the results of observations and tests, improvements

were made in the next cycle to increase the effectiveness of using picture board media. This reflection helps researchers to understand the strengths and weaknesses in the learning process, as well as to plan improvement steps (Lestari et al., 2022).

RESULT AND DISCUSSION

This research was carried out in two cycles with steps including planning, implementation, observation and reflection. Each cycle has a clear objective, namely to improve students' understanding through the application of picture board media, which is expected to improve student learning outcomes, especially in understanding the concept of numbers in hundreds, tens and ones. The research results are divided into two main parts, namely improving learning outcomes through tests and observations, and increasing student involvement in learning.

Improved Student Learning Outcomes

In the first cycle, students were given a test to measure their understanding of the Rapulsa Board material and in the second cycle, students were given the same test to measure changes or improvements in their learning outcomes after using the media. Based on observation data, that out of 30 students, only 9 people reached the learning completeness criteria set with a score range of 70-85, while 21 students were still not complete in cycle 1. This is very different from the students' mathematics learning outcomes in cycle 2, all students were complete and all students showed an increase in scores between 10% to 45%, with an average increase of 23% from the two cycles. The average score in cycle 1 which was initially only 60 increased in cycle 2 to 84.5. This increase reflects the effectiveness of using the printed board media in improving students' understanding of Mathematics material, especially on the concept of the Rapulsa Board. Students who previously had difficulty in understanding the concepts of hundreds, tens and units became easier to understand after using this media.

The learning results obtained through the use of picture board media also show that students who previously had difficulty understanding the material, after learning using picture board media, showed rapid progress in working on questions related to the concepts of hundreds, tens and ones. The process of visualizing numbers through a picture board helps students to see the relationship between larger and smaller numbers, so that it is easier for them to understand these concepts concretely, which were previously difficult to understand using traditional methods. Apart from that, student involvement in learning has also increased significantly. In the first cycle, most students only participated passively in learning, but after the use of picture board media was implemented, many students began to actively ask questions, discuss and work on practice questions with greater enthusiasm. This increased involvement is in line with the motivation theory put forward by (Li et al (2020); Moy et al (2016) which emphasizes the importance of media that can stimulate students' intrinsic motivation, where students feel challenged and interested in learning more deeply.

Observation of Student Engagement

Observations were carried out to assess the extent to which students were involved in the learning process, both in terms of interaction with the teacher, participation in class discussions, and the use of picture board media during learning. Observation results show that there is a significant increase in student engagement after using picture board media. The following are the results of observations that describe the level of student involvement in both cycles:

Table: 2. Level of Student Involvement

Engagement Aspects	Cycle 1	Cycle 2
Active involvement in discussions	50	80
Answer the teacher's questions	55	85
Using drawing boards in training	60	90
Do the questions with confidence	50	80

Observation results show that in the first cycle, only around 50-60% of students were actively involved in learning. However, after using picture board media in the second cycle, student involvement increased significantly, with 80-90% of students actively participating. This increase shows that the picture board media motivates students to interact and participate more in Mathematics learning. The increase in student involvement recorded in table 2 above also shows that picture board media is able to increase student motivation to participate more actively in the learning process. According to Tabbers et al (2004) Learning that uses visual media is often more interesting and enjoyable for students, so they feel more motivated to learn. This is in line with learning motivation theory which states that learning that is fun and invites students' active participation will encourage their intrinsic motivation to study harder (Bauer et al., 2016; Garcia, 2022; Pelikan et al., 2021; Ryan & Deci, 2020). If viewed in terms of success, this research shows that picture board media not only helps students understand the material, but also increases their confidence in working on mathematics problems. Students who previously had difficulty with the concept of numbers began to feel more confident after using picture boards to practice.

The emerging self-confidence of students is very important because it can influence the way students face academic challenges in the future (Akbari & Sahibzada, 2020; Ndze, 2022; Özdemir, 2025; Sidik & Wakih, 2020; Wiriawan, 2023). Students who feel confident tend to have a positive attitude towards learning and are better prepared to face the tasks given by the teacher. This certainly contributes to their overall mental and academic development (Duraku & Hoxha, 2018; George & B, 2022; Ghasemi, 2023; Saidah, 2024; Santi et al., 2023; Yasin et al., 2020). Apart from that, fun and interactive learning using picture boards also creates a positive learning atmosphere. Students become happier studying Mathematics because they feel more helped in a way that is more fun and less scary (Hafidz et al., 2023; Schneider et al., 2016; Tabbers et al., 2004). Learning based on sight and physical activity (such as composing numbers) provides a more holistic experience for students and encourages them to interact more with the material being taught. This proves that the right media can reduce students' anxiety towards mathematics lessons and improve their attitudes towards mathematics subjects (Alvarez-Vargas et al., 2023; Hraste et al., 2018; Riley et al., 2015; Xie, 2021).

Learning Documentation

Documentation in the form of photos and videos was also taken to support observation data. In the documentation, students can be seen working together in groups to solve Mathematics problems using a picture board as a supporting medium. These pictures show how students begin to organize numbers based on hundreds, tens and ones, and discuss to find solutions to problems given by the teacher. This documentation also highlights students' enthusiasm during learning, where they were more interested in participating in activities that involved visualizing numbers.

Based on the research results that have been presented, it can be concluded that the use of picture board media in Mathematics learning using the Rapulsa Board, has a

positive impact on improving student learning outcomes and their involvement in learning. The increase in student learning outcomes seen in Table 1 shows that the use of picture board media is effective in helping students understand abstract mathematical concepts, such as dividing numbers into hundreds, tens and ones. This is in accordance with the Constructivism theory put forward by Piaget and Vygotsky, learning that involves concrete and visual experiences can help students build their understanding of more complex material (Chen, 2024; Joo & Schachter, 2025; Mohammed et al., 2020; Stoltz et al., 2024; Suhendi et al., 2021). Picture board media provides students with the opportunity to directly see and interact with the concepts being taught, so that they can more easily understand and remember them (Niam, 2023; Nuryami et al., 2022; Permadi & Siptiani, 2024; Ristianingsih & Djunaidi, 2023).

CONCLUSION

Based on the results of the research that has been carried out, it can be concluded that the use of picture board media in learning the Rapulsa Board material (hundreds, tens and ones) has had a significant impact on improving student learning outcomes in class III of elementary school. Through this research, it can be proven that the use of picture board media can be an effective strategy for improving student learning outcomes, especially in understanding complex and abstract mathematical concepts. This media also contributes to creating a pleasant learning atmosphere and increasing active student involvement in learning. Therefore, it is recommended that picture board media become part of a teaching method that is applied more widely in the educational context in elementary schools.

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