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The Effect of *Think Talk Write* Learning Model on Improving Mathematical Communication Skills and Matemathical Problem Solving in Grade V Elementary School

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ABSTRACT

Think Talk Write cooperative learning model that affects the mathematical communication and mathematical problem solving skills of fifth grade elementary school students. This study aims to analyze the effect of the application of the Think Talk Write learning model on improving mathematical communication skills and mathematical problem solving skills, this study uses a type of quantitative research with a Quasy Ezperimental Design approach with an Onegrup Pretest-Postest design. The population in this study were all fifth grade elementary school students in the Dipanegara Cluster of 10 schools, with a research sample of 31 fifth grade students at SD Negeri 1 Babadan and SD Negeri 2 Babadan. There were 18 fifth grade students from SD Negeri 1 Babadan as the experimental class and 13 fifth grade students from SD Negeri 2 Babadan as the control group. Data collection techniques used observation instruments/analysis of student answers, test instruments and documentation that had passed the validity and reliability tests. Prerequisite tests needed before testing the hypothesis include normality test, homogeneity test, linear test and regression test. The results obtained showed that the Think Talk Write learning model had an effect on math communication skills by 44.6% and on problem solving skills by 5.7%.

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1. INTRODUCTION

Mathematics is a science that can educate humans to think logically, theoretically, rationally, and systematically, making mathematics the basis for the development of science and technology today[1]. Mathematics is a basic science that has an important role in achieving successful development in all fields[2]. This statement is based on the assumption that mastery of mathematics can be used as a strong guideline in learning other sciences,

[1] Rais Hidayati and Yohanes, 'Eksperimentasi Model Pembelajaran Mind Mapping Terhadap Kemampuan Komunikasi Matematis Ditinjau Dari Motivasi Belajar Siswa Kelas VIII MTS Negeri Bangko', *Edumatica: Jurnal Pendididkan Matematika* 08, no. 01 (2018): 36–48.
[2] Encep Anggun Gunawan and Dede Salim Nahdi, 'Peningkatan Kemampuan Pemecahan Masalah Matematis Melalui Model Pembelajaran Reciprocal Teaching Pada Mata Pelajaran Matematika Di SD', *Papanda Journal of Mathematics and Science Research* 2, no. 1 (28 March 2023): 57–63, https://doi.org/10.56916/pjmsr.v2i1.322.

applicable at the same level of education or at the level of education above.[3] Mathematics is a general knowledge that is used as a foundation in advancing today's technology, has important functions in several disciplines and is used to encourage human thinking patterns[4].

Mathematical communication skills are the skills to express a mathematical thought or idea, through writing or oral, expertise in interpreting and processing mathematical ideas that come from other parties analytically, carefully, evaluatively, and critically to increase knowledge[5]. Mathematical communication skills are skills that students have in describing problems or ideas in mathematics learning using concrete objects, graphs, images, or tables, and mathematical symbols [6].

In line with Astuti and Leonard, according to [7]states that mathematical communication skills are the abilities needed in learning mathematics to learn concepts, convey or express ideas in writing or orally in the form of images, diagrams, symbols, and the use of objects. So that mathematical communication skills are something that is needed in studying mathematics.

Mathematical communication skills, which include the ability to convey a mathematical idea both orally and in writing, are directly proportional to students' mathematical problem solving skills. Because in learning mathematics, students do not only focus on improving their counting skills, memorizing formulas in problems but in mathematics it is more about the ability to solve problems. Often in learning, students think that the end result of a problem is the goal in solving the problems given by the teacher but in fact the main goal is the process carried out in problem solving. Students who have good mathematical communication skills will affect their ability to solve problems, but it should be noted that the most important problem solving is the process towards the end result.

Based on observations and interviews conducted by fifth grade teachers at SD Negeri 1 Babadan, Pagentan District, Banjarnegara Regency, it was found that the mathematical communication skills of fifth grade students were still relatively low and had difficulty explaining in appropriate mathematical language This is reinforced by the test results which show that students still tend to have difficulty understanding the meaning of the problem and how to solve it. And related to problem solving skills are also still lacking because students still only write down the end result without being accompanied by the process to get to that result. Even if asked how and what to do they will answer irrelevantly and tend to just answer carelessly. This condition is also caused by the fact that abstract mathematics material requires a change in treatment to concretize mathematical concepts, besides that, the learning process is still teacher-centered and only uses conventional methods so that it does not support the improvement of mathematical abilities and problem solving when learning takes place. By paying attention to this condition, there needs to be a real effort made to help students improve their mathematical communication and problem solving skills.

One of the efforts made is to implement learning that is not only problem-based to improve problem solving skills but more specifically focuses on improving mathematical communication skills. A problem-based learning model that can influence mathematical communication skills is the Think-Talk-Write (TTW) model[8]. As research that has been conducted by Lusia Ari Sumirat shows if the use of the Think-Talk-Write (TTW) model is more effectively used to hone students' communication skills and mathematical positioning than using direct learning of the expository type[9]. Think-Talk-Write (TTW) is part of a cooperative learning model that prioritizes the learning process of composing, thinking, reflecting, testing, and writing down ideas[10]

The Think-Talk-Write (TTW) Learning Model prioritizes the importance of students expressing their ideas about problems that come from the teacher. Another aspect that shows the relationship between the Think-Talk-

[3] Yadav Sunita, 'Role of Mathematics in the Development of Society', *International Journal of Research and Analytical Reviews (IJRAR)* 6, no. 4 (2019): 295–98.
[4] Yanti Fitria et al., 'Kompetensi Literasi Siswa Pada Pembelajaran IPA Di Sekolah Menengah Pertama Dengan Reading to Learn Model', *Al-Ishlah:Jurnal Pendidikan*, 2021, 1–7.
[5] Erna Aprillia and Karunia Eka Lestari, 'Efektivitas Model Connected Mathematics Project Terhadap Kemampuan Penalaran Matematis Dan Kecemasan Matematika', *Jurnal Educatio FKIP UNMA* 8, no. 3 (1 August 2022): 873–82, https://doi.org/10.31949/educatio.v8i3.2305.
[6] Anggraini Astuti and Leonard Leonard, 'Peran Kemampuan Komunikasi Matematika Terhadap Prestasi Belajar Matematika Siswa', *Formatif: Jurnal Ilmiah Pendidikan MIPA* 2, no. 2 (5 August 2015), https://doi.org/10.30998/formatif.v2i2.91.
[7] Indani Damayanti and Muhammad Iqbal Al Ghozali, 'Implementation of the Radec Learning Model To Improve High Level Thinking Skills in Ipas Courses', *Jurnal Cakrawala Pendas* 9, no. 3 (2023): 399–408, http://dx.doi.org/10.31949/jcp.v9i3.4967.
[8] Kuslinar Kuslinar, Awaludin Awaludin, and La Arapu La Arapu, 'Pengaruh Model Pembelajaran Kooperatif Tipe Tink Talk Write (TTW) Terhadap Kemampuan Komunikasi Matematis Siswa Kelas VIII SMP Negeri 1 Sampara', *Jurnal Penelitian Pendidikan Matematika* 7, no. 1 (1 August 2019): 141, https://doi.org/10.36709/jppm.v7i1.8255.
[9] Sumirat Ali, 'Efektifitas Strategi Pembelajaran Kooperatif Tipe Think-Talk-Write (TTW) Terhadap Kemampuan Komunikasi Dan Disposisi Matematis Siswa', *Program Pasca Sarjanar* 1, no. 2 (2014): 21–29.
[10] Iva Khasanah, Supandi Supandi, and Kartinah Kartinah, 'Efektivitas Model Pembelajaran Think Talk Write (TTW) Melalui Pendekatan Saintifik Dan Open-Ended Terhadap Kemampuan Representasi Matematis Siswa', *Imajiner: Jurnal Matematika Dan Pendidikan Matematika* 3, no. 2 (30 March 2021): 115–21, https://doi.org/10.26877/imajiner.v3i2.7400.

Write (TTW) model and mathematical communication skills is discussion and writing[11]. Khusna explained that Think Talk Write is learning that begins with practicing thinking, reading material, then discussing, giving presentations, and reporting the results of the discussion [12]. The Think Talk Write system begins with students involved in thinking on their own, after the reading process, then talking alone and then before writing students share with a group of friends. The results of the discussion are then poured into writing[13]. The advantages of Think Talk Write are developing solutions that are useful for understanding the material, encouraging students to be critical and creative by asking open questions, being able to communicate and exchange ideas with a group of friends, it will instill the nature of students actively, introduce thinking to students and interact with friends, teachers and even themselves[14].

Based on the description above, the researcher wants to conduct research on "The effect of implementing the Think Talk Write learning model on improving mathematical communication skills and mathematical problem solving in grade V elementary school". This research is important to do so that later it can improve the ability of mathematical communication and mathematical problem solving of elementary school students, especially at State Elementary School 1 Babadan.

2. METHOD OF THE RESEARCH

The research used is a type of experimental quantitative research because researchers want to obtain information in the form of numerical data which is used as a tool to analyze and obtain information from what is wanted to know, the research design used is *Quasi Experimental Design* (pseudo experimental design) which means this design has a control group, but cannot fully function to control external variables that affect the implementation of the experiment[15].

The form of *Quasi Experimental Design* used in this research is *one group pretest postest*. This design is considered effective for determining cause and effect relationships, as well as measuring differences before and after treatment in one group. The following is a *Quasi Experimental Design* research design with the form of *one group pretest-postest* can be seen clearly in the table below:

Table 1. *One group Pretest-Postest Design*

Class	Pretest	Treatment	Posttest
Experiment	P1	X	P2
Control	-	-	Q2

Description:
P1 : Pretest in the experimental class
P2 : Posttest of the experimental class
Q2 : Posttest of the control class
X: Application of *Think Talk Write* learning model
- : Conventional learning

The population in this research is all grade V public elementary schools in the Dipanegara Cluster, totaling 10 schools. The samples in this study were fifth grade students of SD Negeri 1 Babadan and SD Negeri 2 Babadan, totaling 31 students who had both implemented the Merdeka curriculum so that the scope and breadth of material were balanced. There were 18 fifth grade students from SD Negeri 1 Babadan as the experimental class, and 13 fifth grade students from SD Negeri 2 Babadan as the control class. The research time was conducted during the even semester of the 2023/2024 school year in April-June 2024.

The sampling technique used is *random sampling technique. Random sampling* technique is a technique or method of sampling that uses the rules of chance in determining the sample elements. That is to say, this technique is taken randomly or randomly. Generally, random sampling techniques provide opportunities for all members of the population to become selected specimens. The data collection techniques used by researchers in this study are observation with special rubrics, tests and documentation. The instruments used by researchers in conducting research are described as follows:

[11] Fitria Nurapriani, 'Meningkatkan Kemampuan Komunikasi Dan Koneksi Matematik Siswa SMP Melalui Strtaegi Think Talk Write', *BUANA ILMU* 1, no. 1 (18 November 2016), https://doi.org/10.36805/bi.v1i1.97.
[12] Azizatul Khusna, 'Application of Think Talk Write Laerning Model (TTW) Assisted Interactive CD Media in Lesson of Sience on Student Larning', *JURNAL PENELITIAN ILMU PENDIDIKAN* 10, no. 2 (11 January 2018): 136, https://doi.org/10.21831/jpipfip.v10i2.17907.
[13] Lutfiyatuz Zahro and Edi Irawan, 'Efektivitas Model Pembelajaran Think Talk Write (TTW) Dengan Pendekatan Scientific Literacy Terhadap Keterampilan Presentasi Peserta Didik MTs Kelas VIII', *Jurnal Tadris IPA Indonesia* 2, no. 1 (29 March 2022): 35–44, https://doi.org/10.21154/jtii.v2i1.466.
[14] Khasanah, Supandi, and Kartinah, 'Efektivitas Model Pembelajaran Think Talk Write (TTW) Melalui Pendekatan Saintifik Dan Open-Ended Terhadap Kemampuan Representasi Matematis Siswa'.
[15] Sugiyono, *Metode Penelitian Kuantitatif, Kualititif Dan RND* (Bandung: Alfabeta, 2013).

1. Observations containing specific scoring rubrics integrated with indicators of mathematical communication and mathematical problem solving
2. The test instrument is divided into prestest and postest questions with a total of 10 questions with the value of each sub question explained in the instrument grid.

Researchers conducted validity and reliability tests on the instrument before it was tested on the sample class. In addition, it also conducts normality tests and homogeneity tests after the results of the validity and reliability tests of the instrument have been determined the results can be implemented.

All data collection instruments that will be used must obtain valid and reliable provisions before they can be used. So the researchers conducted validity and reliability tests using the *SPSS 27 for windows* application. *The* results of this research instrument test will be declared valid if $r_{count} > r_{table}$ and if on the contrary the results get $r_{tabel} > r_{count}$ then it is stated that the research instrument is declared invalid or invalid. The results of the instrument reliability test were consulted with the price of *r produc moment* at the 5% significance level. If the price of $r_{count} > r_{table}$, then the research instrument is said to be reliable, but if on the contrary the price of $r_{count} < r_{table}$, then the instrument is said to be unreliable.

The last test step is to conduct a linearity test to determine the relationship between existing variables. Before the analysis is carried out regarding the relationship between the independent variable and the dependent variable, it is necessary to carry out a pre-social test first, namely the normality test and the homogeneity test. The normality test was carried out using *SPSS 27 for windows* based on the *Kolmogorov-Smirnov* test. To determine the normality of the data, the test significance level uses $\alpha = 0.05$. If the significance obtained $>\alpha$, then the sample comes from a normally distributed population. Meanwhile, the linearity test is a procedure used to determine the linear status or not of research data. Testing on *SPSS 27 for windows* using *Test for Linearity* the basis for decision making uses ANOVA output at a significance level of 0.05. If *Sig*> 0.05 then the relationship between the two variables is linear.

After all research instruments passed the pre-social test, the researchers took data using the instrument. The data obtained were then analyzed using the t test and simple linear regression analysis test. The t test was conducted to determine the difference between the two sample groups. The *t-test* conducted was *paired sample t-test* and *independent sample t-test*. The simple regression analysis test was conducted because researchers wanted to identify the effect of the *Think Talk Write* (X) learning model on improving math communication skills (Y1) and the effect of the *Think Talk Write* (TTW) learning model on improving math problem solving skills (Y2).

The simple linear regression formula used in this study is:

$$Y = a + bx$$

Description:

Y : dependent variable
X : independent variable
a and b : constants

To find the price of a and b, the following formula is used:

$$a = \frac{\sum y \sum x^2 - \sum x \sum xy}{N \sum x^2 - (\sum x)^2}$$

$$b = \frac{N \sum xy - \sum x \sum y}{N \sum x^2 - (\sum x)^2}$$

Picture 1. Simple linear regression formula

However, in this study, the calculation of the simple linear regression test was analyzed using *SPSS 27 for windows*. The criteria for acceptance and rejection of the hypothesis if:

1. $t_{tabel} < t_{count}$, or significant ≤ 0.05 then the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted. This means that there is a significant influence between one independent variable on the dependent variable.
2. $t_{table} > t_{count}$, or significant ≥ 0.05 then the null hypothesis (H_0) is accepted and the alternative hypothesis (H_a) is rejected. This means that there is no significant influence between one independent variable on the dependent variable.

3. RESULT AND DISCUSSION

This watchfulness is begun with look for information about class student religious character by documentation study from result learns especially religion subject and interview religion subject teacher. Then researcher distributes simple inquiry hits religious service execution (prayer and study) according to online and to then take sample five students with three categories that is two students for category most religious, two students less religious, and one student to category. Afterwards class teacher, religion teacher and student guardian holds meeting to discuss to hit problem this and discuss the solution.

The initial stage in this research is to first test the validity of the instruments used. The validity test carried out on the observation sheet of mathematical communication skills and mathematical problem solving and test instruments on cognitive aspects before being implemented on the actual sample. The results of the *Pearson product moment* correlation if *Sig.*<α with α = 0.05 then each item is determined valid. And each item or test instrument is determined invalid if *Sig.*>α. The following analysis of the validity of the prerequisite test test results is described in the following bold:

Table 2. Analysis of the validity of the math ability indicator instrument

Question No.	*Sig.*	Description	Question No.	*Sig.*	Description
1	<0,001	Valid	6	<0,001	Valid
2	<0,001	Valid	7	0,003	Valid
3	<0,001	Valid	8	<0,001	Valid
4	<0,001	Valid	9	0,018	Valid
5	<0,001	Valid	10	0.030	Valid

Table 3. The results of the validity analysis of the problem solving indicator instrument

Question No.	*Sig.*	Description	Question No.	*Sig.*	Description
1	0,002	Valid	6	<0,001	Valid
2	<0,001	Valid	7	0,003	Valid
3	0,026	Valid	8	0,032	Valid
4	0,040	Valid	9	0,031	Valid
5	<0,001	Valid	10	0.002	Valid

Table 4. Results of item validity analysis

Question No.	*Sig.*	Description	Question No.	*Sig.*	Description
1	<0,001	Valid	6	0,001	Valid
2	0,007	Valid	7	<0,001	Valid
3	0,005	Valid	8	0,001	Valid
4	0,001	Valid	9	<0,001	Valid
5	<0,001	Valid	10	0.027	Valid

Based on the data obtained in table 2, table 3 and table 4, all analysis results show that if the *Sig* value of all tested instrument items shows a *Sig* value *<0*.05. So it can be determined that all research instruments pass the validity test and are determined valid to be able to proceed to the reliability test.

In this study, the analysis of the reliability test results can be seen based on *Cronbach's Alpha* using the *SPSS 27 for windows* program. The decision in *Cronbach's Alpha* is if *Cronbach's Alpha> 0*.60 then the instrument can be determined to have high reliability. The following are the results of the reliability test on the observation sheet rubric items and test items.

Table 5. Reliability results of mathematical communication indicator instruments

Reliability Statistics	
Cronbach's Alpha	N of Items
.860	10

Based on the table above about the results of the test analysis of the mathematical communication indicator instrument, *Cronbach's Alpha* = 0.860 was obtained. Then the reliability on the instrument rubric item observation sheet is determined reliable because 0.860>0.60.

Table 6. Reliability results of problem solving indicator instruments

Reliability Statistics	
Cronbach's Alpha	N of Items
.782	10

Based on the table above about the results of the analysis of the observation sheet rubric item prerequisites, *Cronbach's Alpha* = 0.782 was obtained. So the reliability of the observation sheet rubric item instrument is determined to be reliable because 0.782>0.60.

Table 7. Item reliability results

Reliability Statistics	
Cronbach's Alpha	N of Items
.854	10

Based on the table of reliability pre-test results above, *Cronbach's Alpha* = 0.854 was obtained. Then the reliability on the instrument question items is determined to be reliable because 0.854> 0.60.

Based on the results of research and calculations, data regarding student interactions in the *Think Talk Write* (TTW) learning model are explained as follows:

Table 8. Normality Test Results

	Asymp. Sig. (2-tailed)
TTW Learning Model	0,200
Math Communication	0,200
Problem Solving	0,068
a. Test distribution is Normal.	

Based on Table 6, the probability value or Asymp. Sig. (2- tailed) for each variable, namely: student interaction on the *Think Talk Write* learning model of 0.200, math communication skills of 0.200, and problem solving skills of 0.068. With the α value used is 0.05, this shows that for each variable has an Asymp. Sig. (2-tailed) > α. So it can be determined that the data for all variables are normally distributed. After obtaining the determination of the normality test, it is continued with the homogeneity test on the research data. The distribution of data homogeneity can be seen in the following table:

Table 7. Homogeneity test results

Math Communication	0,471
Problem Solving	0,17

Table 7 shows that the *Sig. The Sig value of* student interaction in the *Thik Talk Write* learning model on improving mathematical communication skills is 0.471 and on improving mathematical problem solving skills is 0.17. This shows that the research data has a homogeneous variance because all *Sig.* values are greater than α (0.05).

The linearity test uses *SPSS 27 for windows* and can be determined using the *test for linearity* with the provisions for making a decision is the result of *Sig. deviation form* linearity> 0.05, so it can be determined that there is a linear relationship between the independent variable (X) and the dependent variable (Y1 and Y2), more details are described in the following table:

Table 8. Linearity Test Results between variables

ANOVA Table							
			Sum of Squares	df	Mean Square	F	Sig.
Math Communication * TTW Learning Model	Between Groups	(Combined)	502.283	16	31.393	.780	.685
		Linearity	277.729	1	277.729	6.905	.078
		Deviation from Linearity	224.554	15	14.970	.372	.916
	Within Groups		120.667	3	40.222		
	Total		622.950	19			
Problem Solving * TTW Learning Model	Between Groups	(Combined)	185.533	16	11.596	.715	.721
		Linearity	40.651	1	40.651	2.506	.212
		Deviation from Linearity	144.883	15	9.659	.595	.786
	Within Groups		48.667	3	16.222		
	Total		234.200	19			

The following are the results of the X-Y1 Partial t Test fully described in the table below:

Table 9: Partial t Test Results of Mathematical Communication Variables

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.876	6.316		2.197	.041
	Math Communication	.840	.221	.668	3.805	.001
a. Dependent Variable: TTW Learning Model						

Based on the results of the t test (partial) that has been done, it shows that the significant value of the effect of the TTW Learning Model (X) on improving math communication skills (Y1) is 0.001 <0.05 and the value of t count 3.805> t table 2.04841, meaning that there is an effect of the TTW Learning Model (X) on improving math communication skills (Y1). So that the analysis of the research hypothesis is H_a accepted or it can be determined that there is a significant influence between the *Think Talk Write* learning model on improving mathematical communication skills.

Based on the *Constant* value and the regression equation on the effect of the *Think Talk Write* learning model on math communication skills is Y = a + bx. Based on the results in the table, the simple linear regression equation that fulfills the formula is to know the *constant* number *of uncotegorized coefficients* (a) = 13.876 and (b) = 0.840, so the regression equation is Y = 13.876 + (0.840X) which means that every addition of one learning value using the *Think Talk Write* model on mathematical communication skills is 0.840. The following are the results of the X-Y2 Partial t Test fully described in the table below:

Table 10. Partial t Test Results of Problem Solving Variables

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	17.882	8.686		2.059	.054
	Problem Solving	.671	.294	.474	2.285	.035
a. Dependent Variable: TTW Learning Model						

Based on the results of the t test (partial) that has been carried out, it shows that the significant value of the effect of the TTW Learning Model (X) on improving problem solving skills (Y2) is 0.035 <0.05 and the value of t count 2.285> t table 2.04841, meaning that there is an effect of the TTW Learning Model (X) on improving problem solving skills (Y2). So that the analysis of the research hypothesis is H_a accepted or it can be determined that there is a significant influence between the *Think Talk Write* learning model on improving problem solving skills.

Based on the *Constant* value and the regression equation on the effect of the *Think Talk Write* learning model on problem solving skills is Y = a + bx. Based on the results in the table, the simple linear regression equation that fulfills the formula is to know the *constant* number *of uncotegorized coefficients* (a) = 17.882 and (b) = 0.671,

so that the regression equation is Y = 17.882 + (0.671X) which means that every addition of one learning value using the *Think Talk Write* model on problem solving ability is 0.671. The following are the results of the simultaneous F Test X - Y1 and Y2 fully described in the table below:

Table 11. Simultaneous F Test X - Y1 and Y2

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	466.035	2	233.017	7.604	.004[b]
	Residuals	520.915	17	30.642		
	Total	986.950	19			
a. Dependent Variable: TTW Learning Model						
b. Predictors: (Constant), Problem Solving, Math Communication						

Based on the results of the F (simultaneous) test that has been carried out, it shows that the significant value of the effect of the TTW Learning Model (X) on improving mathematical communication skills (Y1) and problem solving skills (Y2) is 0.04 <0.05 and the value of F count 7.604> F table 3.33, meaning that there is an effect of the TTW Learning Model (X) on improving mathematical communication skills and problem solving skills (Y1). So that the analysis of the research hypothesis is H_a accepted or it can be determined that there is a significant influence between the *Think Talk Write* learning model on improving math communication skills and problem solving skills.

Table 12. Results of the summary model test for the effect of student interaction on the TTW learning model on mathematical communication skills

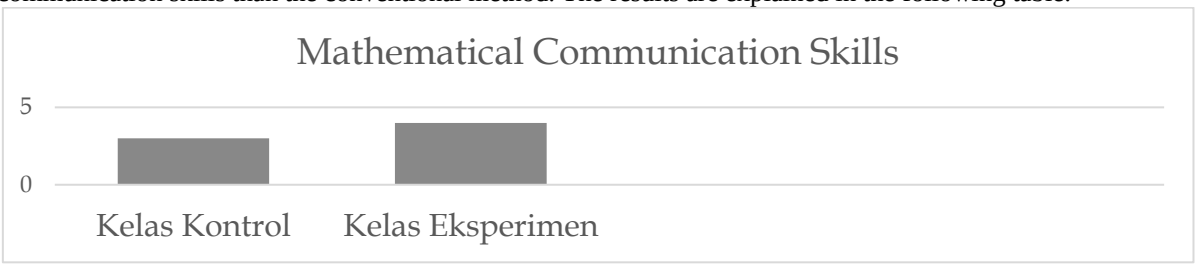
Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.668[a]	.446	.415	5.512
a. Predictors: (Constant), Math Communication				

Table 13. Model summary test results for the effect of student interaction on TTW learning model on problem solving ability

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.240[a]	.057	.005	7.189
a. Predictors: (Constant), Problem Solving				

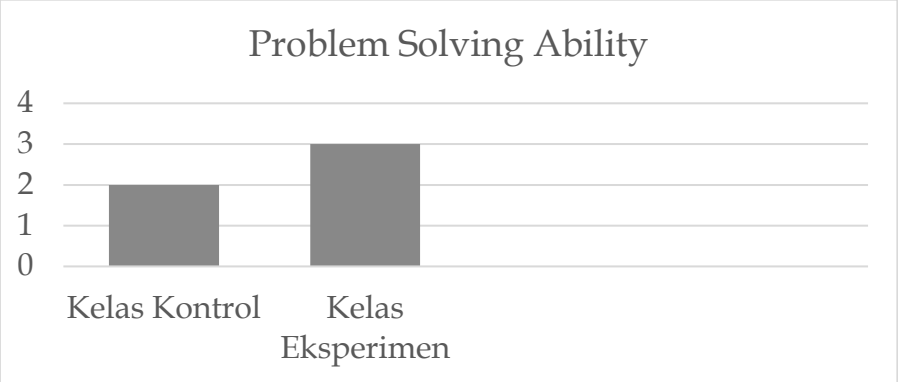
Based on the table above, the data obtained from the determinant coefficient (R square) is 0.446 and 0.057 which means that the *Think Talk Write* learning model affects the improvement of mathematical communication skills by 44.6% and the *Think Talk Write* learning model affects the problem solving ability by 5.7%.

From the research data, it can be determined that the average mathematical communication skills of students in the experimental class increased significantly where the average value of the experimental class class was at a value at level (score) 4 greater than in the control class whose average value of mathematical communication skills at level (score) 3. So that the TTW learning model has more influence on mathematical communication skills than the conventional method. The results are explained in the following table:



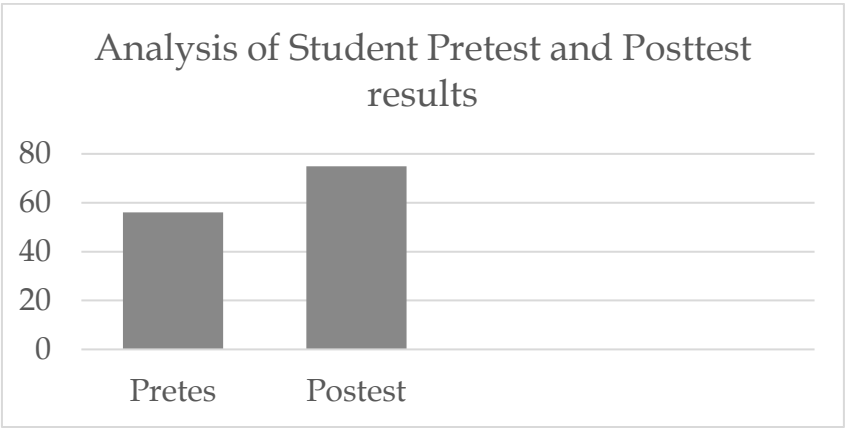
Picture 2. Diagram of the average data of students' mathematical communication skills with the application of the *Think Talk Write* learning model

From the research data, it can be determined that the average mathematical communication ability of students in the experimental class increased significantly where the average value of the experimental class class was at a value at level (score) 3 more bear than in the control class whose average value of mathematical communication ability at level (score) 2. So that the TTW learning model has more influence on problem solving ability compared to conventional methods. The results are explained in the following figure:



Picture 3. Diagram of the average mathematical problem solving ability of students with the application of the *Think Talk Write* learning model

In terms of the ability to improve problem solving skills in students, it is corroborated by data on learning outcomes from the average value of each pretest and posttest question. The average pretest score obtained was 56.1 while the average posttest score was 74.9. This reinforces that the ability to understand mathematical language/communication and problem solving increased after the application of the TTW learning model which is also supported by students prioritizing the process towards the final solution. The results are described in the following figure:



Picture 4. Diagram of average pretest and posttest results with the application of the *Think Talk Write* learning model

4. CONCLUSION

Based on the analysis of the research data and other supporting data, the following conclusions are obtained, among others:

a. Based on the data obtained through the t test (partial) which is in line with the F test (simultaneous), it can be obtained that the significant value of the control class is 0.001 on the math communication variable and 0.035 on the problem solving variable, which means that the significant value is <0.05. So it is determined that the Think Talk Write learning model affects math communication skills by 44.6% and the Think Talk Write learning model affects problem solving skills by 5.7%.
b. There are differences in mathematics learning outcomes in groups of students who applied the Think Talk Write learning model and conventional learning. The average mathematics learning outcomes in the class that applied learning using the Think Talk Write learning model proved to be higher than the class that applied conventional learning.

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