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The effect of place value board learning media on the learning outcomes of third-grade elementary school students

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ABSTRACT

Mathematics learning in elementary schools still faces the problem of low student learning outcomes, especially in the material of place value of numbers, due to learning that tends to be abstract and minimal use of concrete learning media. This study aims to determine the effect of using the Place Value Board learning media on the mathematics learning outcomes of third-grade elementary school students. This study uses a quantitative approach with a quasi-experimental method through a nonequivalent control group design. The research subjects consisted of two classes, namely the experimental class given treatment using the Place Value Board media and the control class using conventional learning. Data were collected through learning outcome tests in the form of pretests and posttests that have been tested for validity and reliability. Data analysis was carried out using an independent sample t-test. The results showed that there was no significant difference between the two groups in the pretest, but there was a significant difference in the posttest with a significance value of $p < 0.001$. This indicates that the use of the Place Value Board media has a significant effect in improving students' mathematics learning outcomes. Thus, the Place Value Board media is effective for helping students understand the concept of place value concretely. The implications of this study indicate that teachers are advised to utilize concrete learning media to improve the quality of mathematics learning in elementary schools.

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INTRODUCTION

Elementary school education is a general education program that aims to educate students and develop them into high-quality individuals (Dewi et al., 2025). Through education, students learn to distinguish between right and wrong, learn to work together, and learn to face challenges. Education essentially helps humans develop into intelligent and ethical individuals, capable of making wise decisions. In elementary education, mathematics plays a very important role in shaping logical, systematic, and critical thinking in students (Fitri et al., 2024). Therefore, mathematics learning in elementary schools needs to be designed in such a way that it not only provides basic concepts but also connects the material to students' real lives so that they truly understand why mathematics is important and how its benefits can be felt in everyday activities.

The concept of mathematics learning is an interactive process aimed at developing students' logical thinking and reasoning skills (Suprayogo et al., 2025). Mathematics learning introduces children to activities such as counting, recognizing patterns, measuring, and solving simple problems. The goal is not only for children to be able to count, but also for them to think sequentially, understand the relationships between numbers, and have the courage to solve problems. The role of mathematics in

education is crucial, as it can train students to think critically, creatively, and actively (Intan et al., 2022). Therefore, learning mathematics is not merely a passive reception of information but also involves active student participation in building their understanding.

Mathematics learning becomes easier for students to understand when they are actively involved, rather than simply listening to teacher explanations. Student activeness significantly influences the development of thinking, emotions, and social skills (Ningsih & Berek, 2023). However, many students are less active in learning activities because they perceive mathematics as boring, difficult to understand, and intimidating. This lack of interest can lead to a loss of interest and motivation in learning, thus hindering student understanding and achievement in mathematics (Wiryana & Alim, 2023). Therefore, students must be given the opportunity to try, ask questions, discuss, or directly practice what they have learned, so they can build a stronger understanding and enjoy the learning process.

This is because in mathematics learning activities, students often learn in less engaging ways, such as simply listening to teacher explanations and working on problems in textbooks without actively involving students. Teachers also do not utilize media that support learning, and teaching methods are not varied, making it difficult to explain the material being taught. (Hamidah & Ain, 2022) stated that a lack of learning media can cause students to dislike mathematics, which leads to learning difficulties. Therefore, in mathematics learning, students need learning aids in the form of learning media and teaching materials to clarify the subject matter, thereby increasing the speed of student understanding of the material (Sari et al., 2022). With the right media and teaching materials, teachers can convey mathematical concepts in a more concrete and engaging manner, so that students can see, experience, and understand the relationships between these concepts more clearly. This can ultimately increase student interest in learning and increase their participation in the learning process.

According to Rahman, (2022) learning outcomes are the results achieved by students after completing learning activities. The results achieved by students can be in the form of abilities, both related to knowledge, behavior, and skills possessed by students after they have gained learning experience. The use of media is an important part of the facilities and infrastructure that can influence learning outcomes, so choosing the right media can improve student achievement (Latifaturrohmah et al., 2025). Student learning outcomes can be affected by a lack of student involvement and the absence of learning media during learning. When learning is designed ineffectively, for example, students do not try things themselves or there are no tools to help understand concepts, it is difficult for students to achieve the desired learning objectives and learning outcomes will be low.

The problem of students' lack of understanding of the subject matter is the result of passive learning methods and minimal use of media, which has a significant impact on their learning process and academic achievement. If learning activities continue to be dominated by the teacher, the expected learning objectives will not be achieved properly (Durisa et al., 2022). When students only listen to the teacher's explanation without actively engaging, they tend to get bored quickly, have difficulty understanding abstract concepts, and are unable to apply the material to exercises or problems. The learning difficulties experienced by students are influenced by factors originating from within themselves, including low enthusiasm and motivation, as well as external factors originating from their surroundings (Karisma et al., 2023). This situation results in many students receiving low grades due to a lack of in-depth understanding and inadequate problem-solving skills.

To address this issue, one solution is to use learning media. According to Agustira & Rahmi, (2022), learning media is a crucial element in enhancing student learning. The use of media creates engaging learning experiences, enabling students to clearly understand what they have seen. Using a place value board as a learning medium encourages students to understand the concept of place value well (Ni'mah et al., 2024). Learning media can make abstract concepts more concrete and understandable, increase student engagement and activity in the learning process, and allow students to learn repeatedly at their own pace.

Place value is a fundamental mathematical concept, as it is not only useful for reading and writing numbers, but more importantly, it helps students understand various arithmetic operations (Puspasari & Sulistyowati, 2024). (Pepayosa et al., 2025) state that the use of less engaging learning media can be a cause of low student numeracy skills. Therefore, place value media can be used because it is able to display numbers visually and concretely through number cards, place value blocks, or place value boards. This media helps students understand the difference between units, tens, hundreds, and

thousands, so that they do not just memorize, but truly understand the position and value of each digit in a number. By using attractive displays that can be touched or moved exclusively by students, place value media also increases focus and enthusiasm, and makes it easier for teachers to explain concepts that are often considered difficult.

The use of interactive learning media not only produces more engaging material but also provides a more effective medium for understanding complex concepts (Handayani, 2024). In addition to using learning media, a solution that can address this problem is to directly involve students in discussions, group work, interactive Q&A sessions, and educational games so that students not only listen to the teacher's explanation but also think and participate. Games help increase student confidence and create positive experiences that encourage greater enthusiasm for learning mathematics (Suhendar & Yanto, 2023). Teachers can also use questioning techniques that spark curiosity, encouraging students to think and find their own answers. Furthermore, providing concrete models relevant to everyday life can help students grasp concepts more easily.

METHODS

Research Design

The research method used in this study is quantitative research. Quantitative research is a research method based on the philosophy of positivism, used to examine a specific population or sample, using commonly used sampling techniques, data collection using research instruments, and quantitative or statistical data analysis with the aim of testing a predetermined hypothesis (Sugiyono, 2023:10). The type of research used is a Quasi-Experimental Design, which is widely used in education to investigate causal relationships when subject randomization is not possible. Quasi-Experimental Design is designed to approximate the conditions of true experimental research while adjusting to various practical limitations that often occur in real classroom environments. This study uses a Nonequivalent Control Group Design, a design that involves the use of experimental and control groups without randomization. The experimental group received treatment through the implementation of the Place Value Board learning media, while the control group continued to follow conventional learning methods. The purpose of using this design is to evaluate the effect of the independent variable, namely the learning media, on the dependent variable such as student learning outcomes. The Quasi-Experimental Design method is considered appropriate for classroom-based research because it allows testing of interventions without disturbing the natural conditions of the learning environment (Hermawan, 2020). Although the absence of randomization can introduce certain biases, rigorous statistical analysis and the administration of a pretest help minimize potential threats to validity. Thus, this approach provides a structured framework for assessing the effectiveness of the Place Value Board learning media in a realistic educational context.

Quasi-experimental designs are valuable in educational research because they allow researchers to conduct systematic comparisons between groups under relatively controlled conditions, despite various limitations. In this study, a nonequivalent control group design was chosen to facilitate a balanced comparison between two intact classes that could not be randomly assigned. Pretests were administered to both the experimental and control groups to assess initial equivalence before the treatment was administered. This step is crucial to ensure that any differences emerging after the intervention can be more confidently attributed to the independent variable, rather than to pre-existing differences. The use of pretest and posttest measures strengthens the internal validity of the research design. Furthermore, a nonequivalent control group design has the advantage of reflecting real-world learning conditions, thereby enhancing the external validity of the findings (Sudrajat, 2025). By integrating these methodological considerations, the study provides meaningful insights into how game-based learning media can influence motivation.

Participants

The research sample in this study consisted of elementary school students purposively selected to represent the third-grade student population. A total of 40 third-grade students were initially involved in the pilot phase to test the validity and reliability of the learning outcome instrument. In the main experimental phase, two intact classes from the third-grade level were involved and divided into an experimental group (EC) and a control group (CC). The experimental group was taught using the Place Value Board learning media, while the control group received instruction through conventional

methods. Both groups took a pretest and posttest so that researchers could measure differences in learning outcomes before and after the intervention (Widodo, 2021). This sampling design followed the nonequivalent control group model, which is commonly used when randomization is not possible in educational contexts. The sample selection process ensured that both groups had similar academic characteristics, thus increasing the comparability of the research results.

Instruments

The instrument used in this study was a mathematics learning achievement test on the place value of whole numbers up to 1,000 for third-grade elementary school students. The test was an objective, multiple-choice test consisting of 20 questions. This test served as a pretest and posttest to measure students' initial abilities and learning outcomes after implementing the Place Value Board learning media. To obtain a valid and reliable instrument, the learning achievement test was piloted on 40 third-grade elementary school students outside the research sample. Construct validity was tested using Exploratory Factor Analysis (EFA), while reliability was analyzed using Cronbach's Alpha using the JAMOVI application version 2.7.12. The analysis showed that the instrument had a Cronbach's Alpha value of 0.993, which is considered highly reliable. Therefore, the test instrument was deemed appropriate and can be used to measure student learning outcomes accurately and consistently.

Data Analyis

Instrument Test

This study used a test as a learning outcome instrument. The scores obtained can be said to have a high correlation with the actual scores, indicating that the instrument is reliable. Reliability can be defined as the correlation coefficient between scores obtained from measurements using parallel tests. Based on this definition, a test is considered reliable if the measurement results are very close to the actual conditions of the test participants (Ewing & Park, 2020). To calculate reliability, the JAMOVI application version 2.7.12 was used. A value ≥ 0.70 is usually considered reliable enough for social, educational, and psychological research. This is the most commonly used limit by researchers (Nunnally, 1978). Nunnally (1978) stated that the minimum limit for Cronbach's Alpha is 0.70. The following Cronbach's Alpha values are presented in Table 1.

Table 1. Cronbach's Alpha Values and Interpretation

Cronbach's Alpha	Interpretation
≥ 0,90	Excellent
0,80 – 0,89	Good
0,70 – 0,79	Acceptable
0,60 – 0,69	Questionable → Still acceptable for exploratory research
0,50 – 0,59	Poor
< 0,50	Unreliable

(George & Mallery, 2003; DeVellis, 2016)

Reliability (U) in a test is generally expressed numerically as a coefficient ranging from -1.00 to +1.00. High reliability is indicated by a high coefficient, while a low test score is associated with low reliability. If reliability reaches a perfect level, the reliability coefficient is +1.00. Ideally, the reliability coefficient should be positive. Reliability is also closely related to measurement error. High reliability indicates that errors in obtaining measurement results are very minimal. In other words, the higher the reliability of an instrument, the smaller the measurement error. Conversely, if the reliability of test scores is low, the measurement error will be greater.

This study employed construct validity, which measures the extent to which an instrument is able to reveal a particular ability or theoretical construct it is intended to assess. The construct validation process begins with identifying and formulating the variables to be measured, then expressing these variables in the form of logical constructs based on relevant theory. From this theory, practical consequences related to the measurement results under certain conditions are derived, and these consequences are then tested. If the results are in accordance with expectations, the instrument is considered to have good construct validity (Mahmud, 2011). In this study, because mathematical creative thinking ability is an extension of creative thinking skills, metacognitive abilities, and learning

readiness, which are relatively new concepts, further exploration of the factors related to these variables is necessary. Construct validity in this study was determined using Exploratory Factor Analysis (EFA), which is used when the measurement model of an instrument construct is still in the exploratory stage. Next, the computer generates a variance-covariance matrix and calculates eigenvalues, which are used to determine the percentage of explained variance and to create a scree plot. Construct validity was assessed using the JAMOVI application version 2.7.12.

Assumption test

For operational product testing, this study used a quasi-experimental design. Before data analysis was conducted, two prerequisite tests were conducted: first, a normality test aimed at determining whether the data from each variable were normally distributed. The normality test was applied to learning motivation data (pretest and posttest) collected from two classes, namely the control class (KK) and the experimental class (KE). The data were then analyzed statistically using Jamovi version 2.7.12 with the Shapiro-Wilk Multivariate Normality Test to evaluate the normality assumption. If $p > 0.05$, the data were considered normally distributed; if $p < 0.05$, the data were considered not normally distributed. The normality test was conducted on the pretest and posttest scores. The criteria for hypothesis testing are as follows:

H_0 : Normally distributed data

H_1 : Data is not normally distributed

The homogeneity test was conducted to determine whether the samples used in the study came from populations with the same variance. This process was carried out using Jamovi version 2.3.28. Homogeneity is determined based on the significance value (sig.); if sig. > 0.05, the data is considered homogeneous, whereas if sig. < 0.05, the data is considered inhomogeneous. The homogeneity test was applied to pretest and posttest data. The criteria for hypothesis testing are as follows:

H_0 : Homogeneous group

H_1 : Non-homogeneous group

The field trial used a nonequivalent control group design, which is similar to a pretest-posttest control group design. This design allows for comparisons between the control and experimental classes, allowing researchers to assess the effect of the intervention while also accounting for initial differences between the two groups.

Eksperiment (KE)	Pretest measure O_1	Treatment X_1	Posttest measure O_2
Control (KK)	Pretest measure O_3	Treatment -	Posttest measure O_4

Figure 1. Quasi-Experimental Design with Nonequivalent Control Group Design Hypothesis Testing

To determine the difference in average scores between the control and experimental classes, an independent sample t-test was used. Before hypothesis testing was conducted, all prerequisite tests had been carried out to ensure data suitability (assumption testing). The t-test was used to examine the effect of the independent variable, namely learning using the Place Value Board media on the material of Whole Numbers Up to 1000, on the dependent variable which included motivation. The analysis was conducted using JAMOVI version 2.7.12, with a significance level of 5% ($\alpha = 0.05$). The research hypothesis was formulated as follows:

H_0 : There is no significant difference in learning outcomes between students who receive learning using the Place Value Board media and students who do not use it.

H_a : There is a significant difference in learning outcomes between students who receive learning using the Place Value Board media and students who do not use it ($\mu 1 \neq \mu 2$).

This design allows for researching the effect of treatment with control and experimental groups, there is a clear comparison between the experimental group and the control group, so that the impact of the Place Value Board learning media on student learning outcomes can be assessed reliably..

RESULTS

Results

The results of this study provide an overview of the quality of learning motivation instruments and the influence of place value board learning media on the learning outcomes of class III students.

Instrument Test

This study used a learning outcome instrument in the form of a test consisting of 20 questions. The test was piloted on 40 third-grade elementary school students to assess the instrument's reliability and validity. Based on the results of the learning outcome instrument test, analyzed using the JAMOVI application, the research findings are presented.

Table 2. Scale Reliability Statistics

Mean	Cronbach's α
0.771	0.993

Based on the results of the reliability analysis in Table 2, *Cronbach's Alpha* value of **0**.993 was obtained, indicating that the learning outcome instrument used in this study was in the Excellent category according to the reliability interpretation criteria according to George & Mallery (2003) and DeVellis (2016). This value exceeds the minimum reliability limit of 0.70 as recommended by Nunnally (1978), so it can be concluded that the test instrument has high internal consistency. High reliability indicates that the scores obtained have a strong correlation with the actual scores, so that the measurement error is relatively small. In the context of reliability theory, a coefficient of 0.993 indicates that the instrument is able to measure learning outcomes stably and accurately, and is close to the actual conditions of students. In addition, the average value (Mean) of 4.40 indicates a tendency for students' answers to be in the High category, which strengthens that the test items are well accepted and understood. Thus, the instrument used in this study met adequate reliability standards, making it suitable for measuring III grade students' learning motivation consistently and reliably.

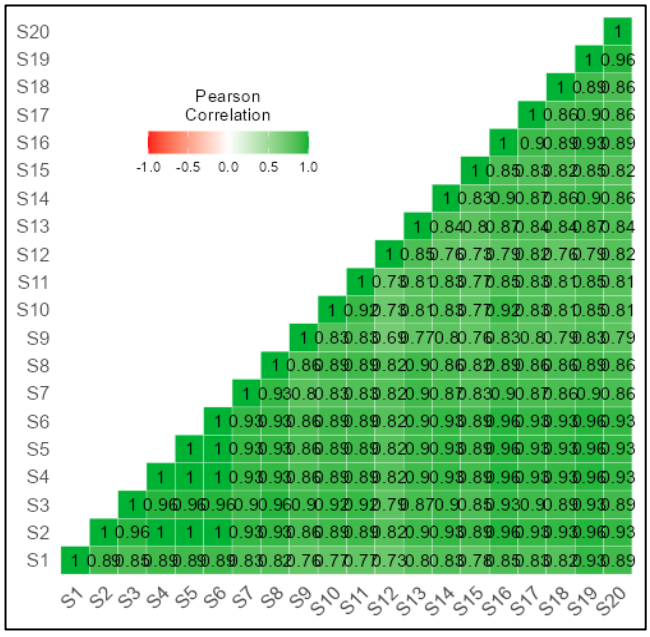

Figure 2. Correlation Heatmap Reliabilitas Instrumen Motivas**i**

These reliability results are further strengthened by the correlation heatmap, which is dominated by green, illustrating a positive correlation between the items in the instrument. The green color on the heatmap indicates that each item is harmoniously related to the others, so that all items work in the same direction to measure the construct of learning motivation. Consistent positive correlations between items are an important indicator of internal coherence in the instrument, a key prerequisite for a high Cronbach's Alpha value. Therefore, the combination of the reliability coefficient of 0.993 and the positive correlation pattern depicted in the heatmap confirms that this learning outcome test instrument

is not only reliable but also well-structured and capable of consistently measuring the construct of learning outcomes in III grade students.

The results of the construct validity test in Table 3 show that the Bartlett's Test of Sphericity value is $\chi^2 = 403$ with df = 190 and $p < .001$. This very small significance value indicates that the correlation matrix between instrument items is not identical, so there is a strong enough relationship between items to conduct factor analysis. In theory, the Bartlett's Test is used to check whether the correlation between variables is large enough and meaningful to be worthy of further analysis through Exploratory Factor Analysis (EFA). When the p value < 0.05, this indicates that the correlation between items is significant, which means the instrument has an internal relationship structure adequate for the formation of a theoretical construct. Thus, the results of the Bartlett test in this study support that the data meets the requirements for the factor extraction process in order to assess construct validity.

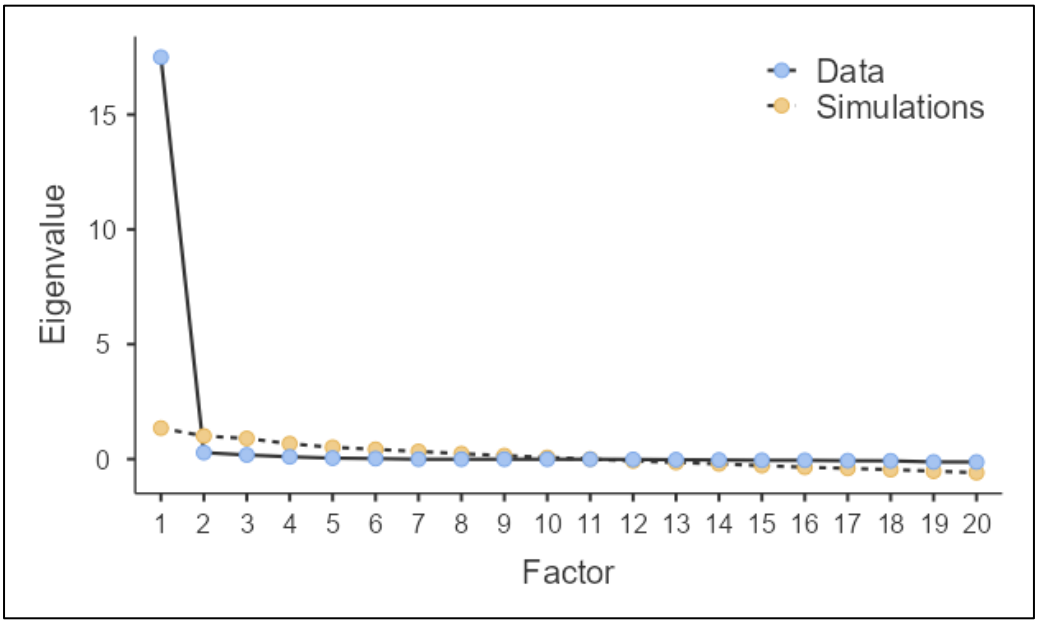

Figure 3. Scree Plot Exploratory Factor Analysis (EFA)

Table 3. Bartlett's Test of Spherecity

df	p
190	<.001

The findings from the scree plot in Figure 3 further corroborate Bartlett's results, as the scree plot shows a clear one-factor drop before the line begins to flatten (elbow). This indicates that there is only one dominant factor explaining most of the variance in the data. Theoretically, when a scree plot shows one main factor, the instrument is considered unidimensional, meaning that all items consistently measure the same core construct in this context, namely learning outcomes. The agreement between the results of the scree plot and Bartlett's test indicates that the internal structure of the instrument is very strong and consistent along one main dimension.

One of the research problems in this study is to test the effect of place value board learning media on the learning outcomes of third-grade elementary school students. To answer this problem, this study uses a quasi-experimental method with a pretest-posttest design. Therefore, it is necessary to calculate the results of the pretest and posttest. The test was conducted on 40 elementary school students, consisting of 20 students in the control class (who learned using conventional learning methods) and 20 students in the experimental class (who learned using place value board learning media). The control class was implemented at SDN 1 Demuk in grade 3, while the experimental class was implemented at SDN 1 Karangtalun in grade 3.

Assumption Test

The test consists of 20 questions from the learning outcomes questions that have been validated and tested for reliability. Because this study uses a nonequivalent control group design, measurements

are required for both pretest and posttest data. Mathematics learning motivation data (pretest and posttest) were collected from two classes, namely the control class (KK) and the experimental class (KE), then analyzed statistically using Jamovi version 2.7.12 to test the assumptions of normality and homogeneity. Table 4 shows a p-value of 0.140 for the pretest and 0.151 for the posttest, both of which are greater than 0.05. This indicates that the data are normally distributed, and the null hypothesis (H_0) is accepted.

Table 4. Normality Test (Shapiro-Wilk)

W	p
0.981	0.712
0.981	0.734

Table 5. Homogeneity of Variances Test (Levene's)

	F	df	df2	p
Pretest	0.473	1	38	0.657
Postest	0.359	1	38	0.552

Table 5 shows a p-value of 1.000 for the pretest and 0.552 for the posttest, both of which are greater than 0.05. This indicates that the data are homogeneous, and the null hypothesis (H_0) is accepted. The prerequisite tests for conducting an independent sample t-test have been met, namely the data are normally distributed and homogeneous, thus allowing further testing. Next, an independent sample t-test was conducted.

Hypothesis Testing

Table 6. Independent Samples T-Test

	Statistic	df	p
Student's t	-1.02	38.0	0.314
Student's t	-13.03	38.0	<.001

Based on Table 6, the results of the Independent Samples T-Test show that in the pretest, the t-value was -1.02 with a degree of freedom (df) of 38.0 and a p-value of 0.314. This p-value greater than 0.05 indicates that there was no significant difference between the average scores of the control and experimental groups before the intervention, so that both groups were in a balanced initial condition. Meanwhile, in the posttest, the t-value was -13.03 with a df of 38.0 and a p-value <0.001 indicating a significant difference between the control and experimental groups after the intervention. A negative t-value indicates that the average score of the experimental group was higher than that of the control group. This confirms that the use of place value board learning media has a significant effect on the measured variables, both learning outcomes, and the differences that appear in the posttest can be attributed to the treatment given, not because of the initial conditions of the two groups. Thus, the place value board learning media is proven to be effective on student learning outcomes in the subject of place value of whole numbers up to 1,000.

DISCUSSION

Based on the research results, the implementation of the Place Value Board media can have a positive influence on the learning outcomes of third-grade elementary school students. According to Multahada (2025) the use of concrete media such as a value board can help students visualize abstract mathematical concepts. The Place Value Board can help students develop and discover techniques for solving problems, embedding concepts, improving understanding, building skills, and motivating

students to learn (Kurnia et al., 2023). Through the place value board media, the learning atmosphere becomes more enjoyable and less monotonous. This condition helps reduce student boredom in mathematics learning which previously tended to be abstract and teacher-centered.

The purpose of this study was to examine the effect of place value boards on the learning outcomes of third-grade elementary school students. Place value is the foundation for learning broader topics, such as arithmetic operations. Although this material is considered easy, many students still experience significant difficulties in understanding these mathematical concepts (Afifah et al., 2022). Therefore, the use of concrete and engaging learning media such as place value boards is crucial to facilitate understanding of place value. By using these media, students more easily understand the meaning of each number based on its position in a whole number (Novendra et al., 2024). This makes learning more effective, engaging, and helps students better understand the concept of place value in whole numbers.

Figure 4. Place Value Board media

Learning media is an important part that plays a very important role in supporting the achievement of an effective and successful learning process (Devita et al., 2025). The use of concrete and interactive learning media such as place value boards helps students to visualize abstract concepts, making it easier for them to remember and apply these concepts. This media also increases students' active participation in the learning process, reduces boredom, and strengthens their memory of the information obtained (Happynees et al., 2025). With real and interactive learning media, students not only receive theoretical explanations but can also see and operate learning objects directly, so that the learning process becomes more meaningful and not boring for students (Nabilah & Muthi, 2025). Therefore, the use of place value boards can help students understand the concept of place value better, increase active involvement in class, and help them remember and apply the concept in solving other, more complex mathematical problems.

Based on the use of learning media, media are needed that can help students understand important concepts in the learning process (Maharani et al., 2025). The use of appropriate learning media can increase students' attention and motivation in learning. Interesting and interactive media encourage students to actively engage in the learning process, not only as listeners, but also as participants who do, observe, and try things themselves. Learning media refers to anything that facilitates the delivery of messages to encourage students to consciously engage in the learning process and focus on their goals (Awallya et al., 2025). In addition, learning media helps teachers explain material systematically and clearly. With the help of media, difficult concepts can be simplified and presented in a form that is easier to understand according to the characteristics of student development.

The use of place value boards has several advantages in mathematics learning, particularly in place value. This tool helps students transform abstract mathematical concepts into more concrete and visual representations, allowing them to directly see how each digit in a number has meaning according to its position. In this way, students can develop a stronger understanding of number structure and place value relationships, which is often difficult to achieve through verbal explanations alone (Hijraningsih et al., 2024). Furthermore, the use of place value boards has been shown to increase student engagement and learning outcomes, as the learning process becomes more interactive, engaging, and relevant to their concrete experiences in constructing numbers (Amalia et al., 2024). Research in the context of elementary education shows that this tool not only improves students' understanding of the concept of place value but also encourages active participation and motivation in learning mathematics overall.

The use of place value boards in mathematics learning has many advantages, but also has several disadvantages that need to be considered. One of its drawbacks is that it requires relatively longer preparation time and requires adjustments to teaching methods, as teachers must prepare appropriate media and activities to ensure students are actively engaged in learning. This can increase the teacher's workload, especially in large classes or when time is limited (Puspitasari et al., 2024). Furthermore, this medium is sometimes less flexible for varying questions or high levels of difficulty, so students who have mastered basic concepts quickly still need additional challenges through other learning methods. These findings imply that the effective use of place value boards requires careful instructional planning, adequate teacher preparation, and integration with complementary learning strategies to maximize students' conceptual understanding and accommodate diverse learning needs. This also shows that although place value boards are helpful in visualization, their effectiveness depends heavily on the teacher's ability to integrate the medium seamlessly into the learning context. If implemented suboptimally, student understanding will be uneven (Azh-Zahra et al., 2024). Therefore, obstacles such as preparation time and adjustments to teaching methods often arise when this medium is implemented in concrete classroom learning practices.

CONCLUSION

This study concluded that the use of Place Value Board learning media significantly improved the mathematics learning outcomes of third-grade elementary school students on the place value of whole numbers up to 1,000. Learning utilizing concrete media helped students understand the concept of place value more clearly and meaningfully than conventional, abstract, teacher-centered learning. The analysis showed that the initial abilities of students in the experimental and control classes were comparable before the treatment. After the implementation of the Place Value Board, student learning outcomes in the experimental class improved significantly compared to the control class. This demonstrates that visual and manipulative learning media can increase student engagement, strengthen conceptual understanding, and support the mathematics learning process more effectively. Overall, this study confirms that the selection and use of appropriate learning media play a crucial role in improving the quality of mathematics learning in elementary schools. This study was limited to third-grade students in a single elementary school and focused only on the topic of place value of whole numbers up to 1,000, which may limit the generalizability of the findings to other grade levels, mathematical topics, and educational contexts. Therefore, the use of concrete learning media such as the Place Value Board should be considered as a strategic alternative for creating more meaningful and sustainable learning in the context of elementary education.

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