

The Effect of Everyone is a Teacher Here Learning Method on Students' Problem Solving Ability on Pythagorean Theorem Material

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Abstract

This study aims to determine the significant effect between the Everyone Is A Teacher Here Learning method on Students' Problem Solving Ability on Pythagorean Theorem Material in Class VIII SMP Negeri 2 Padangsidempuan. This research is a quantitative research with quasi experimental method. The population in this study were all grade VIII SMP Negeri 2 Padangsidempuan with sampling using purposive sampling. This research instrument uses tests and analysis using the t test. Based on data analysis, it can be found that it is shown by the results of hypothesis testing which applies that $t_{hitung} > t_{tabel}$, namely $4.465 > 2.00488$. From the results of these calculations it is evident that H_0 is rejected and H_a is accepted. Thus there is an effect of everyone is a teacher here learning method on students' problem solving ability on pythagorean theorem material in class VIII SMP Negeri 2 Padangsidempuan.

Keywords: *Everyone Is A Teacher Here Learning Method; Problem Solving Ability; Pythagoras theorem.*

Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh signifikan antara metode Pembelajaran Everyone Is A Teacher Here Terhadap Kemampuan Pemecahan Masalah Siswa Pada Materi Teorema Pythagoras Di Kelas VIII SMP Negeri 2 Padangsidempuan. Penelitian ini merupakan penelitian kuantitatif dengan metode quasi eksperimen. Populasi pada penelitian ini yaitu seluruh kelas VIII SMP Negeri 2 Padangsidempuan dengan pengambilan sampel menggunakan purposive sampling. Instrumen penelitian ini menggunakan tes dan analisis menggunakan uji t. Berdasarkan analisis data yang dapati bahwa ditunjukkan dengan hasil uji hipotesis yang menerapkan bahwa $t_{hitung} > t_{tabel}$ yakni $4,465 > 2,00488$. Dari hasil perhitungan tersebut terbukti bahwa H_0 ditolak dan H_a diterima. Dengan demikian terdapat pengaruh metode pembelajaran everyone is a teacher here terhadap kemampuan pemecahan masalah siswa pada materi teorema pythagoras di kelas VIII SMP Negeri 2 Padangsidempuan.

Kata Kunci: *Metode Pembelajaran Everyone Is A Teacher Here; Kemampuan Pemecahan Pemecahan Masalah; Teorema Pythagoras.*

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INTRODUCTION

According to the Regulation of the Minister of National Education of the Republic of Indonesia Number 22 of 2006, one of the objectives of mathematics is that in problem solving, students are expected to master mathematical concepts, describe the relationship between concepts and use algorithms or concepts, flexible, thorough, and efficient. Five standards of mathematical ability to be able to realize the objectives in learning Mathematics, namely problem solving skills (problem solving), reasoning and proof skills, communication skills, connection skills and representation skills. (communication), connection ability and representation ability (Siswanto & Meiliasari, 2024). From the description of the learning objectives of mathematics, it is clear that the ability to understand concepts is an important skill for students to acquire and master. This is because mathematics consists of various concepts that are arranged sequentially. The concepts learned in the previous material are used to learn the next concept. Therefore, if students do not understand the concepts they are learning, it will be difficult for them to continue the subject matter (Rohman, Syaifudin, 2021).

Mathematics learning includes problem-solving, reasoning and proof, communication, connection, and representation. This explains how important problem solving is for students in learning mathematics. In addition, problem solving has become an international standard that students must overcome to face today's challenges. The ability to solve problems is also a goal of learning mathematics. The purpose of learning mathematics is for students to: (1) understand mathematical concepts, (2) use reasoning on material that contains patterns and characteristics, (3) solve problems, (4) communicate students' ideas using symbols, diagrams, or tables. explain the problem, (5) students' attitudes evaluate the usefulness of mathematics in life (Chabibah et al., 2019).

Problem solving is an important part of math learning because it can increase students' confidence in solving math problems and also improve everyday decision-making skills (Hannur & Adinda, 2023). Students' ability to solve problems can be seen from student learning and learning outcomes. Problem solving skills are skills that must be developed when learning mathematics, the

more students' problem solving skills increase, the more students' thinking skills will increase.

According to Polya, the indicators of problem solving ability are: (1) Understand the problem, (2) Develop a strategy or solution plan (3) Solve the problem according to the plan that has been made and (4) Recheck the answer (Purnamasari & Setiawan, 2019).

Problem solving ability is an ability that every individual must have, both adults and children. This is because every child or adult cannot be separated from what is called a problem. The problems faced by adults are certainly different from children, but both need the ability to solve or solve them (Wahyuti et al., 2023). Problem solving requires complex problem-solving activities, which not only require the recall of facts, skills and ways of solving them, but also the ability to solve problems (Siregar, 2018).

Problem solving ability is an ability that every individual must have both adults and children. This is in accordance with research conducted by Alfi Rahmawati, who stated that students with high ability can solve the problem at hand, but they are less careful in solving the problem. Students in the medium ability category cannot solve the problem because they can only understand the problem given. Students in the low category cannot solve problems because they still have difficulty understanding the problems given. Therefore, the process of learning mathematics in problem solving needs to be improved, so that problem solving skills are honed (Rahmawati & Warmi, 2022).

To improve students' problem solving skills, it is necessary to develop appropriate learning strategies and methods to help students improve their problem solving skills. Thus, students will be able to face real-world challenges more confidently and effectively. Therefore, one of the alternative learning methods that can be applied is the Everyone Is A Teacher Here learning method. Everyone is a teacher here is a strategy that is perfect for whole class and individual participation. It allows each student to act as a teacher for his or her peers. It also allows students who are not willing to participate to actively participate in learning (Asiza, 2019).

The "Everyone is a Teacher Here" learning method is very suitable for learning mathematics because it involves students actively in the learning process. The Everyone Is Teacher Here method is a simple learning strategy that involves the whole class and holds individuals accountable. It offers every student the opportunity to act as a teacher (Pratiwi et al., 2019). In this method, each student takes turns playing the role of teacher and student. In this way, students can share knowledge, understanding and strategies in solving math problems. Based on the explanation above, the purpose of this study is to determine the effect of the everyone is a teacher here learning method on students' problem solving skills.

RESEARCH METHODS

The type of research used is quantitative research. Quantitative research is research that uses quantitative data (data in the form of numbers or data that is quantified) (Rangkuti, 2015). Researchers used a type of quantitative research with the Quasi Experiment method. The Quasi-Experiment method is one type of experimental research, but the sample is not randomly selected because the sample is conviniety (a naturally formed sample set) (Muhammad Galang Isnawan, 2020). The research design was posttest only control design. In this design there were two kelloimpolk each selected by randolm. The first group was treated (X) and the other group was not (Sugiono, 2016).

This research procedure uses two classes, namely the experimental class and the control class. At each meeting of the two classes, the experimental class was given treatment (X) and the control class was not given treatment. After completing the treatment, both groups were given another test as a posttest. This research was conducted at SMP Negeri 2 Padangsidimpuan and was conducted in the even semester of the 2023-2024 school year.

The population of this study was all VIII grade students of SMP Negeri 2 Padangsidimpuan which amounted to 335 students from 11 classes while the research sample was VIII-8 and VIII-9 grade students totaling 56 students. The data analysis used is a prerequisite test, namely normality test, homogeneity test,

and linearity test followed by simple linear regression test and T test to answer the research hypothesis.

To simplify the scoring of the mathematical communication ability test, consider the table below:

Table 1. Scoring Guidelines for Students' Problem Solving Skills Stage Criteria Score

Stage	Criteria	Score
Understand the problem	Did not write what is known and asked	0
	Mentioning what is known without mentioning what is known or vice versa	1
	Write what is known and what is asked correctly	2
	Mentioned what is known and what is asked correctly.	3
Strategizing	Did not plan the solution at all	0
	Planned a solution but not quite right	1
	Plan problem solving appropriately	2
Perform calculations	Did not answer at all	0
	Solves the problem by writing one or most of the answers correctly	1
	Executes the solution by writing half or mostly correct answers	2
	Implement the solution by writing the answer completely and correctly.	3
Rechecking the answer	Did not write the conclusion	0
	Interprets the results obtained by making conclusions but less precise	1
	Interpret the results obtained by making conclusions appropriately	2

RESULTS AND DISCUSSION

After the research was carried out and the results of data analysis obtained using the SPSS application, the data used was the data on the posttest results of students from the experimental class and control class. the results of the posttest data description can be seen in the following table

Table 2. Test Result of Mathematical Problem Solving Ability

Class	Max score	X_{mak}	X_{min}	$\bar{X}$	SD
Experimental	100	94	56	79,00	11,515
Control	100	94	54	71,93	9,638

Based on the data from the results of student post test scores in the experimental and control classes above, it shows that the post test scores in the experimental class range at a value of 79.00 in the good category and based on the standard deviation it can be concluded that the post test scores of students in the experimental class range at a value of 11.515 from the average value. Meanwhile, in the control class, the post test value ranges from 71.93 in the good category and based on the standard deviation it can be concluded that the post test value ranges from 9.638 from the average value. Thus the standard deviation obtained by the experimental class and control class shows that the data is homogeneous due to the small standard deviation value and has a large difference with the average value.

Before analyzing data with regression analysis, the data is tested prerequisites, namely normality test, homogeneity test and linearity test. The results of the normality test analysis are in table 3 below:

Table 3. Normality Test

Class	Significance Value	Description
Experimental	0,158	Normally distributed
Control	0,200	Normally distributed

Based on the normality analysis test that has been carried out using the Kolmogorov-Smirnov test with the SPSS Version 23 application, the significant results of the experimental class and control class are 0.158 and 0.200. So it can be concluded that the post test of the experimental class and control class is normally distributed. Then the data will be analyzed for homogeneity test. The homogeneity test results are in the table below:

Table 4. Homogeneity Test

Levene Statistic	df1	df2	Sig.
1,348	1	54	0,251

Based on the results of the homogeneity analysis of the posttets data using the SPSS Version 23 application, the significance value Sig = 0.251, Sig > 0.05 H0 is accepted, thus it can be concluded that the two classes are homogeneous.

Then the next analysis is the linearity test. The results of the analysis with the linearity test in table 5 below:

Table 5. Linearity Test

			Sum of Squares	df	Mean Square	F	Sig.
Everyone Is A Teacher Here * Problem Solving Ability	Between Groups	(Combined)	2405,000	14	171,786	1,901	,128
		Linearity				17,191	
			1553,787	1	1553,787		,001
		Deviation from Linearity	851,213	13	65,478	,724	,715
	Within Groups		1175,000	13	90,385		
Total			3580,000	27			

Based on the results of the linearity analysis conducted with the SPSS Version 23 application, the result is 0,715, so it can be concluded that there is a significant linear relationship between the everyone is a teacher here learning method and students' problem solving skills. Because the three data have been fulfilled, the data can be analyzed with correlation and regression analysis. The results of the regression analysis are in table 6, table 7, and table 8 below

Table 6. Correlation Analysis Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,659 ^a	,434	,412	7,389
a. Predictors: (Constant), Problem Sol ving Ability Result				S

Based on the table above, the R value is 0,659, meaning that the correlation between the everyone is a teacher here learning method (X) on students' problem solving ability (Y) is 0,659. Based on the classification of the R value in the table, it can be interpreted that there is a strong relationship between the everyone is a teacher here learning method (X) on students' problem solving skills (Y). The square result of the correlation coefficient R² (R square) is 0,434, meaning that the percentage of the influence of the everyone is a teacher here learning method (X) on students' problem solving ability (Y) or the coefficient of determination is 43,4%, while the rest is influenced by other variables.

Table 7. F Test Results

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1088,457	1	1088,457	19,938	,000 ^b
Residual	1419,400	26	54,592		
Total	2507,857	27			

The table above explains that the calculated F value is 19.938. By looking at the F table (df = 26), the value is 4.23. Because the calculated F value is greater than the F table, there is a significant effect of the everyone is a teacher here learning method on students' problem solving skills at SMP Negeri 2 Padangsidempuan. Furthermore, to find out the regression equation in the table below:

Table 8. Regression Equation Coefficient

		Unstandardized Coefficients		Standardized Coefficients	
Model		B	Std. Error	Beta	t Sig.
1	(Constant)	28,368	9,855		2,879 ,008
	Problem Solving Ability Results	,551	,123	,659	4,465 ,000

Based on the table above, it is found that the constant value is 28,368 and the coefficient of everyone is a teacher here learning method (b) is 0,551. The regression equation is $\hat{Y} = 28,368 + 0,551 (X)$. From this equation it is found that the constant value of 28,368 means that if the value of the learning method variable everyone is a teacher here is 0 then the problem solving ability is 0,551. The coefficient value of the everyone is a teacher here learning method variable (b) increases by 1 unit, then the problem solving ability will increase by 0.551. From the results of all data analysis carried out, it can be concluded that the everyone is a teacher here method affects students' problem solving ability on pythagorean theorem material in class VIII SMP Negeri 2 Padangsidempuan.

Based on the results of the analysis that has been carried out regarding the effect of the everyone is a teacher here learning method on students' problem solving abilities on the material of the pythagoras theorem in Class VIII SMP Negeri 2 Padangsidempuan in the 2023-2024 school year with a total population of 343 students and 58 student samples, it shows that there is a significant effect of the everyone is a teacher here learning method on students' problem solving abilities on the material of the pythagorean theorem in Class VIII SMP Negeri 2 Padangsidempuan. A significant effect means that any increase in the independent variable, namely the everyone is a teacher here learning method, will affect the increase in the dependent variable, namely the students' problem solving ability.

And if there is a decrease in the independent variable, it will affect the decrease in the dependent variable.

This result is in line with the opinion Jade Rehaulina Muntuan (Muntuan, 2019) which states that, There is an increase in the problem solving ability of students who get Everyone Is A Teacher Here and Quantum Teaching learning models significantly better than students who only get Everyone Is A Teacher Here learning alone. This is because by implementing the Quantum Teaching approach, teachers can be more creative to make the classroom atmosphere fun during learning but not disturbing other classes. Pelnellitian conducted by Nurul Ainayah (Ainayah et al., 2021) also states that there is an effect of the everyone is a teacher here method on the learning motivation of fifth grade students of SD N Inpres Soroafu in the 2020/2021 academic year. So it can be concluded that there is an influence after the use of everyone is a teacher here learning method on students' problem solving skills.

CONCLUSION

Based on the results obtained by researchers from data analysis, there is a significant effect of the everyone is a teacher here learning method on problem solving skills on the material. This can be shown by the results of hypothesis testing which applies that $t_{hitung} > t_{tabel}$, namely $4.465 > 2.00488$. Today the results of the t_{hitung} calculation prove that H_0 is rejected and H_a is accepted. Thus there is an effect of everyone is a teacher here learning method on problem solving ability on pythagorean theorem material in class VIII SMP Negeri 2 Padangsidempuan.

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