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THE EFFECT OF THE STAD LEARNING MODEL WITH THE RME APPROACH ON THE MATHEMATICAL REASONING ABILITY OF JUNIOR HIGH SCHOOL STUDENTS FLAT SIDE SPACE BUILDING MATERIALS

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Abstract

This study aims to analyze the classical mastery of mathematical reasoning abilities in the STAD learning model with the RME approach and the direct learning model. Another goal is to analyze the comparison of mathematical reasoning abilities with the STAD learning model and the RME approach with the direct learning model. This is a quantitative study with a quasi-experimental design in the form of a posttest-only control design. The population is class VIII students of SMPN 3 Mertoyudan. Using the cluster random sampling technique, two classes were obtained as research samples, with class VIII C consisting of 32 students as the experimental class and class VIII D consisting of 26 students as the control class. The data analysis technique used is the Z test and the independent sample T test. The test results with the Z test, in the experimental class and control class, is accepted, meaning that the two classes have completed classically. The test results with the T test in both classes, H_0 *obtained* $t_{count}(2{,}09205) > t_{table}(2{,}003)$ *,then is rejected meaning that there is a difference in the mathematical reasoning abilities of the experimental class and control class students. After further analysis, the average value of the experimental class was* $H_0 79{,}21875$ *while the average value of the control class was. Based on the results of the study, it can be concluded that: 1) the mathematical reasoning abilities of students who apply the STAD learning model with the RME approach achieve classical mastery; 2) the mathematical reasoning abilities of students who apply direct learning models achieve classical mastery; and 3) the mathematical reasoning abilities of students who apply the STAD learning model with the RME approach are better than students who apply the direct learning model.* $70{,}19231$

Keywords: STAD Learning Model, RME Approach, Mathematical Reasoning Ability, Build Flat Sided Space

INTRODUCTION

Education is important for everyone. With education, humans are able to prepare resources to meet all the demands of the times. One of the fields of education that we must study is mathematics. However, the reality shows that mathematics is such a scary subject that most students consider it a scourge in school. Nevertheless (Dewita, 2019) Mathematics is one of the basic sciences that has an important role in daily life. One of the goals of learning mathematics is to have the ability to use students' mathematical reasoning. Mathematical reasoning plays an important role during time to think creatively, logically, and systematically, thus allowing students to deduce the solution of some known truths. Therefore, every student needs to have mathematical reasoning skills. One of the materials that requires good mathematical reasoning is geometry material. However, geometry material is one of the materials that is still considered difficult

for students to learn, although it is important, specially building flat side spaces. Based on the results of the pre-research test carried out in class VIII of SMPN 3 Mertoyudan, the average score percentage of the 4 indicators was set at 55.47%. This means that students' mathematical reasoning skills are still relatively low. Of the 32 students, only 4 students obtained a complete score or 12.5%, so the classical completeness of the class is in the category of less or incomplete because it has not reached the expected classical completeness of 70%(Octaviyunas & Ekayanti, 2018)(Astiati, 2020)(Maisyarah & Prahmana, 2020)(Rosyidah, Hidayanto, & Muksar, 2022). Based on the results of interviews with junior high school teachers 3 Mertoyudan, teachers have tried to improve students' mathematical reasoning through direct learning, lectures, questions and answers, and discussions. However, what teachers often use is the direct learning model. However, this effort is not enough to improve students' reasoning because the learning is still passive and tends to focus on the teacher.

From these problems, a learning system is needed that provides opportunities for students to actively participate in the learning process. The learning delivered in this way is emphasized in the application of the discussion. Such a learning model can be called cooperative learning. The Student Teams Achievement Division *(STAD)* learning model is one of the cooperative learning models that can be used. According to Afandi and Irawan (2013: 3), the essence of STAD is that the teacher presents a topic, and students then work in predetermined groups of four to six students to answer questions. Students then take a final test, after which the teacher and students calculate individual progress scores and award awards to the group with the highest score. In addition to actively involving students, students also need to get used to developing their own knowledge and applying it in more complex contexts, so that it will be more attached to students, one of which is the *Realistic Mathematics Education* (RME) approach. According to Saragih and Tamba (2022), RME is a mathematics-specific learning approach based on mathematics learning activities that are closely related to contextual problems that can be imagined as the beginning of developing and understanding mathematical concepts.

The STAD learning model with the RME approach can be used to make learning more varied and is expected to affect students' mathematical reasoning skills, especially in the materials for building flat side spaces. The use of the STAD learning model with the RME approach was chosen for the following reasons: 1) it makes it easier for students to reason about problems and solve problems, because students can discuss them with friends in their group; 2) emphasizing cooperation between students to convince each other and help in mastering the material to achieve maximum achievements; and 3) make it easier for students to reason about a mathematical problem because learning is done using facts (reality) that they encounter on a daily basis.

The purpose of this study is to analyze the classical completeness of mathematical reasoning skills of the STAD learning model with the RME approach and the direct learning model. Another purpose is to analyze the comparison of the mathematical reasoning ability of the STAD learning model with the RME approach with the direct learning model on the building materials of flat-sided spaces of cubes and blocks. Based on the background that has been stated above, the researcher is interested in conducting research on "The Influence of the STAD Learning Model with the RME Approach on the Mathematical Reasoning Ability of Junior High School Students in Flat Side Space Building Materials".

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RESEARCH METHODS

A quantitative approach with experimental research methods was used in this study. The design used is *Quasi Experimental* (pseudo-experiment) with *a posttest-only control design*. The population in this study is grade VIII students of SMPN 3 Mertoyudan. Using the cluster random sampling *technique*, two classes were obtained as research samples, with class VIII C as many as 32 students as the experimental class and class VIII D as many as 26 students as the control class. Data collection was carried out by providing a description test of 4 questions. After the prerequisite test was carried out, namely the normality test using the Liliefors *test* and the homogeneity test using the Fisher *test*, then a hypothesis test was carried out. The final analysis technique or hypothesis test used used the proportion Z test and the *independent sample T test*.

RESULTS AND DISCUSSION

Before being given treatment in the form of the application of the learning model, both classes were given a test to find out their initial ability. From the initial test, preliminary data were obtained for the experimental class and the control class under normal, homogeneous conditions, and having the same ability. Furthermore, treatment was carried out in the form of the application of the STAD learning model with RME in the experimental class and the application of the teaching aid-assisted direct learning model in the control class. Next, a final test (*posttest*) is carried out, and final data is obtained for analysis.

Before conducting hypothesis testing, a prerequisite test is carried out, namely a normality test and a homogeneity test. From the final test (*posttest*), the final data was obtained under normal and homogeneous conditions. Then a proportion Z test and an *independent T test were carried out*. The following are the results of the Z test performed on the experimental class shown in Table 1, as follows.

Table 1. *Results of the First Hypothesis Test*

Class	x	n	ρ	Z_{hitung}	$-Z_{tabel}$
Eksperimen	27	32	0,70	1,774	-1,645

From Table 1, it can be seen that the value $Z_{hitung}(1{,}774) > -Z_{tabel}(-1{,}645)$of, is H_0 accepted, which means the mathematical reasoning ability of students who apply the STAD learning model with the RME approach to achieve classical completeness.

From the description, it shows that students in the experimental class have completed classically compared to the students' initial test scores before the treatment. In the final test (*posttest*), students who completed with a score of more than or equal to 70 were obtained as many as 27 out of 32 students in the class or 84.375% of students who completed. The results of this study are supported by research from Sidebang, Hutauruk, and Nababan (2022), which was obtained that the use of the STAD-type cooperative learning model can improve students' mathematical reasoning skills with classical completeness reaching 94.2%. In line with Novikasari & Wahyuni (2019), with the RME approach in the STAD model, learning outcomes that experience completeness in mathematical representation and reasoning skills can be obtained with a learning completeness of 78.31%. The STAD learning model with the RME approach can provide opportunities for students to become more active in the learning process, so that it can help

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improve student learning outcomes.

Furthermore, the results of the Z test performed on the control class are shown in Table 2, as follows.

Table 2. *Results of the Second Hypothesis Test*

Class	x	n	ρ	Z_{hitung}	$-Z_{tabel}$
Control	18	26	0,70	-0,0856	-1,645

From Table 2, it can be seen that the value $Z_{hitung}(-0{,}0856) > -Z_{tabel}(-1{,}645)$of, is H_0 also accepted, which means that the mathematical reasoning ability of students who apply the direct learning model also achieves classical completeness.

From the description, it shows that students in the control class have completed classically with students who complete with a score greater than or equal to 70 is as many as 18 out of 26 students in the class or 69.23% of students who complete. The results of this study are supported by research from Asmah (2018), that the use of the direct learning model can further develop students' mathematics learning outcomes with students' classical completeness reaching 84.00% with 21 students out of 25 students in the class. The success of the direct learning model strategy is highly dependent on the role of the teacher, as this learning is still teacher-centered (Afandi, Chamalah, & Wardani, 2013: 23)

Then the results of *the independent T test in* both classes are shown in Table 3, as follows.

Table 3. *Results of the Third Hypothesis Test*

	$\bar{x}$	n	S^2	t_{hitung}	t_{tabel}
Eksperimen	79,21875	32	282,83770	2,09205	2,003
Control	70,19231	26	247,46154		

From Table 3, it can be seen that the value $t_{hitung}(2{,}09205) > t_{tabel}(2{,}003)$, is H_0 rejected and accepted, soH_1it is concluded that the two classes have different mathematical reasoning skills. This shows that students in the experimental class and the control class have different mathematical reasoning abilities. Furthermore, it is seen from the average value, in the experimental class of 79,21875, while the control class is. These results show that the 70,19231mathematical reasoning ability in the experimental class is better than in the control class.

From the analysis of the final data, in the experimental class it was obtained the percentage of average scores from the 4 indicators set was 79.22%. It means that students' mathematical reasoning skills are classified as moderate. With the first indicator, namely analyzing or submitting a conjecture, an average of 91.25% was obtained, the second indicator, namely performing mathematical manipulation, obtained an average of 83.75%, the third indicator, namely compiling evidence or giving reasons for the truthfulness of the evidence, was obtained on average 81.25%, and the fourth indicator, namely drawing conclusions, obtained an average of 60.63%. While (Rosyidah, Hidayanto, & Muksar, 2022) in the control class, obtained the average score percentage of the 4 indicators set was 70.19%, which means that students' mathematical reasoning ability is also classified as moderate. With the first indicator, namely analyzing or submitting a conjecture, an average of 90.00% was obtained, the second indicator, namely performing

mathematical manipulation, obtained an average of 72.31%, the third indicator, namely compiling evidence or giving reasons for the correctness of the evidence, was obtained on average of 63.46%, and the fourth indicator, namely drawing conclusions, obtained an average of 55.00%.

From the use of the STAD learning model with the RME approach, it can be seen that students are more active and enthusiastic in learning because learning is student-centered. This can also be seen from the students' activity when discussing to solve problems in the LKS and the enthusiasm of students when asking if there are things that have not been understood. In addition, student enthusiasm is also seen when passive students can discuss with their group mates if they are embarrassed to ask the teacher. Supported by the opinion of Pasalbessy, Mataheru, & Ayal (2020), students who learn using the STAD-type learning model get better mathematical reasoning skills than students who use the direct teaching model. This research is also supported by the opinion of Ulya & Agustyarini (2020), who stated that getting used to using the RME approach has a positive effect on students' mathematical reasoning skills. This is supported by the theory of constructivism which says that information comes from the continuation effects of human development itself. So that with students developing their own insights, they can practice in the process of reasoning.

CONCLUSION

Based on the results and discussion, related to the influence of the STAD learning model with the RME approach on the mathematical reasoning ability of grade VIII junior high school students in the material of building a flat side room, the following conclusions were obtained.

1. The mathematical reasoning skills of students who apply the STAD learning model with the RME approach achieve classical completeness.
2. The mathematical reasoning ability of students who apply the direct learning model achieves classical completeness.
3. The mathematical reasoning ability of students who apply the STAD model with the RME approach is better than the application of the direct learning model.

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