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MASTER Learning Model: Motivating, Acquiring, Searching, Triggering, Exhibiting, and Reflecting toward Students' Mathematical Reasoning

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Abstract: MASTER Learning Model: Motivating, Acquiring, Searching, Triggering, Exhibiting, Reflecting toward Students Mathematical Reasoning. Objectives: This study aims to analyze the effect of the MASTER learning model (motivating, acquiring, searching, triggering, exhibiting, and reflecting) on students' mathematical reasoning. **Methods:** This study is classified as a quasi-experiment involving participants engaging fifth-grade students in two Sidoarjo primary schools. The study design was a pre-test, post-test-only control group involving the experiment and control classes. The experiment class implemented the MASTER learning model, and the control class implemented conventional learning. Learning in both classes used the same material, namely building space. The sample was selected using a purposive sampling technique, with one class in one primary school in Sidoarjo as the experimental class and one primary school in Sidoarjo as the control class. The study instrument used a mathematical reasoning test to measure three components of mathematical reasoning: analysis, generalization, and justification. Validity and reliability tests were conducted before the mathematical reasoning test was used. Data analysis used descriptive and inferential. Descriptive analysis includes the calculation of mean, standard deviation, and effect size. Meanwhile, inferential analysis uses an independent t-test with two prerequisite tests: normality and homogeneity. **Findings:** This study's result shows a significant impact of the MASTER learning model on students' mathematical reasoning. In this case, the effect size is confirmed in the large category of mathematical reasoning. Descriptive study results show that there is a difference between students who follow MASTER learning and students who follow conventional learning. The difference can be seen in the value of students' mathematical reasoning component. In this case, the highest to smallest differences in mathematical reasoning components are analysis, justification, and generalization. **Conclusion:** The MASTER learning model can significantly impact enhancing students' mathematical reasoning in elementary school. Consecutively, enhancing mathematical reasoning is confirmed in the components of analysis, justification, and generalization.

Keywords: MASTER learning model, mathematical reasoning, primary students.

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INTRODUCTION

Mathematical reasoning is a logical thinking skill in mathematics about problems to obtain a completion involving numbers, patterns, and mathematical concepts (Hjelte et al., 2020). Mathematical reasoning often focuses on two aspects, namely cognitive and metacognitive (Cai & Leikin, 2020). Students' mathematical reasoning is applied as a foundation in mathematics learning. According to Kliziene et al. (2022), explained that the foundation of primary students' mathematical reasoning can be impacted by several factors, which include cognitive, metacognitive, and social aspects of mathematical learning. Mathematical reasoning enhances cognitive skills and supports other skills, such as decision-making and adapting to new situations. In addition, according Herbert (2021), good mathematical reasoning for students can equip students to face academic challenges with self-confidence and understanding.

In primary education, mathematical reasoning is critical to pay attention to because it can train students' thinking activities to solve problems in mathematics (Buchbinder & Mccrone, 2022). According to Kaitera and Harmoinen (2022), mathematical reasoning is essential in primary education because it helps students develop complex problem-solving skills and implement mathematical principles in real life. According to Palinussa et al. (2021), mathematical reasoning is crucial for primary students because it supports the development of logical thinking, problem-solving, and mathematical communication skills. In addition, reasoning that is honed early on enhances students' adaptation skills in problem-solving more complex mathematics at the next level. Therefore, Melhuish et al. (2018) explain that integrating mathematical reasoning in primary education is crucial to building analytical skills and supporting primary students' learning. If primary students do not implement mathematical reasoning, then students do not understand the material learned but only follow a series of learning procedures without knowing the meaning.

Currently, mathematical reasoning remains a significant challenge in education, where many students struggle to go beyond procedural understanding to deeper analytical thinking (Kaitera & Harmoinen, 2022). These difficulties include the inability to recognize patterns, make logical predictions, and present arguments that can be justified when facing non-routine mathematical problems, which are essential skills for higher-level thinking and future academic success. In addition, Herbert (2021), traditional teaching approaches that focus on memorization and closed problem-solving often do not prepare students to implement mathematical concepts in real-world contexts. According to Hidayat et al. (2020), low reasoning and mathematical communication have not received much attention in learning activities in class. At this time, mathematical reasoning can also be considered low because education in Indonesia still tends to focus on memorizing formulas or procedures rather than understanding material concepts deeply. The curriculum is often oriented towards routine problems and similar exercises, not including students developing problem-solving skills.

Mathematical reasoning still has problems for primary students. According to Klang et al. (2021), problems related to mathematical reasoning at the primary school level often stem from the lack of a learning approach that supports the development of students' mathematical understanding. Many students have difficulties contextualizing mathematical concepts because learning focuses on procedural exercises rather than meaningful problem-solving exploration. In addition, according to Yuanita et al. (2018), the lack of support for various mathematical representations, such as verbal, visual, and symbolic, limits students' understanding of various points of view when problem-solving. These conditions are exacerbated by students' low confidence in mathematics, which is often impacted by teaching methods that are not adaptive enough to individual needs.

The MASTER learning model (motivating, acquiring, searching, triggering, exhibiting, and reflecting) is expected to overcome mathematical reasoning problems. This is because, according to Supriadi et al. (2024), the problem of low mathematical reasoning can be overcome by critical, creative, and reflective learning. Meanwhile, the MASTER learning model has characteristics of learning problem-solving activities that can activate logical reasoning (Putra et., 2024), so that it can stimulate critical thinking, creative thinking, and reflective thinking (Djakaria et al., 2021). In this case, the fundamental difference between the MASTER learning model and other learning models is cognitive stimulation based on deep learning, logic, and problem-solving (Kastira & Irwan, 2023; Purnamawati et al., 2020; Suherman et al., 2021). The stimulation is reflected in each of the stages of motivating, acquiring, searching, triggering, exhibiting, and reflecting (Sabirin et al., 2022).

Previous studies only focused on the MASTER learning model in addition to students' mathematical reasoning. Earlier studies discussed the MASTER learning model on mathematical connection skills (Suparti & Netriwati, 2021), mathematical problem-solving skills (Nurhudaeni, 2022), mathematical literacy (Ani et al., 2019), mathematical concept understanding skills (Maharani et al., 2023), mathematical connection skills (Ardiani et al., 2021). Another study similar to the MASTER learning model is about the accelerated learning method, which has similar principles. This study focuses on the comparison of mathematics learning outcomes compared to conventional methods (Asrawati & Sulaiman, 2020). Thus, the existing state of the art shows no study on the MASTER learning model towards students' mathematical reasoning.

Previous empirical evidence conducted by researchers shows that primary students' mathematical reasoning in Sidoarjo is still inadequate. Logical reasoning by primary students is in the low category (Windari & Amir, 2020). Primary students have difficulty reasoning in conceptual and procedural knowledge (Devi & Amir, 2021; Magfirotin & Amir, 2024). Primary students' reasoning difficulty in making divergent solutions in solving mathematical literacy problems (Utami & Amir, 2023), one of the skill difficulties is due to comprehension errors (Mubarokah & Amir, 2024). Recent studies have also shown similarly that primary students have inadequate mathematical reasoning in generalizing the statement (Romadhon et al., 2024).

Based on the above studies, the study wants to test whether the MASTER learning model can enhance the mathematical reasoning of primary students, especially in Sidoarjo. In addition, according to Wathne and Brodahl (2019), although the design-based approach and contextualized learning can connect abstract concepts with concrete situations, the systematic implementation of MASTER to develop logical thinking, conclude, and construct mathematical arguments at the primary school level is rarely discussed in depth in the current literature. The gap study related to MASTER learning model components and mathematical reasoning in primary students can be seen from the lack of empirical evidence that shows how each MASTER component can optimally support various aspects of mathematical reasoning. Therefore, this learning innovation can be used in achieving students' mathematical reasoning because the MASTER learning model makes students' mathematics learning fun and effective (Nurmasari et al., 2024). Therefore, this study aims to fill the gap by evaluating the effectiveness of integrating MASTER elements in supporting the mathematical reasoning of primary students.

METHOD

Participants

The participants were fifth-grade students in two Sidoarjo primary schools. Sampling from both schools was purposively selected. The purposive criteria to determine the sampling was based on inclusion and exclusion criteria. The inclusion criteria include students must be 10-11 years old; students must be classified as regular (not experiencing barriers to inclusion (e.g., cognitive, physical, or motor), and students must have a maximum mathematical reasoning score range of 2 in all aspects of analyzing, generalizing, and justifying. Meanwhile, the exclusion criteria were students who did not attend during the study or attended less than 50% of the meetings. A total sample of 39 out of 57 students was obtained through the inclusion and exclusion criteria. In this, the 39 students consisted of 22 students from the first and 17 from the second schools. Furthermore, the group of students in the first school was designated as the experiment class and the second school was designated as the control class.

Research Design and Procedures

The research design used is a pre-test and post-test-only control group design, which is classified as a quantitative quasi-experiment (Creswell & Guetterman, 2019). There are two classes: the first class is the experiment class, which is given the learning model treatment, and the second is the control class, which is not. Pre-tests and post-tests are intended to find out the initial and final conditions before learning in both classes. In this, the experiment and control classes consisted of 22 and 17 students respectively. Both classes were given pre-tests and post-tests to measure students' mathematical reasoning on building space material. Meanwhile, this study was conducted over eight weeks. In this, the first four weeks were focused on reviewing the literature review and making instruments. Furthermore, the second four weeks focused on the implementation of learning.

The research procedures consisted of nine stages. First, the literature review on the rationality of the MASTER learning model and mathematical reasoning. Second, making a research instrument regarding mathematical reasoning tests. Third, the validity and reliability of the mathematical reasoning test are tested to determine whether it is feasible to use or not. Fourth, inclusion and exclusion will determine the number of samples in the experiment and control class. Fifth, provide a pre-test in the experiment and control class to determine students' initial mathematical reasoning value before learning. Sixth, implement learning in the experiment and control classes for 8 meetings alternately. In this, there are 4 weeks with 2 meetings per week. The topics of building space that are discussed consecutively every week are understanding volume units, analyzing elements and volume of cubes and blocks, understanding how to determine the volume of cubes and blocks, and completing problems using volume units. The experimental class applied the MASTER learning model. Meanwhile, the experimental class applied conventional learning. Seventh, provide a post-test on the experiment and control class to determine students' final mathematical reasoning value after learning. Eighth, the normality and homogeneity values are counted as a prerequisite hypothesis test. Ninth, analyze data descriptively and inferentially.

Implementing the MASTER learning model follows the stages of motivating, acquiring, searching, triggering, exhibiting, and reflecting. Each MASTER activity is adapted from Colin and Nicholl (2002). Table 1 shows the details of learning activities in each MASTER stage. On the other hand, conventional learning is implemented by following the natural way of learning that the school usually does. Usually, conventional learning is implemented by providing material to students through the lecture method.

Instrument

The research instrument used is a mathematical reasoning test in the form of descriptions. The researcher developed the mathematical reasoning test based on synthesis and rubric to measure mathematical reasoning, which is based on the opinion of Loong et al. (2018). This test consists of 5 main problems

Table 1. Stage dan activity MASTER

Stage	Activity
Motivating	The teacher conditions the students to be ready to learn.
	The teacher retrieved the learning objectives that will take place.
	The teacher centralizes students' thoughts by showing motivational learning videos.
	The teacher retrieved the meaning of the video.
	The teacher guides students to write the desires achieved during the learning process.
Acquiring	The teacher takes a video about building spaces.
	The teacher provides students with opportunities to ask questions.
	The teacher explains the concept of the material with a PowerPoint to provide information.
Searching	The teacher gives students worksheets.
	Students identify a problem with a friend provided to obtain a problem.
	The teacher helps students if they have difficulty answering the problem.
	The teacher ensures that students are finished doing the questions.
Triggering	The teacher asks again about the material that has been learned in order to strengthen the student's memory.
Exhibiting	Students present the results of the worksheets that have been done.
	The teacher invites other students to ask questions or support the material.
Reflecting	Students reflect on shortcomings or difficulties experienced during the learning process.
	The teacher asks students to evaluate each other's performance.

about building space, with 12 sub-problems (4 sub-problems on 3 mathematical reasoning aspects: analyzing, generalizing, and justifying). In this, the pre-test and post-test have the same problem structure but differ in numbers. The synthesis and rubrics used as the basis to develop and measure mathematical reasoning are presented in Table 2.

Table 2. Assessment rubric of mathematical reasoning

Aspect	Students Response	Score
Analyzing	Not Justified	0
	Recalls random known facts	1
	Noting general properties or ranking cases	2
	Analyzing structures to form conjectures or make predictions about other cases	3
	Noticing and exploring the nature of	4
Generalizing	Does not communicate general properties or rules (conjectures)	0
	Attempt to communicate general properties or rules (conjectures) for patterns	1
	Communicating rules (conjectures) using mathematical terms	2
	Explain the meaning of the rule using examples	3
	Generalize cases, patterns, or properties using mathematical symbols and apply rules	4
Justifying	Does not justify	0

	Explaining what they are doing and recognizing what is right or wrong	1
	Attempt to verify by correcting errors (initial statement in a correct logical argument	2
	Testing the veracity of statements by confirming all cases	3
	Using arguments logically	4

Before the mathematical reasoning test instrument was used, the researcher checked its validity and reliability. The validity and reliability tests were conducted outside the school but within the same sample characteristics as this study. In addition, the instrument was also validated by two validators. The first validator is an expert in mathematical learning, and the second is an expert in the learning management model. Regarding the validity test, the validity test was conducted with a significance level of 5%. If the significance value is more than 0.05, the data is considered valid, and vice versa. If it is less than 0.05, the data is considered invalid. Meanwhile, the reliability test uses Cronbach's Alpha value, where the instrument is considered reliable if the value is more than 0.6. Based on the result analysis, the five tested items obtained significance values above 0.05. In addition, the reliability test showed a Cronbach's Alpha value of 0.964, which is larger than 0.6. Thus, the mathematical reasoning test was declared valid and reliable for use.

Data Analysis

Descriptive analysis uses the mean, standard deviation, and effect size. The mean and standard deviation values are intended to measure the centering size and deviation of the data so that the difference or proportion of mathematical reasoning in the control and experiment classes can be known. Effect size determines how large the difference or effect is between the treated group and the untreated group. Based on Cohen's formula, the effect size value can be categorized as small if 0.00 d" es < 0.50, medium category if 0.50 d" es < 0.80, large category if 0.80 d" es < 1.30, very large category if es d" 1 or es e"1.

Meanwhile, inferential analysis uses the independent t-test. The prerequisites for the independent test are the normality test and the homogeneity test. A normality test is used to find out whether the data obtained includes data that is normally distributed or not. The normality test can be assumed if the significance value is > 0.05, so the study data is distributed normally. At the same time, the homogeneity test is to determine whether the sample data comes from a homogeneous or non-homogeneous population. The homogeneous test can be assumed if the significance value is > 0.05, so the data distribution is homogeneous. Finally, the hypothesis was tested using independent t-tests to find the mean difference. The independent t-test can be assumed if the sig value. (2 tailed) < 0.05, then there is a significant difference between students' mathematical reasoning.

■ RESULT AND DISCUSSION

Implementing the MASTER learning model is based on stages and activities in motivating, acquiring, searching, triggering, exhibiting, and reflecting. MASTER is designed to stimulate the mind cognitively based on deep learning, logic, and problem-solving. Each stage is expected to activate primary students' mathematical reasoning. Figure 1 shows an overview of each stage conducted.

In Figure 1 of each meeting, the class experiment will be given students worksheets for each student. The learning process uses the MASTER (motivating, acquiring, searching, triggering, exhibiting, and reflecting) learning model. Stage "Motivating the Mind": Students are given a motivational video that aims to focus

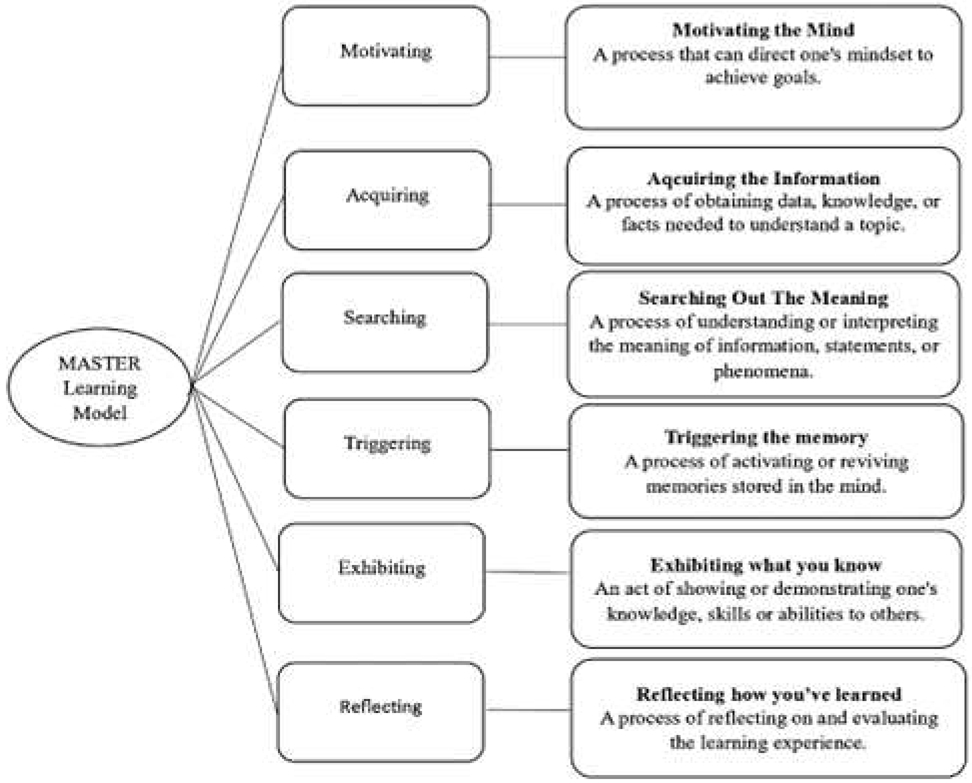

Figure 1. Stages MASTER learning model

the minds of students and can enhance students' learning motivation. Each student can pay attention to the motivation video shown. Stage "acquiring the information": Students are given material about building space by showing videos on the projector. After that, students are allowed to ask questions about the material from the video. This stage aims for students to obtain information. Stage "searching out the meaning": Students are given (a student worksheet) according to the material that has been learned. Students are working on questions and answers. This stage aims to dig for information that has been acquired or learned. Stage "triggering the memory": The teacher invites students to discuss each material item verbally, which aims to strengthen memory in students. Stage "exhibiting what you know": The teacher asks one of the students to present the answers given orally. Stage "reflecting how you have learned": At this stage, the teacher asks students to evaluate their performance by reflecting on short.

Normality Test

The normality test is a prerequisite test for knowing or discovering whether the data obtained includes normally distributed data or not. Normality tests use pre-post-test scores in the study. The normality test used is the Shapiro-Wilk test because the number of samples is less than 50. The normality test results are presented in Table 3.

Table 3. Normality test results

Group	Data Type	Sig. Level	Status	Explanation
Control	Pre-test	0.472	>0.05	Normal
	Post-test	0.448	>0.05	Normal
Experiment	Pre-test	0.110	>0.05	Normal
	Post-test	0.593	>0.05	Normal

The normality test results were calculated using the Shapiro-Wilk test, so that the significance level (sig.) of the pre-post-test in the experimental class and control class was obtained. In the experimental class, the sig. value was obtained in the pre-test 0.110> 0.05 and post-test 0.593> 0.05. While in the control class, the sig. value in the pre-test was 0.472> 0.05 and the post-test was 0.448> 0.05. By using a significance level of 0.05 or 5%, the pre-post-test data in the experimental class through the MASTER learning model and control through conventional learning are normally distributed.

Homogeneity Test

The homogeneity test determines whether the sample data comes from a homogeneous or non-homogeneous population. Homogeneity tests use pre-test and post-test scores in the study. The homogeneity test results of students' mathematical reasoning pre-test and post-test data are presented in Table 4.

Table 4. Homogeneity test results

Data Type	Sig. Level	Status	Explanation
Experiment and Control Group Pre-test	0.612	>0.05	Homogeneous
Experiment and Control Group Post-test	0.697	>0.05	Homogeneous

The results of the homogeneity test in Table 3 show that the pre-test and post-test values in the experiment and control classes have the same significance level, which is greater than 0.05. The pretest value in the experiment and control class was 0.612, and the post-test value in the experiment and control class was 0.697. Therefore, the pre-test and post-test data in the experiment and control classes for students' mathematical reasonings' are declared homogeneous.

Descriptive Results

The descriptive results include the mean, standard deviation, and effect size. This aims to determine the difference in the pre-test and post-test mean and standard deviation values in the control and experimental classes. Table 5 shows the mean, standard deviation, and effect size of the students' mathematical reasoning data in the experiment and control classes.

Table 5 shows a difference in the mean value of the pre-test and post-test in the experiment and control classes. The mean value of the pre-test in the control class in students' mathematical reasoning obtained a mean value of 29.41 and SD 17.586. Meanwhile, the control class given conventional learning obtained a mean post-test value of 48.06 and an SD of 24.989. On the other hand, the mean pre-test value in the experimental class obtained a mean value of 57.32 and SD 17.053. Meanwhile, the experimental class treated with the MASTER

Table 5. Descriptive statistic of study data

Group	Data Type	Mean	Std. Deviation	N	Effect Size	Category
Control	Pre-test	29.41	17.586	17	1.68	Large
	Post-test	48.06	24.989	17		
Experiment	Pre-test	57.32	17.053	22		
	Post-test	84.00	20.468	22		

learning model obtained a mean post-test value of 84.00 and an SD of 20.468. In addition, the effect size score using Cohen's was obtained at 1.68 in the large category. This shows enhanced students' mathematical reasoning scores in the experimental and control classes, but the effect size due to the MASTER learning model is larger. In other words, the effect size of the MASTER learning model is in a large category compared to conventional learning. More specifically, Figure 2 visualizes the mean pre-test and post-test values in the experimental and control classes, more specifically in the three mathematical reasoning indicators.

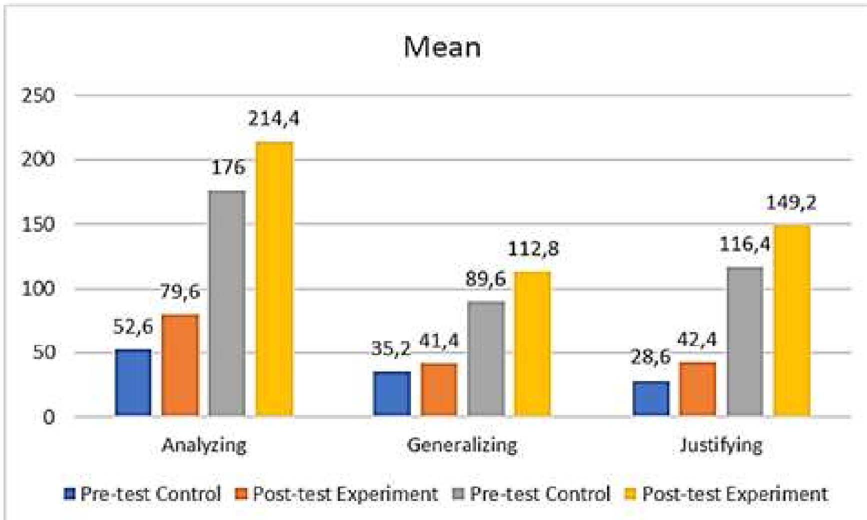

Figure 2. Visualization of mean on analyzing, generalizing, and justifying

Figure 2 presents the mean scores' differences in analyzing, generalizing, and justifying. In analysis, the pre-test and post-test for the control class were 52.6 and 79.6, while for the experimental class were 176 and 214.4. In generalizing, the pre-test and post-test for the control class were 35.2 and 41.4, while for the experimental class were 89.6 and 112.8. In justifying, the pre-test and post-test for the control class were 28.6 and 42.4, while for the experimental class were 116.4 and 149.2. This shows an increase in all components of mathematical reasoning in the control and experimental classes, but the highest increase occurs in the experimental class. The ′highest increase successively occurred in analyzing, generalizing, and justifying. Thus, visually, there is an increase in students' mathematical reasoning, which is higher in MASTER learning than in conventional learning. The largest increase occurred in the analyzing component and the next smaller ones were generalizing, and justifying.

Inferential Results

After conducting statistical tests, namely normality tests and homogeneity tests. Furthermore, the overall hypothesis test was conducted to determine whether the experimental and control classes had a significant average difference or impact. The results of the overall hypothesis test (independent t-test) of students' mathematical reasoning pre-test and post-test data are presented in Table 5.

The independent-test hypothesis testing in Table 5 shows a difference between the pre-test in the experiment control class and the post-test in the control class. In the pre-test data between the experiment and control classes, the null

Table 5. Hypothesis test results independent-test

Group	Sig. Level	Result
Experiment and Control Pre-test	0.017	H0 Rejected
Experiment and Control Post-test	0.000	H0 Accepted

hypothesis significance level (H0) is greater than 0.005, so there is acceptance from both classes. Thus, there is no significant difference in students' mathematical reasoning. This shows that the experiment and control classes have the same mathematical reasoning before applying the learning model. In contrast to the results of the post-test data, the experiment class and control class obtained a null hypothesis (H0) significance level value smaller than 0.005. This significantly enhances mathematical reasoning for students who follow the MASTER learning model compared to those who follow conventional learning. Furthermore, Table 6 shows the hypothesis test results on each mathematical reasoning indicator.

Table 6. Hypothesis test results for mathematical reasoning components

Group	Indikator Mathematical Reasoning	Sig. (2 tailed)	Result
Experiment and Control Pre-test	Analyzing	0.000	H0 Rejected
	Generalizing	0.011	H0 Accepted
	Justifying	0.008	H0 Accepted
Experiment and Control Post-test	Analyzing	0.000	H0 Rejected
	Generalizing	0.001	H0 Rejected
	Justifying	0.000	H0 Rejected

Based on the independent-test hypothesis testing in Table 6, there is a difference between the pre-test in the experiment control class and the post-test in the experiment control class, which is solved in three mathematical reasoning indicators. The pre-test data between the experiment and control classes on the analyzing indicator obtained a significance level value of the null hypothesis (H0) smaller than 0.005, so the alternative hypothesis (Ha) is accepted. Meanwhile, in the generalizing and justifying indicators, the null hypothesis significance level value (H0) is larger than 0.005, so the alternative hypothesis (Ha) is rejected. This shows that before the application of learning in the experimental and control classes, students had the same mathematical reasoning on the generalizing and justifying indicators. In contrast to the results in the post-test data, the experiment class and control class from all indicators of analyzing, generalizing, and justifying obtained a null hypothesis significance level value (H0) smaller than 0.005, then the alternative hypothesis (Ha) is accepted. This significantly enhances each mathematical reasoning indicator for students who follow the MASTER learning model compared to those who follow conventional learning.

This study produced several findings that can be categorized into two groups. The first finding is that the MASTER learning model significantly affects students' mathematical reasoning, with the effect size of mathematical reasoning being in the large category compared to conventional learning. Although no study is the same, the findings of this study can be said to be in line with the findings of other studies that use experimental methods in the implementation of the MASTER Learning model. In this, other studies have found that the MASTER learning model has a significant effect on the variables it targets, including significance on mathematical connection skills (Suparti & Netriwati, 2021), mathematical problem-solving skills (Nurhudaeni, 2022), mathematical literacy (Ani et al., 2019), mathematical concept understanding skills (Maharani et al., 2023), and mathematical connection skills(Ardiani et al., 2021). Another study also showed similar findings, for instance, accelerated learning has a significant impact on mathematics learning outcomes compared to conventional learning (Asrawati & Sulaiman, 2020). This is because Colin and Nicholl (2002) as the originator of the MASTER learning model, this model supports student cognitive acceleration.

The second finding is that the mathematical reasoning component with the highest difference between students who follow MASTER learning and conventional learning is analysis, followed by justification, and the smallest is generalization. This finding is in line with the study by Maharani et al. (2023), which revealed that the MASTER approach could enhance students' analysis skills more significantly than other aspects because this model's searching and triggering phases encourage in-depth exploration of concepts. In addition, Lestari and Sardin (2020) showed that problem-solving-based teaching-learning models also have more impact on enhancing analysis skills than justification and generalization because students are often trained to evaluate patterns and relationships before concluding. However, a study by Asrawati and Sulaiman (2020) founded that in accelerated learning, enhancing justification was more prominent than analysis, possibly due to the strong reflection-based approach in the model. This difference indicates that the effectiveness of each mathematical reasoning component depends on the structure and strategies in the learning model applied. Therefore, MASTER learning could be said to more effectively enhance mathematical reasoning regarding mathematical occure analysis skills while enhancing justification and generalization, which still occurs but with a smaller impact than the analysis aspect.

Each stage and activity of the MASTER model (motivating, acquiring, searching, triggering, exhibiting, reflecting) certainly has a specific role in helping enhance students' mathematical reasoning. The motivating stage fosters students' interest and motivation to learn knowledge. In this, students are given an interesting stimulus to build learning readiness and awareness of the importance of learning mathematics. Enhancing this motivation can affect students' mathematical reasoning skills because motivated students tend to be more active in learning (Aprilyanti, 2024). The next stage, acquiring, involves students understanding the illustration of a problem presented (Colin & Nicholl, 2002). Students are asked to read and understand the illustration of building space to identify relevant information. This process helps students acquire the mathematical knowledge and concepts needed to solve the problem. By understanding concepts deeply, students can develop better reasoning skills. The study shows that the acquiring stage can enhance students' mathematical reflective thinking skills, especially in interpreting the information provided (Maharani et al., 2023).

The searching stage provides an opportunity for students to explore further information and train their' skills in finding solutions to the problems faced (Colin & Nicholl, 2002). At this stage, students are faced with questions that encourage students to find mathematical concepts hidden in problem illustrations (Suharni, 2021). This activity trains students in finding information and solving problems independently, thus enhancing students' mathematical reasoning skills. Furthermore, the triggering stage triggers students to think critically and creatively when solving math problems. Students are given problems related to concepts that have just been discovered to strengthen student understanding. This stage challenges students to apply the concepts they have learned in different contexts, thus encouraging critical and creative thinking. The study shows that the Triggering stage can help students evaluate students' understanding and enhance their mathematical reflective thinking skills (Maharani et al., 2023).

At the exhibiting stage, students are allowed to communicate their mathematical ideas and receive feedback (Colin & Nicholl, 2002). Students present the results of their work to classmates, which allows students to articulate their understanding and receive constructive feedback (Suharni, 2021). This activity not only strengthens understanding of mathematical concepts, but also enhances students' mathematical communication skills. Finally, the reflecting stage helps students reflect on their learning process and enhance their understanding of mathematics. Students are invited to reflect on what they have learned, evaluate the strategies used, and consider how they can apply this knowledge in the future. This reflection process is important to consolidate learning and encourage the development of deeper mathematical reasoning. Studies show that the reflecting stage can help students evaluate and draw analogies, which are important components in mathematical reasoning (Aprilyanti, 2024).

The stages and activities of the MASTER learning mode can be explained in line with the principles of constructivism, this is because these stages and activities emphasize the active role of students in their knowledge (Steffe & Ulrich, 2020; Thompson, 2020). The motivating stage encourages students to be actively involved in learning under the constructivist view that students should actively participate in the learning process. The acquiring stage allows students to identify and understand mathematical concepts, which is the core of constructivism, where students build their understanding. Furthermore, the searching stage requires students to search for information and solutions independently, encouraging the development of students' problem-solving strategies. The triggering stage triggers critical and creative thinking, which is important in knowledge construction. In the exhibiting stage, students communicate their understanding, allowing for reflection and constructive feedback. Finally, the reflecting stage encourages students to reflect on their learning process, deepening understanding and enabling the integration of new knowledge into existing schemas (Colin & Nicholl, 2002). Thus, the MASTER model can also be concluded to effectively facilitate the process of knowledge construction during learning per the principles of constructivism.

■ CONCLUSION

Based on the data analysis and testing above, it can be concluded that there is a significant impact on students' mathematical reasoning who follow learning with the MASTER (motivating, acquiring, searching, triggering, exhibiting, reflecting) learning model and students who follow learning using conventional learning model. The significance of the impact can be seen from the components of mathematical reasoning in terms of analysis, justification, and generalization. The largest effect size occurs in analysis, followed by justification, and the smallest is generalization. Therefore, the MASTER learning model can be a comprehensive alternative solution for facilitating students' mathematical reasoning. Hence, a teacher can implement the MASTER learning model to enhance mathematical reasoning, especially for primary students.

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