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The Effect of Learning Community in Improving Students' Ability in Solve Math Problems in Class V

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ABSTRACT
Students' skills in solving problems in mathematics have an impact on learning outcomes. Mathematical problems are closely related to students' daily lives. These problems can be resolved through discussion and collaboration. A learning community is a learning model that facilitates problem-solving in a learning community. In society, students play an active role by changing knowledge in problem-solving. The purpose of this research is to know the effect of mathematical problem-solving ability in class with a Learning Community. The method used is a quasi-experimental design with a nonequivalent control group design. The results of this study indicate an increase in the mathematical problem-solving ability of the experimental class with a percentage of N-Gain in the experimental class of 65. 84% are categorized as quite effective. The experimental class and the control class showed differences in mathematical problem-solving abilities which were indicated by a significance level of < 0.05, this indicates that there is an influence of the learning community on increasing mathematical problem-solving abilities. The results of the research in the experimental class can be concluded that the learning community has an influence on improving students' ability to solve mathematical problems.

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1. INTRODUCTION

Mathematics is a science that studies abstract structures and patterns of relationships that exist in them (Subarinah, 2006). To understand the abstract structure and the pattern of relationships that occur, a concrete activity is needed to facilitate understanding the structure and pattern of relationships in mathematics. Mathematical skills are very necessary because mathematics is related to everyday life. Therefore in the standard content of the Education Unit Level Curriculum (KTSP), the purpose of mathematics is stated, namely so that students understand concepts and the interrelationships between concepts flexibly and efficiently solve problems, reason on patterns, characteristics, and mathematical manipulation.

Based on the objectives listed in the curriculum, after understanding the mathematical concept, it is hoped that it will be applied in students' daily lives. The application of mathematics in everyday life will foster an attitude of respect for mathematics. Mathematics appreciation must be done because mathematics provides many benefits. This is expressed by Subarinah (2006:1) that mathematics can shape the mindset of people who study it into a systematic, logical, and critical mathematical mindset with great care. Mathematics is one of the means of forming students' mindsets which can later be measured by their abilities (Mathematical Proficiency). Mathematical skills include five components, namely conceptual understanding, strategic competence or problem-solving abilities, procedural skills, reasoning, and productive dispositions.

These five components of mathematics are not separate things but are interrelated into one skill that represents different aspects of something complex. (Kilpatrick, 2002)

The real benefits of mathematics can be felt directly in everyday life. Mathematics is widely used to solve various everyday problems, therefore humans are expected to think mathematically. The relationship between mathematics and concerns the ability to formulate problems into mathematical sentences that will facilitate the resolution of a problem. Mathematics is closely related to everyday life. Almost all of our daily activities involve mathematics. Because of the importance of mathematics in supporting everyday life, students need to acquire adequate mathematical abilities. The ability to solve mathematical problems that they get will help them in solving mathematical problems they encounter in everyday life.

The ability to solve mathematical problems can be obtained by students at school and in the community. Connecting real or contextual activities that they see and experience will help students to solve mathematical problems. But in reality, there are still many students who have difficulty because most of the problems that exist in the real world are problems that have not been in the form of mathematical models so they need skills in formulas in mathematics. mathematical form. This is proven when there are learning activities at school, when students are given math problems in the form of direct numbers, they are more fed up with understanding and solving the problem, but when later the problem is converted into the form of a story or case, students have difficulty in solving them. Students are in a social environment both at school and in the community. Social interaction activities affect various patterns in their lives. They are in various communities. In society, they find problems and also learn to solve problems. In learning activities, students are in a learning community.

A learning community is a learning model that trains communication and collaboration skills because the learning community is also part of contextual learning where students' knowledge is built based on their own experiences and knowledge. The learning community is very flexible to express various problems that will be discussed in class, as well as study partners to provide critical suggestions in the learning process carried out by students. The learning community was chosen because it is one of the main components in the context of developing students' ideas and exchanging ideas and opinions with peers in a group. In this sharing activity, students are invited to build their knowledge.

Kamaludin (2020) in his article entitled "Efforts to Improve Civics Learning Outcomes through Learning Community Learning for Elementary School Students" shows that learning community learning has succeeded in increasing Civics learning outcomes, Ninik (2021) in his article also discusses this through community learning can increase activities learning and learning outcomes. Based on this, the researchers considered that the learning community could improve students' ability to solve mathematical problems. The problem that will be discussed in this study is whether there are differences in students' abilities in solving math problems using conventional learning and those using the learning community.

Senge (1990) defines a student learning community as continuously developing their capacity to achieve desired outcomes and continue to learn how to learn together. However, according to Zhao & Kuh (2004), the concept of a learning community is not new at all. This concept was introduced by Alexander Meiklejohn in 1920 (Smith in Zhao & Kuh, 2004). According to West & Williams (2017), the learning community is not limited to face-to-face meetings. Some researchers use this term to describe something very narrow and specific, while other researchers use it to describe a wider group of people who interact in various ways, even though they may be spread over different spaces and times. In particular, In the Learning Community method, two-way or more communication occurs, all group members are sought to be open, free to speak, and actively communicate between friends so that they can motivate student learning (Nurhadi, et al. 2004). Furthermore, Learning Community can be used to train students to do social relations, exchange ideas, complement each other and complement each other's shortcomings which have an impact on increasing students' writing activities (Supatmi, 2020). In addition to increasing students' writing activities, according to Kamaluddin & Hidayat (2020), the

application of the Learning Community is effective in improving student learning outcomes. Furthermore, Learning Community can be used to train students to do social relations, exchange ideas, complement each other and complement each other's shortcomings which have an impact on increasing students' writing activities (Supatmi, 2010). 2020). In addition to increasing students' writing activities, according to Kamaluddin & Hidayat (2020), the application of the Learning Community is effective in improving student learning outcomes. Furthermore, Learning Community can be used to train students to do social relations, exchange ideas, complement each other and complement each other's shortcomings which have an impact on increasing students' writing activities (Supatmi, 2020). In addition to increasing students' writing activities, according to Kamaluddin & Hidayat (2020), the application of the Learning Community is effective in improving student learning outcomes. complement each other and complement each other's shortcomings which have an impact on increasing students' writing activities (Supatmi, 2020). In addition to increasing students' writing activities, according to Kamaluddin & Hidayat (2020), the application of the Learning Community is effective in improving student learning outcomes. complement each other and complement each other's shortcomings which have an impact on increasing students' writing activities (Supatmi, 2020). In addition to increasing students' writing activities, according to Kamaluddin & Hidayat (2020), the application of the Learning Community is effective in improving student learning outcomes.

Mathematical skills are one of the requirements to achieve progress in modern times so nations prioritize mathematics as the main subject in schools that need attention (NRC, 2002). Mathematics is one of the means of forming students' mindsets which can later be measured by their abilities (Mathematical Proficiency). Mathematical skills are conceptual understanding, strategic competence, procedural fluency, reasoning, and productive disposition. These five components of mathematical skills are not separate things but are interwoven into one representative skill with different aspects of something complex (Kilpatrick, et al, 2001).

Based on the description above, the following is a description of the component indicators of students' mathematical skills

Table 1 Description of Mathematics Proficiency Indicators

Math Skills	**Indicator Description**
Conceptual Understanding	• Students can restate known concepts. • Students can connect various concepts in solving problems
procedural fluency	• Students can use procedures and make use of appropriate procedures. • Students can develop procedures
Strategic Competence (problem-solving)	• Students can understand the situation and condition of a problem. • Students can choose the right formula, approach, or method to solve the problem. • Students can find solutions to the problems given correctly. • Students can check the correctness of the problem-solving that has been obtained
Adaptive Reasoning	• Students can check the validity of an argument by providing reasons or proof of the truth of a statement. • students can conclude a statement.
Productive Disposition	• Students can provide answers in their way

Many studies have been carried out related to the application of learning communities, this is the support for researchers to use learning communities in this study. Kamaludin in his research entitled "Efforts to Improve Civic Education Learning Outcomes through Learning Community for Elementary School Students" conveyed the results which showed the success of community learning, Putu Eka Juliana Jaya, in the Journal of Economic Education Undiksha: 2020 also conveyed the results of his research entitled "Improving Outcomes Student Learning with Learning Methods" so that learning outcomes increase with the learning community.

2. METHOD

This study uses a quasi-experimental approach with a pretest-posttest nonrandomized control-groupdesign, where a group of subjects is taken from a certain population, and the pretest is then given sequential treatment. This experimental research design is a nonequivalent pretest-posttest group design. Based on the design, the first step that must be done is to determine the experimental groups 1 and 2. The second step is to give the same pretest (initial test) to the experimental groups 1 and 2. Then two experimental groups are given. different treatment, namely learning by applying the learning community and conventional learning. After that, both experimental groups were given the same posttest (final test).

The sample used consisted of two classes, namely the experimental class and the control class. Sampling with purposive sampling technique. The samples taken were class V UPT SD Negeri Bendosewu 02 as an experimental class which amounted to 15 children and class V UPT SD Negeri Jeblog as a control class also amounted to 15 children. Sampling was based on the consideration that both samples were in the same school cluster area and had almost the same mathematical ability. The next stage is the pretest in the form of a cognitive pretest. Pretest serves to determine the initial ability of students before learning. The results of the pretest were used to test the prerequisites (normality and homogeneity) in the experimental class and the control class. In the experimental class, learning is done using the learning community model. Students in the experimental class mostly study in groups and collaborate. Learning in the control class uses conventional methods. The material taught is material about fractions as a comparison. At the end of the lesson, a posttest was held. The form of the questions used is the same as the pretest questions. The post-test results were used for the normality test and homogeneity test. Furthermore, the gain test and t-test were carried out. The gain test is used to calculate the increase in student learning outcomes in the experimental class. The t-test was used to determine the significant difference in learning outcomes between the experimental class using the learning community model and the control class using the conventional method. Data was collected using the methods of documentation, tests, and observations. Documentation for early-stage data analysis is in the form of mid-semester test scores. Observations to determine students' psychomotor abilities when conducting experiments. The test is in the form of multiple choice for the pretest and posttest. Observations to determine students' psychomotor abilities when conducting experiments. Observations to determine students' psychomotor abilities when conducting experiments.

Data analysis technique

For the prerequisite test, namely the data analysis using the normality test as a condition for conducting parametric statistical analysis. One-Sample Kolmogorov-Smirnov test with SPSS-25 application was used in this study with a significance level of 0.05. To determine the variance of the data from the two groups using the homogeneity test. Homogeneous data is a requirement (not an absolute requirement) in the independent sample t-test. The data in the group are declared the same if the significance value (sig.) based on the mean is greater than 5%. Hypothesis test,

The comparison between t count and t table is as follows:

- H 0 is accepted if t count < t table,
- H 0 is rejected if count > t table,

Comparison between t count and t table, with the following conditions:

- H 0 is accepted if sig.> level
- H 0 is rejected if sig. < level

3. RESULTS

Description of Experimental Class and Control Class Test Results

Table 2 Description of Pre-Test Values for Experiment Class and Control Class

Not	Class	The highest score	Lowest Value	Average
1	Control	75	45	54.66
2	Test	70	45	56.67

The table above can be seen that the average value of the experimental class and control class is still in the low category, namely, the average value of the students is less than 75. This indicates that the student's abilities are still in the low category.

Description of Post-Test

The post-test scores that have been carried out by researchers in the experimental and control class, the data in Table 2.

Table 3 Description of Post-Test Values for Experiment and Control Class

Not	Class	The highest score	Lowest Value	Average
1	Control	80	50	63.33
2	Test	100	75	85, 33

The table explains that the average value of the experimental class is higher than the control class, where the average value of the experimental class is 85.33 and the average value of the control class is 63.33. It can be concluded that there is an effect of problem-solving ability in the experimental class after the application of learning using the Learning Community.

Prerequisite Test Analysis

The data that has been collected will then be analyzed to determine student learning outcomes. This study conducted a prerequisite test first.

1. Normality test

   The normality test was conducted to determine the normality of the research data. The results of the normality test calculations are in Table 4 below:

Table 4 Normality Test Results

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Responden	Statistic	df	Sig.	Statistic	df	Sig.
Post Test	Kelas Kontrol	.167	15	.200*	.949	15	.505
	Kelas Eksperimen	.150	15	.200*	.936	15	.332

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The results of the analysis in table 4, that the experimental sample and the control sample are normally distributed as shown in the figure for the significance level > 0.05, namely, Hα is accepted and Ho is rejected.

2. Homogeneity Test

   The similarity of the two variants was carried out to determine the homogeneity of the sample. The results homogeneity test are in Table 5 below:

Table 5 Homogeneity Test

Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Pre Test	Based on Mean	.010	1	28	.920
	Based on Median	.027	1	28	.871
	Based on Median and with adjusted df	.027	1	27.998	.871
	Based on trimmed mean	.028	1	28	.868
Post Test	Based on Mean	.199	1	28	.659
	Based on Median	.152	1	28	.699
	Based on Median and with adjusted df	.152	1	27.673	.699
	Based on trimmed mean	.231	1	28	.635

Based on the pre-test scores obtained from the experimental and control class, the homogeneity test results have a significance level of 0.871 > 0.05, and the post-test value data was obtained from the experimental class and control class. , the results of the homogeneity test using SPSS have a significance level of 0.635 > 0.05, so it can be concluded that the data variance of the control class and the experimental class of the two groups are homogeneous.

3. N-Gain Test

Table 6 Description of the results of the experimental and control class N-gain

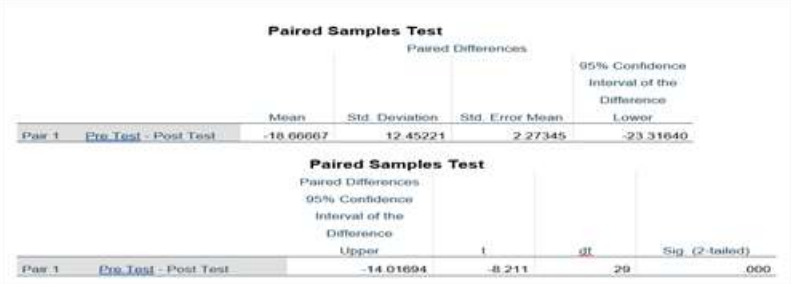
Descriptives

	Responden			Statistic	Std. Error
NGain_Persen	Kelas Kontrol	Mean		19.4969	1.34232
		95% Confidence Interval for Mean	Lower Bound	16.6179	
			Upper Bound	22.3759	
		5% Trimmed Mean		19.5708	
		Median		20.0000	
		Variance		27.027	
		Std. Deviation		5.19879	
		Minimum		9.09	
		Maximum		28.57	
		Range		19.48	
		Interquartile Range		4.04	
		Skewness		-.426	.580
		Kurtosis		.172	1.121
	Kelas Eksperimen	Mean		65.8492	4.61339
		95% Confidence Interval for Mean	Lower Bound	55.9545	
			Upper Bound	75.7439	
		5% Trimmed Mean		65.5269	
		Median		62.5000	
		Variance		319.251	
		Std. Deviation		17.86759	
		Minimum		37.50	
		Maximum		100.00	
		Range		62.50	
		Interquartile Range		27.27	
		Skewness		.468	.580
		Kurtosis		-.471	1.121

The table shows that the average N-Gain for the control class is 19.49 and experimental class is 65.85. This shows that the N-Gain of the experimental class is greater than the control class.

Hypothesis test

Table 7 T-Test Results for Hypotheses



Paired Samples Test

		Paired Differences				
					95% Confidence Interval of the Difference	
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper
Pair 1	Pre Test - Post Test	-18.66667	12.45221	2.27345	-23.31640	-14.01694

		t	df	Sig. (2-tailed)
Pair 1	Pre Test - Post Test	-8.211	29	.000

From the table above obtained homogeneous data, namely sig. (2-tailed) the value of 0.000 <0.05, which means that there is a significant difference in average between the learning community model and the non-learning community model.

3.2.Discussion

The results of the study in data process while the average value of the post-test results of the experimental class was 85.33 and the control class was 63.33. So that the value that shows the ability of students to solve mathematical problems obtained by students through the learning community is higher than students who are taught by applying conventional learning. The results of the normality test showed that the significance of the control class was 0.505 and the experimental class was 0.332, the results of the two variants were greater than 0.05 so the distribution of the sample in this study was normally distributed.

Data entry the pre-test value obtained by the homogeneity test has a significant level of 0.871 > 0.05, and the post-test value data obtained from the experimental class and control class, the homogeneity test using SPSS have a significance level of 0.635 > 0.05, so it can be concluded that the data variance of the two groups of classes is homogeneous. To determine the effectiveness of the learning community in improving mathematical problem-solving skills, the N-Gain test was carried out. From the N-gain test, the average N-Gain results for the control class were 19.49, and for the experimental class 65.85. The N-Gain of the experimental class is greater than the control class. The following table is used to determine the effectiveness of the two models:

Table 8 Interpretation of the Effectiveness of N-Gain

Tabel 8 Interpretasi Efektivitas N-Gain

Persentase (%)	penafsiran
< 40	tidak efektif
40 – 55	kurang efektif
56 – 75	cukup efektif
>76	efektif

The average N-Gain result for the experimental class is 65.85%, this means that the application of the learning community to improve mathematical problem-solving ability is quite effective. The results of the t-test obtained a significant level value of 0.00 which means it is smaller than 0.05, this means that H0 is rejected because of sig. < level then Hα is accepted which means that there is an effect of implementing a learning community on increasing math problem-solving ability in grade 5 students.

The concept of a learning community suggests collaborating with other students on how to solve problems in mathematics and sharing between friends so that all community members learn together in groups, the increase in learning outcomes is because teachers always learning by forming groups whose members are heterogeneous, namely mixing the weak with those who have mastered the concept of learning mathematics and the teacher continues to encourage students to convey ideas, suggestions, and opinions during mathematics learning.

This learning activity looks active because all community members are involved and no one is dominant in conveying their ideas and suggestions, there is good interaction between students in communicating, no one is reluctant to ask questions and each student has their knowledge and experience and knows very well what students are studying. This learning

model has the advantage allowed to respond to mathematical problems and familiarize students to learn together in learning communication,

The key to learning community activities is that students talk, and share experiences with other friends to create an atmosphere of cooperation with others through sharing activities. This activity becomes effective if the goals have been set and achieved smoothly. Learning community activities can be achieved if there is a transfer of learning to understanding between students and a clear conceptual framework of learning which will certainly have an impact on increasing student achievement if using guidelines for designing, planning, and implementing learning activities is truly activities that are carried out based on systematic goals and procedures. in improving student learning outcomes.

Improved learning outcomes because of variations in learning carried out in the experimental group. In community learning, the teacher applies a discussion process and collaborates in problem-solving. In this learning, students are more active in speaking and expressing opinions during group discussions. Students also increase their activities when presenting in front of the class, because it is proven that the class feels crowded when students express their opinions. This shows that students are happy with the implementation of the learning community.

The concept of learning in community (Learning Community) Community) in CTL suggests that learning outcomes be obtained through cooperation with others. The cooperation can be carried out in various forms both in formal study groups and in a natural environment. Learning outcomes can be obtained from the results of sharing with other people, between friends or groups; The already know tells the uninitiated or who has had the experience of sharing his experience with others. This is the essence of the learning society, which is a society that shares with each other. This research shows the influence of using one of them, namely active students and enthusiasm in working together with their group members and sharing knowledge and enthusiasm of each student is very visible.

Student motivation is one of the supporters in improving student learning outcomes with various efforts made by teachers can increase student learning motivation and will automatically affect their learning outcomes. The skill of working together is very visible in learning activities with the learning community model in this study, the form of cooperation between students has been systematically directed and the teacher is very good at performing his role, therefore it is not surprising that the class becomes very interactive and students seem so enthusiastic about conveying ideas and ideas and together finding ways to solve problems in mathematics in the form of story problems that have been made by teachers and students can associate it with the real life of everyday students.

Learning activities with a learning community model can have an influence on learning outcomes with increased student learning motivation and a great curiosity for students to learn. Students no longer feel bored in contrast to what happens in control classes where students only listen to the teacher's explanations and are less eager to learn, teachers use the lecture method, assignments and questions and answers in delivering assignments, learning activities are dominated by the teacher while students are very passive.

Control groups using conventional learning models did not see much improvement in learning outcomes. Teacher-centered learning activities affect the low motivation of student learning so that students are less optimal in accepting mathematics learning concepts related to solving problems in mathematics and the mindset of students does not focus on students' daily events or experiences (not contextual). Teachers who aredominant give adhere to lessons and their students look passive in conventional classes causing differences in learning outcomes between the experimental class and the control class.

The results complement existing research but there are innovations found in the research, namely: 1) passive students become active 2) students understand activities well through discussion and sharing activities with friends 3) teachers as supervisors can be more focused on students which requires more treatment than others. The advantages of the learning

community model are that it can provide opportunities for students to continue to advance according to their potential, improve students' communication and critical reasoning skills, select and sort information obtained, and help students work systematically. This study found several shortcomings, including the selection of learning materials based on the different wishes of students, quite difficult for the teacher.

4. CONCLUSION

This concluded that there are differences in learning outcomes of mathematics in solving mathematics problems in the learning community and classes that carry out conventional learning. The results of the study stated that there was an effect of implementing the learning community on increasing the mathematical problem-solving ability of 5th elementary school students. This research is still limited, so it is hoped that there will be similar studies that further develop it in a wider scope and combine it with several other variables.

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