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THE DIFFERENCE OF STUDENTS' MATHEMATICS LEARNING OUTCOMES TAUGHT BY THINK-PAIR-SHARE AND NUMBERED HEADS TOGETHER MODELS

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ABSTRAK

Penelitian ini bertujuan untuk menganalisis perbedaan hasil pembelajaran matematika siswa yang diajarkan menggunakan model *Think Pair-Share* dan *Numbered Heads Together*. Populasi dalam penelitian ini adalah seluruh siswa kelas VIII di SMP Parulian 1 Medan. Dua kelas dipilih dari populasi ini untuk penelitian eksperimental dengan dua kelompok perlakuan yang berbeda: kelas VIII-3 sebagai kelompok eksperimental II, diajarkan dengan model Numbered Heads Together (NHT), dan kelas VIII-2 sebagai kelompok sampel, eksperimental I, diajarkan dengan model Think-Pair-Share (TPS). Berdasarkan hasil penelitian dapat disimpulkan bahwa: rata-rata nilai kelas eksperimental I lebih tinggi daripada kelas eksperimental II, dengan nilai rata-rata postest kelas eksperimental I adalah 81,41 sementara kelas eksperimental II adalah 75,87. Pengujian hipotesis menunjukkan bahwa t_{hitung} = 2,383 > t_{tabel} =1,99962, sehingga H_a diterima dan H_0 ditolak. Dengan demikian, dapat disimpulkan bahwa hasil pembelajaran matematika siswa yang diajarkan menggunakan model *Think-Pair-Share* lebih tinggi daripada menggunakan model *Numbered Heads Together*.

Kata kunci : Hasil Belajar; Matematika; *Numbered Heads Together; Think-Pair-Share*

ABSTRACT

The research aims to examine the variance in students' mathematics when instructed use the Think-Pair-Share and Numbered Heads Together models. The study's population comprises all eighth-grade students at SMP Parulian 1 Medan. Two classes were selected from this population for experimental research, each receiving different treatments: Class VIII-3 as Experimental Group II, taught using the Numbered Heads Together (NHT) model, and Class VIII-2 as the sample group, Experimental Group I, instructed using the Think-Pair-Share (TPS) model. Based on the research findings and discussions outlined in the previous chapter, it can be concluded that: The average score of Experimental Group I surpasses that of Experimental Group II, with the posttest average of Experimental Group I amounting to 81.41 while Experimental Group II scored 75.87. Hypothesis testing is t_{hitung} = 2.383 > t_{tabel} =1.99962, thus accepting H_a and rejecting H_0. Hence, it can be concluded that students' mathematics learning outcomes using the Think-Pair-Share model are higher than using the Numbered Heads Together model.

Keywords **:** *Learning Outcomes; Mathematics; Numbered Head Together; Think-Pair-Share.*

INTRODUCTION

Mathematics should be one of the most interesting and popular subjects for students. However, for most students, mathematics is the most difficult, boring and most frightening subject. This situation causes mathematics to be disliked and ignored. Education is considered important in improving the quality of human resources, and various efforts are made to improve the quality of education. It is hoped that various efforts to improve the quality of education will lead to increasing students' academic achievements, especially in the field of mathematics (Muliandari, 2019).

In learning abstract mathematics, students need tools in the form of media, and if there is material that can help clarify it, the teacher will distribute it to learn further. Students understand quickly, but all concepts understood require immediate reinforcement so that they stick, last a long time in students' memories, and become embedded in thought patterns and behavior.

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Discussing this concept requires learning by doing and understanding, not just memorizing or memorizing facts. This is easily forgotten by students (Sandra et al., 2022).

In teaching mathematics, teachers need to understand that each student's abilities are different and not all students enjoy mathematics lessons. Effective mathematics learning requires understanding what students know and need to learn, then providing challenges and support to them so that students can learn well (Susanto, 2013).

Based on the results of observations in class VIII of SMP Parulian 1 Medan which were carried out when the teacher provided teaching materials, the following field facts were found: 1) Mathematics learning is still teacher-centered, so there is boredom felt by students, 2) The RPP prepared by the mathematics teacher is designed using innovative learning models, but in reality learning is still conventional, 3) The learning atmosphere is conducive and orderly. However, some students are not serious about studying mathematics and do not dare to ask relevant questions and what is more, the homework given by the teacher is also not done.

Student learning outcomes are one of the things that need to be achieved in the learning process. Based on the results of preliminary research on class VIII teachers at SMP Parulian 1 Medan, it shows that there are still many students who do not like learning mathematics, so there are still many students' learning outcomes that are classified as low, especially in mathematics subjects. Then students also experience difficulty in solving the questions given by the teacher, students also make mathematics a scary lesson in class because they feel stressed by the too difficult learning load presented.

Observations at SMP Parulian 1 Medan show that teachers as classroom teachers only carry out teacher-centered learning, and students only listen to explanations and note down things that need to be noted during class hours. This affects students' activeness in the learning process so that it does not develop students' thinking abilities. Another factor related to students' difficulties in learning mathematics is the learning model used by teachers. Teachers who teach mathematics never use the Think-Pair-Share model or the Numbered Heads Together model. The model that teachers usually use is the lecture and demonstration model for students. So students consider learning to be boring during mathematics learning hours because of the lack of variety in learning models.

The low student learning outcomes can be seen from the fact that the average mathematics learning outcomes are related to Cartesian coordinates. Based on the results of the daily test scores obtained from the class VIII Mathematics Teacher, the test results show that there are still several students whose scores do not reach the Maximum Completeness Criteria (KKM) limit set by SMP Parulian 1 Medan, namely a score of 75, so the Cartesian Coordinate material is still low. This can be seen in the table of daily mathematics test scores for students in class VIII of SMP Parulian 1 Medan in 2023 as follows:

Table 1. Data on Prerequisite Test Score Results for Class VIII Students at SMP Parulian 1 Medan

Class	KKM	Complete (%)	Incomplete (%)
VIII 1	75	13 (43,33%)	17 (56,66)
VIII 2	75	2 (6,25%)	30 (93,75%)
VIII 3	75	5 (16,12%)	26 (83,87%)

Based on the problems above, the researchers created a treatment using the Think-Pair-Share and Numbered Heads Together models. According to Suprijono (Kurniawan et al., 2020) Frank Lyman and his colleagues from the University of

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Maryland in 1981 developed a cooperative learning model called Think-Pair-Share. Think-Pair-Share (TPS) is a cooperative learning model that gives students time to think, react, and help each other. This may change the belief that memorization and discussion methods should be carried out in whole class groups. The Think-Pair-Share (TPS) learning model involves a pair discussion method followed by a plenary discussion. By continuing to refer to the material or learning objectives, this learning model teaches students how to express their own opinions and respect the opinions of others.

According to Fathurrohman (2015), the Numbered Head Together (NHT) type learning model is also the treatment in this research. The Numbered Heads Together (NHT) learning model is a learning model that prioritizes student activities in searching, managing and reporting information from various sources. This model was finally presented in front of the class.

From the two models above, researchers want to see differences in mathematics learning outcomes for students taught using the Think-Pair-Share and Number Heads Together (NHT) models. Wahidin et al. (2019) stated that the Think-Pair-Share model stimulates students' thinking activities in pairs, while Shoimin (2014) stated that Number Heads Together is a learning model that involves students and makes students more enthusiastic about thinking in pairs.

The research objectives were determined to analyze how the difference of students' mathematics learning outcomes taught by Think Pair-Share and Numbered Heads Together models.

RESEARCH METHODOLOGY

This research uses a quantitative type of research, as according to Sugiyono (2019) that quantitative research methods are research methods that are based on the philosophy of positivism, used to research certain populations or samples, sampling techniques are generally carried out randomly, data collection uses research instruments, quantitative/statistical data analysis with the aim of testing predetermined hypotheses. This research is to determine whether there are differences in student learning outcomes taught using the TPS and NHT learning models. The method used is a quasi-experimental method.

This research involved two classes, namely experimental class I and experimental class II which were given different treatments. To find out students' mathematics learning outcomes obtained from using this learning model, a test is given.

The sample is part of the number of characteristics possessed by the population. Samples taken from the population must be able to represent the population (Sugiyono, 2019). The sampling technique used is purposive sampling. According to Sugiyono (2019) purposive sampling is sampling technique with certain considerations. This means that sampling is based on certain considerations or criteria that have been formulated in advance by researchers. This sample consisted of 32 people in the TPS class (class VIII-2) and 31 people in the NHT class (class VIII-3).

This research is included in experimental research. This research design uses a two group pretest and posttest design or there is no control class. This research involved two classes, namely experimental class I and experimental class II where these two classes received different treatment. Experimental class I was given the Think-Pair-Share type learning model treatment while experimental class II was given the Numbered Heads Together learning model treatment.

In this study, the test was given twice, namely before and after treatment. The test given before treatment (T_1) is called Pretest

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and the test given after treatment (T_2) is called Posttest.

The data collection instrument used in this research is a learning outcomes test, namely an objective test in the form of essay questions. The test is in the form of a final test (Post test) which is carried out after the treatment, the aim of which is to determine student learning outcomes in the Cartesian Coordinate material. This is a test in the form of 5 descriptive questions.

The data analysis technique processed in this research is quantitative data in the form of tests of students' mathematics learning outcomes on Cartesian Coordinates material in experimental class I and experimental class II. Through pretest and posttest on students' mathematics learning outcomes on Cartesian Coordinates material.

Data normality testing is carried out by checking whether the research variable data is normally distributed or not. In this study, a test was carried out based on the results of the pretest and posttest on mathematics learning outcomes taught using the Think-Pair-Share and Numbered Heads Together models. If the research data is normally distributed, then proceed with the parametric test, namely the homogeneity of variance test.

By using SPSS software with the hypothesis:

H_0 : The sample comes from a normally distributed population

H_a : The sample is not from a normally distributed population

The decision making criteria in the normality test is a significant value > 0.05, so H_0 is accepted and Ha is rejected. On the other hand, the sample does not come from a normally distributed population. If the significance value is < 0.05, then H_0 is rejected and H_a is accepted. To make calculations easier, the author uses SPSS 22.0 for Windows.

The homogeneity test was carried out with the aim of finding out whether the samples taken had homogeneous variance or not.

Testing criteria: If $F_{count} < F_{table}$ then the population has the same variance (homogeneous). Hypothesis testing is the next step to be taken. In accordance with the title of the research, the researcher proposed a hypothesis in the research, namely: "How Are The Difference of Students' Mathematics Learning Outcomes Taught by Think Pair-Share and Numbered Heads Together Models in class VIII of SMP Parulian 1 Medan".

Statistical Hypothesis:

H_0: $\mu_1 \leq \mu_2$: The mathematics learning outcomes of students taught using the Think-Pair-Share Type Cooperative learning model are lower or equal than the mathematics learning outcomes of students taught using the Numbered Heads Together Type Cooperative learning model in class VIII of SMP Parulian 1 Medan

H_a: $\mu_1 > \mu_2$: The mathematics learning outcomes of students taught using the Think-Pair-Share Type Cooperative learning model are higher than the mathematics learning outcomes of students taught using the Numbered Heads Together Type Cooperative learning model in class VIII of SMP Parulian 1 Medan.

Hypothesis testing is carried out using the independent t-test. The tcount price is compared with the ttable price with the terms of degrees of freedom ($dk = n_1+n_2 – 2$) and α= 0,05 then:

a. If $t_{count} > t_{table}$ then H_a is accepted and H_0 is rejected

b. If $t_{count} < t_{table}$ then H_0 is accepted and H_a is rejected.

RESULT AND DISCUSSION

Result

From the data from the pretest results, the learning outcomes of experimental class I students were tested for normality using the Liliefors test and also using SPSS 22.0 which aims to determine whether the distribution of learning outcomes data has a

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normal distribution or not. The sample is said to be normally distributed if $L_{count} < L_{table}$ and for SPSS output with a significance level > 0.05 by looking at Kolmogorov-Smirnov. From manual calculation, the results of the pretest data of normality test for experimental class I at a significant level α = 0.05 obtained L_{count} = 0,12011 and L_{table} = 0,15662. Then obtained $L_{count} < L_{table}$ namely 0,12011 < 0,15662. Presented in Table 2, the results obtained by calculating the normality test are as follows:

Table 2. Kolmogorov-Smirnov SPSS 22.0 Output Pretest Results for Experimental Class I

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Nilai Pretest Eksperimen I	.119	32	.200*	.963	32	.338

From the Test of Normality table, the significant value = 0.200. It means The significant value of the experimental class I data is 0.200 > 0.05 Thus: The null hypothesis is accepted. It can be said that the sample of student learning outcomes with TPS has a normal distribution.

From the data from the pretest results, the learning outcomes of experimental class I students were tested for normality using the Liliefors test and also using SPSS 22.0 which aims to determine whether the distribution of learning outcomes data has a normal distribution or not. The sample is said to be normally distributed if $L_{count} < L_{table}$ and for SPSS output with a significance level > 0.05 by looking at Kolmogorov-Smirnov. From manual calculation, the results of the pretest data of normality test for experimental class I at a significant level α = 0.05 obtained L_{count} = 0,1078 and L_{table} = 0,1591. Then obtained $L_{count} < L_{table}$ namely 0,1078 < 0,1591. Presented in Table 3, the results obtained by calculating the normality test are as follows:

Table 3. Kolmogorov-Smirnov SPSS 22.0 Output Pretest Results for Experimental Class II

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Nilai Pretest Eksperimen II	.140	31	.128	.941	31	.087

From the Test of Normality table, the significant value = 0.128. it means The significant value of the experimental class I data is 0.128 > 0.05 Thus: The null hypothesis is accepted. It can be said that the sample of student learning outcomes with NHT has a normal distribution.

From the data from the pretest results, the learning outcomes of experimental class I students were tested for normality using the Liliefors test and also using SPSS 22.0 which aims to determine whether the distribution of learning outcomes data has a normal distribution or not. The sample is said to be normally distributed if $L_{count} < L_{table}$ and for SPSS output with a significance level > 0.05 by looking at Kolmogorov-Smirnov. From manual calculation, the results of the pretest data of normality test for experimental class I at a significant level α = 0.05 obtained L_{count} = 0,1018 and L_{table} = 0,15662. Then obtained $L_{count} < L_{table}$ namely 0,1018 < 0,15662. Presented in Table 4, the results obtained by calculating the normality test are as follows:

Table 4. Kolmogorov-Smirnov SPSS 22.0 Output Posttest Results for Experiment Class I

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Nilai Posttest Eksperimen I	.102	32	.200*	.979	32	.759

From the Test of Normality table, the significant value = 0.200. it means The significant value of the experimental class I data is 0.200 > 0.05 Thus: The null hypothesis is accepted. It can be said that the sample of student learning outcomes with TPS has a normal distribution.

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From the data from the pretest results, the learning outcomes of experimental class I students were tested for normality using the Liliefors test and also using SPSS 22.0 which aims to determine whether the distribution of learning outcomes data has a normal distribution or not. The sample is said to be normally distributed if $L_{count} < L_{table}$ and for SPSS output with a significance level > 0.05 by looking at Kolmogorov-Smirnov. From manual calculation, the results of the pretest data of normality test for experimental class I at a significant level $\alpha = 0.05$ obtained $L_{count} = 0{,}0668$ and $L_{table} = 0{,}1591$. Then obtained $L_{count} < L_{table}$ namely 0,0668< 0,1591. Presented in Table 5, the results obtained by calculating the normality test are as follows:

Table 5 Kolmogorov-Smirnov SPSS 22.0 Output Posttest Results for Experiment Class II

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Nilai Posttest Eksperimen II	.100	31	.200*	.966	31	.407

From the Test of Normality table, the significant value = 0.200. it means The significant value of the experimental class I data is 0.200 > 0.05 Thus: The null hypothesis is accepted. It can be said that the sample of student learning outcomes with NHT has a normal distribution.

Based on the data distribution normality test, the pretest scores for experiment I and experiment II were normally distributed and the analysis continued by testing the homogeneity of the two variances between the pretest data from experiment I and experiment II using the F test if $F_{count} \geq F_{table}$ then H_0 is rejected or the two variances are different, while if $F_{count} < F_{table}$ then H_0 is accepted or both variances are the same. With degrees of freedom in the numerator = $(n_1 - 1)$ and degrees of freedom in the denominator = $(n_2 - 1)$ with a significant level $\alpha = 0.05$. From the manual calculation, the result is $F_{count} = 1{,}4833$, and $F_{table} = 1{,}835$. So, $F_{count} < F_{table}$, namely 1,4833 < 1,835. Based on manual calculation, data from both groups have the same variance (Homogenous). Homogeneity test is also using the Levene test using the SPSS 22.0 for Windows program with a significance level of 0.05. The results of the homogeneity test in Table 6 show the results of the homogeneity test calculation as follows.

Table 6. SPSS 22.0 Homogeneity Test Output Pretest Results for Experimental Class I and Experimental Class II

Levene Statistic	df1	df2	Sig.
.903	1	61	.346

From Table 6, a significance value of 0.346 is obtained, this value is compared with 0.05 (because it uses a significance level of 5%) so 0.346 > 0.05 can be concluded that the data from both groups have the same variance (Homogenous), meaning that before being treated with the Think-learning model Pair-Share and Numbered Heads Together learning model.

Based on the normality test of data distribution, the posttest scores for experiment I and experiment II were normally and abnormally distributed, the analysis was continued by testing the homogeneity of the two variances between the data from the posttest results of experiment I and experiment II using the F test if $F_{count} \geq F_{table}$ then H_0 is rejected or the two variances are different, while if $F_{count} < F_{table}$ then H_0 is accepted or both variances are the same. With degrees of freedom in the numerator = $(n_1 - 1)$ and degrees of freedom in the denominator = $(n_2 - 1)$ with a significant level $\alpha = 0.05$. From the manual calculation, the result is $F_{count} = 1{,}02767$, and $F_{table} = 1{,}835$. So, $F_{count} < F_{table}$, namely 1,02767 < 1,835. Based on manual calculation, data from both groups have the same variance (Homogenous). Homogeneity test is also using the Levene test using the SPSS 22.0 for Windows program with a significance level of 0.05.

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The results of the homogeneity test in Table 7 show the results of the homogeneity test calculation as follows.

Table 7. SPSS 22.0 Homogeneity Test Output Posttest Results for Experimental Class I and Experimental Class II

Levene Statistic	df1	df2	Sig.
.001	1	61	.971

From Table 7, a significance value of 0.971 is obtained, this value is compared with 0.05 (because it uses a significance level of 5%) so 0.971 > 0.05 can be concluded that the data from both groups have the same variance (Homogenous), meaning that before being treated with the Think-learning model Pair-Share and Numbered Heads Together learning model.

By fulfilling the prerequisite tests, namely the normality test and homogeneity test, both variables have a normal distribution. So hypothesis testing is carried out using the t test formula at the α = 0.05 level. Where this test is used to test the hypothesis whether the truth is acceptable or not. This t test technique was used to determine the difference between the TPS type and NHT type cooperative models on student mathematics learning outcomes.

Table 8. Summary of Calculations of Hypothesis Testing Results

Data	$\bar{X}$	t_{count}	t_{table}	Conclusion
Posttest eksperimen I	81,141	2,383	1,99962	H_a is accepted
Posttest eksperimen II	75,87			

By comparing the value of t_{count} = 2,383 and t_{table} = 1,99962 which means that $t_{count} > t_{table}$ or 2.383 > 1,99962. So it can be concluded that H_a is accepted and H_0 is rejected, which means that "The Mathematics Learning Outcomes of Students Taught Using the Think-Pair-Share Type Cooperative Learning Model are higher than the Numbered Heads Together Type in Class VIII of SMP Parulian 1 Medan".

Discussion

In implementing the NHT type cooperative learning model, what the researchers carried out in the initial activities was to greet students, inform them of the learning objectives and motivate students to learn, teaching Cartesian Coordinates material briefly. The core activities carried out by researchers were dividing students into several groups and giving each group member a different number, noting that the numbers between groups were the same, giving the same LAS questions to each group, guiding students to solve LAS questions. In the closing activity, the researcher randomly selected a number of students who would come forward to present the answers they had obtained, the other groups were given the opportunity to respond, provide conclusions from the learning results, provide assignments and close the learning.

One of the learning theories that supports the TPS type and NHT type cooperative learning model is constructivism theory (Trianto, 2018) which states that students must find and transform complex information themselves, check new information with old rules and revise it if the rules it is no longer appropriate. For students to truly understand and be able to apply knowledge, they must work to solve problems, discover things for themselves, and try with their ideas.

To see whether the differences in the learning models used are significantly different to students' mathematics learning outcomes, a hypothesis test was carried out using the t test and obtained t_{count} = 2.383 > t_{table} = 1,99962, then H_a was accepted and H_0 was rejected. So it can be concluded that the mathematics learning outcomes of students taught using the Think-Pair-Share type

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cooperative model are higher than the learning outcomes of students taught using the Numbered Heads Together type cooperative learning model.

In this case it can be said that in this research, the mathematics learning outcomes of students taught using the Think-Pair-Share model were higher compared to the Numbered Heads Together type by looking at the advantages of Think-Pair-Share according to Trianto (2018), including increasing students' thinking power, providing time to think to improve the quality of students' responses, students understand more about the concept of the lesson topic during discussions, students can learn from other students, and each student in their group has the opportunity to share or convey their ideas. Meanwhile, the advantages of Numbered Heads Together according to Affandi (2017) include that every student is ready to study, can have serious discussions and smart students can teach students who are less smart. From this theory it can be said that the Think-Pair-Share model is superior to the Numbered Heads Together model because the Think-Pair-Share model has more advantages than the Numbered Heads Together model in improving students' mathematics learning outcomes, so that mathematics learning outcomes students taught using the Think-Pair-Share model were higher than the mathematics learning outcomes of students taught using the Numbered Heads Together model.

To strengthen the results of this research, researchers compared the research results obtained with the results of previous research that were relevant to this research. Below are presented the results of previous research that are relevant to the research.

The research that is relevant to the research conducted by researchers is research conducted by Kurniawan et al., (2020) entitled "The Influence of the Think Pair Share Type Cooperative Learning Model using Power Point on Mathematics Learning Outcomes" obtained the average learning outcomes of students who were taught using the Think-Pair-Share type cooperative learning model is 82.33. The average student mathematics learning outcomes obtained by researchers using the TPS type cooperative learning model are still lower than those in relevant research, where the average learning outcomes obtained by researchers is 81.141.

Sulianto et al., (2019) in his research entitled "The Influence of the Think-Pair-Share Learning Model on the Learning Outcomes of Class V (Fifth) Students on Human and Animal Organs" found that the average learning outcomes of students using the TPS type cooperative learning model was 77.82. The average student mathematics learning outcomes obtained by researchers using the TPS type cooperative learning model were higher compared to the relevant research, where the average learning outcomes obtained by researchers was 81.141.

Muliandari (2019) in her research entitled "The Influence of the NHT (Numbered Head Together) Type Cooperative Learning Model on Mathematics Learning Outcomes" found that the average mathematics learning outcome of students taught using the NHT type cooperative learning model was 21.1. Based on this relevant research, it appears that the research results for the average student learning outcomes obtained by researchers using the NHT type cooperative learning model are 75.87, where the average student mathematics learning outcomes are still higher than the average mathematics learning outcomes. students from such relevant research.

Mardiah (2020) in her research entitled "The Influence of the NHT (Numbered Head Together) Learning Model on Student Learning Outcomes in Mathematics Subjects at State Elementary School 056000 Lampung Baru, Stabat District, Langkat Regency T.A. 2019/2020" obtained the

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average student mathematics learning outcomes using the NHT type cooperative learning model of 85. The average student mathematics learning outcomes obtained by researchers using the NHT type cooperative learning model were still lower compared to the relevant research. Where the average learning outcome obtained by researchers was 75.87.

From the relevant research results above, it can be concluded that Think-Pair-Share type cooperative learning is an important variable in improving students' mathematics learning outcomes.

CONCLUSION AND SUGGESTION

Conclusion

Based on the research results and discussion presented in the research results described in the previous chapter, the researcher can conclude that: The average value of experimental class I is greater than the average value of experimental class II, namely the posttest average of experimental class I amounted to 81.41 while the experimental class II amounted to 75.87. Based on the results of hypothesis testing using the t test and obtained $t_{count} = 2.383 > t_{table} = 1{,}99962$, then H_a is accepted and H_0 is rejected. So it can be concluded that the mathematics learning outcomes of students taught using the Think-Pair-Share learning model are higher than the learning outcomes using the Numbered Heads Together model.

Suggestion

In order to develop and successfully implement learning in improving the quality of education, especially student learning outcomes, researchers provide the following suggestions:

1. It is hoped that students will be more serious and disciplined in learning mathematics, especially the material presented by the teacher in class.
2. Mathematics teachers can use the Think Pair Share (TPS) cooperative learning model as an alternative learning in an effort to improve student mathematics learning outcomes.
3. Because there are limitations in carrying out this research, it is recommended that there be further research that examines the Think-Pair-Share learning model and the Numbered Heads Together learning model on other subjects or other aspects.

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