

COMPARISON OF STUDENTS' MATHEMATICS LEARNING OUTCOMES USING A COOPERATIVE LEARNING MODEL JIGSAW TYPES AND STAD TYPES IN STUDENTS CLASS VIII STATE MIDDLE SCHOOL 1 NOSU

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ABSTRACT

This research aims to determine: (1) Students' mathematics learning outcomes using the Jigsaw type cooperative learning model; (2) Student mathematics learning outcomes using the STAD type cooperative learning model; and (3) Differences in student mathematics learning outcomes using the Jigsaw type and STAD type cooperative learning models. The population of this study were all students in class VIII of SMP Negeri 1 Nosu. The sample used was 32 students in class VIIIB and class VIIIC, with 16 students in each class. The sampling technique in this research was carried out using a *purposive sampling technique*. In this research, the data analysis techniques used are descriptive statistical analysis and inferential statistical analysis at a significance level of $\alpha = 0.025$ using the SPSS version 25 program. The results of this research show that: (1) Students' mathematics learning outcomes using the Jigsaw type cooperative learning model are at high category with an average score of 82.56 and a standard deviation of 12.248; (2) Students' mathematics learning outcomes using the STAD type cooperative learning model are in the medium category with an average score of 69.44 and a standard deviation of 15.849; (3) In data analysis using the *t-test*, the value obtained was $t_{hitung} = 2.521$. The value of p_{value} obtained = $0.017 < 0.025$, then H_0 is rejected and H_1 is accepted. So it can be concluded that there are differences in students' mathematics learning outcomes using the Jigsaw type and STAD type cooperative learning models for class VIII students at SMP Negeri 1 Nosu.

Keywords: Mathematics Learning Outcomes, Jigsaw Type Cooperative Learning Model, STAD Type Cooperative Learning Model

1. Introduction

In Law (UU) no. 20 of 2003 Concerning National Education System (Sisdiknas), (Danim, 2013:4) mentioned that education is effort conscious and planned For create environment and learning process in which students in a way active develop potency himself For own spiritual and religious strength, personality, intelligence, morals noble, and necessary skills For self they themselves, society, nation, and state.. According to (Asrawati, 2020) Education is factor main in formation personal human, so error in education will harm generation next. Thus, education is very important in life humans, especially

generation nation, that is student moment this, which is just can obtain education at school.

ideal school should be produce student with intelligence intellectual, emotional, and spiritual. They should too change method school seen as place learning., (Nurfirdaus & Hodija, 2018). In the learning process teach This Of course exists materials learning, one material ongoing learning _ need get attention moment This that is mathematics.

Mathematics is method think logical, tool thinking, and other kings of science whose development independent from knowledge other. Mathematics also provides the language of processes and theories that provide shape and

strength science , and calculation mathematics become base for design knowledge technique , (Ovan, 2019) . Therefore _ That mathematics is one _ eye very important lesson For studied especially for student as successor Nation .

However based on interview through phone mobile on March 15 , 2023 with a mathematics teacher at SMP Negeri 1 Nosu , obtained information that part student Still difficulty in Study mathematics Where eye lesson this is dominant use numbers or according to calculations student difficult For resolved . View student like This can influence results Study shiva become decreased .

Apart from that problem in learning not even mathematics at SMP Negeri 1 Nosu apply the learning model otherwise , according to what the eye teacher said lesson mathematics that for the learning model only using a learning model straight away . Where is the learning model direct is a *teacher* - centered learning model (Rosmi, 2017:163) . So that student accept What just what the teacher says , silent or not willing put forward questions and opinions so that make student nature closed , no active in interact with teachers and friends .

For respond problem this is necessary use of an involved learning model participation active shiva For optimizing potency at a time results Study students . According to (Daten et al., 2022) learning model is something methods used by teachers _ objective For help student in reach objective learning . With this researcher using a learning model cooperative , because According to (Alfami et al., 2021) is one of the established learning models student as subject learning . As well as learning models according to (Rusman, 2016) cooperative (*cooperative learning*) is form learning with method student study and work in groups small in a way

Group	Treatment	Posttest
Class experiment I	O_1	x_1
Class experiment II	O_2	x_2

collaborative whose members consists from four until six people with structure group nature _ *heterogeneous* , in learning models cooperative learning process No must Study from teacher to students , students can each other teach fellow student others .

Learning model cooperative own a number of types , including , Jigsaw type and

STAD type . Second type This drip focus on work The same group . Learning model Jigsaw type has characteristic typical from other models . Jigsaw is one of them type learning dripping cooperation _ emphasize cooperation _ group in group small . Typical characteristics learning This compared to with type cooperative others , viz exists group study and groups experts (*expert-team*). (Lestari & Yudhanegara, 2015) . Learning cooperative STAD type is place student Study in group small consisting _ of 4-5 students with level ability different students , for _ control material as well as help Friend control material learning , (Wulandari, 2022:19) .

In connection with matter the author _ interested For do research entitled " Comparison of Learning Outcomes Mathematics Student Using Learning Models Cooperative Jigsaw Type and STAD Type in Students Class VIII of Nosu 1 Public Middle School "

2. Research Methods

Type of research used researcher is *quasi experiment* Where defined as experiments that have treatment , measurement impact , experimental unit However No use assignment random For create comparison in frame concluded caused changes _ treatment , according to Cook in (Abraham & Supriati, 2022) . Study This involving two groups , namely group experiment I and group experiment II. Study This done For compare results Study mathematics between students who are taught using a learning model cooperative Jigsaw Type and STAD Type . Study This held at SMP Negeri 1 Nosu ber Address on Jalan Andola , Nosu , Kec . Nosu , Kab . Mamasa, Prov. West Sulawesi. Study This held in the even semester year 2022/2023 teachings . Research design used _ in study This is *the nonequivalent posttest -only control group design* , which is one type from *quasi experimental design*. On research This two different samples were used .

**Table 1 The Nonequivalent Posttet -Q
Only Control Group Design**

Information:

O_1 = *treatment 1* (learning using the Jigsaw model)

O_2 = *treatment 2* (learning using the STAD model)

$x_1 = \text{Posttest}$ (Jigsaw class mathematics learning results)

$x_2 = \text{Posttest}$ (STAD class mathematics learning results)

Where is the second sample This applied different learning (*treatment*), each sample given test the same final (*posttest*). For obtain results Study mathematics . Population is object or subjects that are in an area and fulfill it terms certain related with problem research , (Riduwan, 2018:8) . Population in study This is all over student class VIII of SMP Negeri 1 Nosu . Retrieval technique sample in study This done with technique *purposive sampling*. *Purposive sampling* is technique determination sample ith consideration certain matter This according to Sugiyono in (Mamik, 2015) . Deep sample study This is student class VIIIB and students class VIIIC of SMP Negeri 1 Nosu . In research This data collection technique is carried out with technique test with provide test instruments used For obtain results Study mathematics students . Data analysis techniques used For analyze the data obtained that is use analysis statistics descriptive and analytical statistics inferential .

3. Discussion

Study This involves two learning models , namely the learning model cooperative Jigsaw type and STAD type , which are compared with see results Study mathematics students on the same material that is statistics . For measure results Study mathematics students , especially formerly applied learning model cooperative Jigsaw type in class experiment I and learning models cooperative STAD type in the class experiment II. Where in class experiment I which uses a learning model cooperative The Jigsaw type was implemented in class VIIIC for 4 meetings , at meetings First up to 3 students taught with material statistics and the 4th student meeting given test results Study mathematics on the material statistics , same as in class Experiment II which uses a learning model cooperative tariff STAD type which is carried out in class VIIIB for 4 meetings First up to 3 students taught with material statistics and the 4th student meeting given test results Study mathematics on the material statistics . From the results test This data obtained in the form

of score results Study mathematics students , then the data is analyzed use analysis statistics descriptive and analytical inferential .

1. Analysis Results Statistics Descriptive

Analysis statistics descriptive used For describe score results Study mathematics students obtained _ from each class experiments , data obtained from analysis statistics descriptive are mean, median, mode, standard deviation , variance , minimum value , and value maximum .

- a. Description results Study mathematics student using a learning model cooperative Jigsaw type
Score data results Study mathematics student using a learning model cooperative Jigsaw type in class experiment I. Analysis results statistics descriptive summarized in Table 1

Table 2 Distribution results Study mathematics students in class experiment I

Statistics	Statistical Value
Size sample	16
Maximum score	96
Minimum score	56
Reach	40
Mean	82.06
Median	84
Mode	96
Variance	149,929
Standard Deviation	12,245

Based on Table 2 above, after giving a learning outcomes test to 16 students in experimental class I with statistics material, the highest score was 96 which was the maximum score and the lowest score was 56 which was the minimum score. From the difference between the maximum and minimum scores, a value of 40 is obtained, which is the range, the mean or average score of student learning outcomes is 82.06 with the total number of student scores divided by the number of students, the median is 84 which is the middle value of the students' scores, the mode is 96. which means the highest score obtained by students, the variance of the data is 149.929, and the standard deviation is 12.245 From the total scores obtained by students, the frequency distribution and percentage of students' mathematics learning outcomes using the Jigsaw type cooperative learning model for class VIIIC

**Comparison of Learning Outcomes Mathematics Student Using Learning Models
Cooperative Jigsaw Type and STAD Type in Students Class VIII of SMP Negeri 1 Nosu**

SMP Negeri 1 Nosu is shown in experimental class I in Table 2 below.

Table 3 Frequency distribution and percentage of students' mathematics learning outcomes in experimental class I

Value Range	Category	Frequency	Percentage (%)
90 – 100	very high	5	31.25
79 – 89	tall	6	37.5
68 - 78	currently	2	12.5
0 - 67	low	3	18.75
Amount		16	100

From Table 3 above, it shows that of the 16 class VIIIC students at SMP Negeri 1 Nosu, there are 5 students whose learning outcomes are in the very high category at a percentage of 31.25%, 6 students whose learning outcomes are in the high category at a percentage of 37.5%. , 2 students with learning outcome levels were in the medium category at a percentage of 12.5% and 3 students with learning outcome levels were in the low category at a percentage of 18.75%. After the average value of students' mathematics learning outcomes of 82.56 is converted into the 5 categories above, it can be concluded that the average value of students' mathematics learning outcomes using the Jigsaw type cooperative learning model in class VIIIC of SMP Negeri 1 Nosu is in the high category

- b. Description results Study students' mathematics uses a learning model cooperative STAD type

Score data results Study mathematics student using a learning model cooperative Jigsaw type in class experiment II. Analysis results statistics descriptive summarized in Table 4

Table 4 Distribution results Study mathematics students in class experiment II

Statistics	Statistical Value
Size sample	16
Maximum score	95
Minimum score	47
Reach	48
Mean	69.44
Median	74
Mode	76
Variant	251,196
Standard Deviation	15,849

Based on Table 4 above, after giving the learning outcomes test to 16 students in experimental class 2 with statistics material, the

highest score was 95 which was the maximum score and the lowest score was 47 which was the minimum score. From the difference between the maximum and minimum scores, a value of 48 is obtained, which is the range, the mean or average score of student learning outcomes is 69.44 with the total number of student scores divided by the number of students, the median is 74 which is the middle value of the student scores, the mode is 76. which means the highest score obtained by students, obtained a variance of 251.196 and a standard deviation of 15.849.

From the total scores obtained by students, the frequency distribution and percentage of students' mathematics learning outcomes using the Jigsaw type cooperative learning model for class VIIIB SMP Negeri 1 Nosu is shown in experimental class II in Table 4 below.

Table 5 Frequency distribution and percentage of students' mathematics learning outcomes in experimental class II

Value Range	Category	Frequency	Percentage (%)
90 – 100	very high	2	12.5
79 – 89	tall	2	12.5
68 - 78	currently	7	43.75
0 - 67	low	5	31.25
Amount		16	100

From Table 5 above, it shows that of the 16 students in class VIIIB of SMP Negeri 1 Nosu, there are 2 students with learning outcome levels in the very high category at a percentage of 12.5%, 2 students with learning outcome levels in the high category at a percentage of 12.5%. , 7 students with learning outcome levels were in the medium category at a percentage of 43.75% and 5 students with learning outcome levels were in the low category at a percentage of 31.25%. After the average value of students' mathematics learning outcomes of 69.44 is converted into the 5 categories above, it can be concluded that the average value of students' mathematics learning outcomes using the STAD type cooperative learning model in class VIIIB of SMP Negeri 1 Nosu is in the medium category.

From the description of the data above, it can be seen that the average score of mathematics learning outcomes for experimental class I students who use the Jigsaw type cooperative learning model is different from the average score of experimental class II which uses the

STAD type cooperative learning model. To see whether there are differences between the two classes or vice versa, further statistical tests will be carried out .

2. Analysis Results Statistics Inferential

Analysis statistics inferential used For testing hypothesis . However before stage testing hypothesis moreover formerly prerequisite tests are carried out analysis , namely normality test and homogeneity test .

a. Normality Test

Table 6 . Normality test with *kolmogroff-smirnov*

Tests of Normality

Kolmogorov-Smirnov^a

	Statistic	df	Sig.
Jigsaw Class	,183	16	,156
Stad Class	,190	16	,125

Based on table 6 , the data obtained from the calculation of the *Kolmogorof-Smirnov test results* shows that the Jigsaw class learning outcomes have sig. 0.156, that means $0.156 \geq 0.05$ and the STAD class learning outcomes have sig. 0.125, also means $0.125 \geq 0.05$. So it can be concluded that the data for the two groups is normally distributed. Homogeneity Test

Table 7 . Test homogeneity with *Levene's test*

Test of Homogeneity of Variances

		Levene Statistics	df1	df2
Student Mathematics Learning Outcomes	Based on Mean	1,641	1	30
	Based on Median	1,079	1	30
	Based on Median and with adjusted df	1,079	1	28,319
	Based on trimmed mean	1,744	1	30

Based on Table 7 , the homogeneity test shows that it is significant, which means $0.210 \geq -0.05$. So it can be concluded that the data variance for the two groups is homogeneous.

b. Hypothesis testing

Table 8 . Test the hypothesis with the independent sample *t*-test

F	S i g.	t	df	Si g. (2 - tai le d)	Me an Dif fer enc e	Std. Err or Dif fer enc e	95% Confidence Interval of the Difference	
							Lo w er	Upper

Results	Equal variances assumed	1,641	2,520	2,520	30	.017	12,625	5,007	2,399	22,851
	Equal variances not assumed		2,521	28,203		.018	12,625	5,007	2,372	22,878

Based on Table 8 the values in column t is the t_{hitung} value obtained from calculation results . The t value in the first row , namely 2.521 , is mark t test results If variance both data are homogeneous , with Levene 's test results stated second variance homogeneous , then mark t_{hitung} used is based on the t test ie amounting to 2,521 with p_{value} equal to 0.017. The value p_{value} obtained is $0.017 < 0.025$, then H_0 rejected and H_1 accepted. So you can concluded there is difference results Study mathematics student using a learning model cooperative Jigsaw type and STAD type in students class VIII of SMP Negeri 1 Nosu.

Discussion

This research was carried out in two classes, namely experimental class I which used the Jigsaw type cooperative learning model and experimental class II used the STAD type cooperative learning model. The number of students taught from these two classes is the same, namely 16 people each. In terms of minimum completeness criteria (KKM), the average of the two classes can be seen that both classes have an average above the KKM, where the KKM for class VIII SMP Negeri 1 Nosu is 68. So these two types of cooperatives are able to encourage students in learning outcomes.

However, from the data presentation and data analysis it can be seen that the class using the Jigsaw type cooperative learning model has a *mean* of 82.56. Meanwhile, the class using the STAD type cooperative learning model has a *mean* (average) of 69.44, or the average for the class using the Jigsaw type cooperative learning model is higher than the class using the STAD type cooperative learning model. The value p_{value} obtained is $0.017 < 0.025$, so H_0 it is rejected and H_1 accepted. This indicates that using the Jigsaw type cooperative learning model improves student learning outcomes compared to using the STAD type cooperative learning model where classes using the Jigsaw type cooperative

learning model are in the high category and classes using the STAD type cooperative learning model are in the low category.

This is supported by research conducted by (Annisa, 2019) with the title "Comparison of the STAD Type (*Student Teams Achievement Divisions*) Cooperative Learning Model with the Jigsaw Type on the Mathematics Learning Outcomes of Class VII Students of SMPN 2 Bajeng Barat, Kab. Gowa". The results of the research show that: There is an average difference in the application of the STAD type and Jigsaw type cooperative learning models to the mathematics learning outcomes of class VII students at SMPN 2 Bajeng Barat, where the students' mathematics learning outcomes in the Jigsaw type cooperative learning model are greater than those of the Jigsaw type learning model. STAD type cooperative. The difference between this research and the research conducted by (Annisa, 2019) lies in the research design using a *pretest-posttest group design* ; Data collection techniques use tests and observations.

Research conducted (Khalistyawati & Muhyadi, 2018) . With the title: "The Influence of the STAD and Jigsaw Models on Collaborative Character, Critical Thinking Ability, and Cognitive Learning Outcomes". The results of the research show that: There is a positive and significant influence of the use of STAD and Jigsaw cooperative learning models on the character of cooperation, the ability to think critically, and cognitive learning outcomes; and the use of jigsaw cooperative learning has a more positive and significant effect than the use of STAD type cooperative learning. The difference in research conducted by (Khalistyawati & Muhyadi, 2018) lies in the research objectives which look at the character of cooperation, the ability to think critically, and cognitive learning outcomes; Observation data collection techniques and written tests; The research design is *nonequivalent control group design*

Research conducted by (Munandar et al., 2020) with the title: "The Effectiveness of the Jigsaw and STAD Cooperative Learning Model in View from the Mathematics Learning Results of Students at SMP Negeri 18 Bengkulu City". The results of the research show that: The average mathematics learning outcomes of students who use the Jigsaw type cooperative learning model are higher than the mathematics learning outcomes of students using the STAD

type cooperative learning model in class VIII of SMP Negeri 18 Bengkulu City, using the t-test, a significant value is obtained = $0.016 \leq \text{significant level } (\alpha) = 0.05$. The average learning outcome for Jigsaw class students is 68.75 and the average learning outcome for STAD class students is 57.80. The difference in this research lies in the aim where this research looks at effectiveness in terms of learning outcomes; The average obtained in this study is lower than the average obtained by researchers.

The core activity in Jigsaw type learning was carried out by researchers in class VIIC, attended by 16 students. Study groups were formed (original) consisting of 4 groups and each group had 4 students. After that, a group leader was determined, and the four students in each group were given different sub-topics, from these different sub-topics an expert group was created where those who received the same material as the other groups, an expert group was formed with the same group position but with different students. After studying together with the expert group, students return to their original (home) group. Here, what they have learned in the expert group, students teach to their group friends in turn. In this case, students are required to work together and each member has positive interdependence and is responsible for the completeness of the part of the learning material that has been studied. Hamdani in (Hasanah & Himami, 2021:8) .

4. Conclusion

Based on the discussion of the research results, the following conclusions can be drawn.

1. The results of student mathematics learning using the Jigsaw type cooperative learning model for class VIII students at SMP Negeri 1 Nosu are in the high category with an average score of 82.56 and a standard deviation of 12.245.
2. The results of student mathematics learning using the STAD type cooperative learning model for class VIII students at SMP Negeri 1 Nosu are in the medium category with an average score of 69.44 and a standard deviation of 15.849.
3. In data analysis using *the t-test* , the value obtained $t_{hitung} = 2.521$ with a significance of 0.017. The value P_{value} obtained is $0.017 < 0.025$, so H_0 it is rejected and H_1 accepted.

So it can be concluded that there are differences in students' mathematics learning outcomes using the Jigsaw type cooperative learning model and the STAD type for class VIII students at SMP Negeri 1 Nosu

5. Sayings Thank you

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***Comparison of Learning Outcomes Mathematics Student Using Learning Models
Cooperative Jigsaw Type and STAD Type in Students Class VIII of SMP Negeri 1 Nosu***

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