THE EFFECTIVENESS OF USING COOPERATIVE LEARNING MODEL TYPE STUDENT TEAM ACHIEVEMENT DIVISION (STAD) ON STUDENT LEARNING OUTCOMES

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ABSTRACT

Mathematics learning in class XI SMK N 1 Sewon is still centered on teachers. Students assume that mathematics is a complicated subject that resulted in the students' mathematics learning outcome. Learning using Student Team Achievement Division (STAD) type cooperative learning model is expected to improve students' mathematics learning outcomes. This research is aimed to find out whether or not the difference of mathematics learning result of the students is taught by using STAD type cooperative learning model and by using direct learning model, and which is better learning model to student learning achievement, STAD type cooperative learning model or model direct learning. This study's population were students of Class XI Hospitality Accommodation Program (AP) State Vocational High School (SMK N) 1 Sewon consisting of three classes. In contrast, the sample in this study, there are two classes determined by random sampling. The research sample is class XI (AP-1) as an experiment class with STAD type cooperative learning model, and class XI (AP-2) as a control class with a direct learning model. This research instrument is the test result of mathematics learning and analyzed using the validity test, distinguishing power, and reliability. Then, the data analysis uses a two-t-test and one-party test. The first hypothesis test analysis is two t-test on the students' mathematics learning results. A significance level of 5% and degrees of freedom 53 obtained t_{count} = 4.560, and t_{table} = 2.00584 then $t_{count} > t_{table}$. Hence, there is a significant difference between the learning results in mathematics of students taught by using STAD type cooperative learning model and by using direct learning model, and on second hypothesis test that is t-test one side with 5% significance level and degrees of freedom 53 obtained t_{count}= 4,560, and t_{table} = 1,67416, then $t_{count} > t_{table}$ so that model of cooperative learning type STAD better than direct learning model to result of student learning of mathematics.

Keywords: effectiveness, STAD type cooperative learning model, mathematics learning outcomes.

INTRODUCTION

Education is an essential thing in human life because, through education, humans can understand various sciences. This will continue to happen, as the development of human needs is unlimited and uninterrupted. The importance of education is undoubtedly the government's concern and priority because a good education will produce a superior generation that will become a generation of national leaders and other important professions to the Indonesian nation. According to Elea Tinggih in Suherman, Erman et al. (2003: 16). Mathematics is the knowledge that is acquired with reason. This does not mean that other sciences are obtained not through reasoning, but in mathematics, more emphasis on activities in the world of the reason (reasoning), while in other sciences, it emphasizes the results of observation or experimentation in addition to reasoning. Mathematics is formed as a result of human thought related to ideas, processes, and reasoning, according to M.Ali Hamzah and Muhlisrarini (2014: 57-58). Mathematics education is the first step in developing learning activities to effectively and efficiently achieve the expected educational goals. This is intended to improve students' reasoning, increase students' intelligence, and change their positive attitude. There is a stage to achieve this that is seen in the indicators of mathematics learning competence. One stage relates to other resilience. Implementing the stages with the ultimate goal must be completed with an implementation plan, so there is a target. The emphasis of mathematics learning is on the process of not forgetting the achievement of results. School mathematics education must be planned appropriately to improve

everyday reasoning's sharpness to use mathematics and mathematical thinking patterns in learning various sciences so that students are skilled or have abilities.

The results of interviews with students conducted on August 21, 2017, showed that in learning mathematics in class XI Hospitality Accommodation Expertise Programs, many students thought that mathematics was complicated, resulting in students being less eager to learn and less interested in subjects mathematics. It will impact student learning outcomes, especially in mathematics subjects that have not been as expected. Based on the results of an interview with a mathematics teacher at SMK N 1 Sewon, Mr.Muryadi, on Tuesday, August 21, 2017, information was obtained that teachers still use direct learning models in the teaching and learning process. When researchers made observations in class XI Hospitality Accommodation Expertise Program SMK N 1 Sewon on Tuesday, August 21, 2017, a learning model made students still passive, i.e., students only listened to the teacher's explanation. They were less brave to express their opinions so that students lacked seen in learning activities. Because in learning, it is more centered on the teacher (teacher center).

The above can be shown by the results of Final Semester Assessment mathematics grade XI students who are still low. Observation results also indicate that the students' mathematical grades have not yet reached the Minimum Completeness Criteria (MCC) set. MCC math lessons in this school amounted to 75.6. Percentage of mastery learning in class XI Hospitality Accommodation Skills Program students of SMK N 1 Sewon is only 0% class XI AP-1, 0% class XI AP-2, and 0% class XI AP-3. Most students still do not meet the MCC criteria. This is because, from the way, the delivery of material by the teacher in class can affect student enthusiasm for learning.

The teacher has an important role in realizing the achievement of mathematics learning goals. A teacher provides knowledge to students, but teachers must create conditions and situations that allow active learning to occur. One of them is by paying attention to the learning model used. The use of less precise learning models can lead to boredom, poorly understood, and monotonous so that students are less motivated to learn. One learning model used by teachers as one of the variations in increasing student activity in mastering mathematical material is applying the cooperative learning model type STAD. According to Aris Shoimin (2014: 185). Teachers who use STAD also refer to student group learning, present new academic information to students every week using verbal or text presentations. The syntax is: conveying goals and motivation, group division, presentations from the teacher, learning activities in teams, quizzes (evaluations), team achievement awards. Based on the above, the research takes the effectiveness of using the STAD type cooperative learning model of mathematics learning outcomes in class XI Hospitality Accommodation Expertise Program at SMK N 1 Sewon, Bantul Regency.

The aim of this research si: 1) To determine whether there are differences in student learning outcomes in mathematics using the cooperative learning model, STAD type and students use the direct learning model. 2) To find out more effectively between learning using the STAD cooperative learning model using direct learning models for learning outcomes.

METHODS

In this study involving two classes, namely the experimental class, and the control class. Both classes have the same ability and the same material, but different treatment in the learning process. In this study, using a posttest-only control design. According to Sugiyono (2015: 112), there are two groups in this design, each randomly chosen (R). The first group was given treatment (X). Moreover, other groups do not. The treated group is called the experimental group, and the untreated group is called the control group. The effect of the treatment is (O1: O2). In true research, the effect of treatment is analyzed by different tests, using statistical t-tests, for example. If there is a significant difference between the experimental and control groups, the treatment given has a significant effect.

Table 1. Research Design Using Posttest-Only Control Design

Experiment Group	R	X_1	O_1
Control Group	R	X_2	O_2

Information:
R: Random
X_1:An experimental class that is treated using the Student Learning Achievement Division (STAD) type of cooperative learning model
X_2: Control class is a class that uses the Direct Learning model
O_1: Posttest results of the experimental class
O_2: Posttest result of control class

This research was conducted at SMK Negeri 1 Sewon, Bantul Regency. In this study, the population was grade XI students of the Hospitality Accommodation Expertise Program of SMK N 1 Sewon in the academic year 2017/2018, consisting of 3 classes. The class is class XI AP-1, XI AP-2, and XI AP-3. Sampling in this study was carried out by using random sampling techniques for the class. After drawing for one-time sampling, class XI in the Hospitality Accommodation Program (AP-1) was obtained as an experimental class, a class that uses the Student Team Achievement Division (STAD) cooperative learning model, class XI in the Hospitality Accommodation Program (AP-2) as a class The control is the class that uses the direct learning model and class XI Hospitality Accommodation Program (AP-3) as a test class for learning achievement test instruments. Data collection methods in this study are the documentation method and the test method. The documentation method is used to obtain data on names and odd semester final exam scores. The test method is used to find out the results of learning mathematics. The test's form is an objective test with four alternative answers: a, b, c, or d, and there is only one correct answer.

The instrument test uses a validity test, a different power test, and a reliability test. Arikunto, Suharsimi (2016: 73-79) A test is valid if the test measures what is to be measured. In Indonesian, valid is referred to as valid. Reliability is a test that can have a high confidence level if it can provide permanent results Arikunto, Suharsimi (2016: 100). Different power is the ability of a question to distinguish between smart students (high ability) and students who are not smart (low ability) Arikunto, Suharsimi (2016: 226). The prerequisite test analysis and hypothesis testing are normality tests, homogeneity tests, two-party hypothesis tests, and one-party hypothesis tests.

RESULTS AND DISCUSSION

Description of Initial Ability Value

Table 2. Summary Description of Initial Ability Values

Class	Parameter						
	Σ	n_i	**Min value**	**Max value**	$\bar{X}$	**S**	S^2
Experimentation Class	1608	28	52	60	57	2,3882	5,7037
Control class	1525	27	55	65	56,4815	2,4864	6,1823

Normality Test Results Initial Capability Value

Table 3. Summary of the Normality Test Results Initial Capability

Class	χ^2_{count}	χ^2_{table}	Significant level	df	Information
Experimentation Class	5.25	7.81	5%	2	Normal
Control class	4.72	5.99	5%	1	Normal

Based on the above table, it can be seen that $\chi^2{}_{count} < \chi^2{}_{table}$. This shows that the initial mathematical ability values come from normally distributed data.

Homogeneity Test Results Initial Capability Value

Table 4. Summary of Homogeneity Test Results Initial Ability

Kelas	$S_i{}^2$	F_{count}	F_{tabel}	df	α	Information
Experiment	5,7037	0,9226	2,18	(27,26)	5%	Homogeneous
Control	6,1823					

Based on homogeneity tests that have been done in class XI AP-1 and XI AP-2 , it can be seen that $F_{count} = 0{,}9226$ and $f_{0,025}(27,26) = 2{,}18$ because $F_{count} < f_{0,025}(27,26)$ which means that both classes have the same variance (homogeneous). Value of $f_{0,025}(27,26) = 2{,}18$.

Hypothesis Test Results Two Parties Initial Capability Value

H_0: There is no difference in mathematics learning outcomes using the STAD type cooperative learning model with the direct learning model in class XI AP-1 students in the even semester of SMK N 1 Sewon in the academic year 2017/2018.

H_1: There is a difference in mathematics learning outcomes using the STAD type cooperative learning model with the direct learning model in class XI AP-1 students in the even semester of SMK N 1 Sewon in the academic year 2017/2018.

The null pair of hypotheses (H_0) and their counterparts (H_1) to be tested are as follows:

H_0: $\mu_1 = \mu_2$

H_1: $\mu_1 \neq \mu_2$

Test criteria for the two-party t-test: If $t_{count} > t_{\frac{\alpha}{2}}(n_1 + n_2 - 2)$, H_0 is rejected, and H_1 is accepted at a significant 5% level.

Table 5. Summary of Average Similarities of Initial Abilities

$\bar{X}_1$	$\bar{X}_2$	n_1	n_2	t_{count}	α	df	t_{table}
57	56,4815	28	27	0,3370	5%	53	2,00584
Information	H_0 accepted, there is no difference in students' initial mathematical abilities.						

Based on the analysis results carried out with a significant level of 5% and degrees of freedom 53, the value of $t_{count} = 0{,}3370$ and $t_{table} = 2{,}00584$ is obtained. So $t_{count} < t_{table}$, H_0 is accepted H_1 is rejected, which means that the initial mathematical ability that obtained learning using learning models STAD cooperative type is the same as students who get learning with direct learning models in class XI AP-1 students in the even semester of SMK N 1 Sewon in the academic year 2017/2018.

Description of Mathematics Learning Outcomes

Table 6. The summary description of the Value of Mathematics Learning Outcomes

Class	Parameter						
	Σ	n_i	Min value	Max value	$\bar{X}$	S	S^2
Experimentation Class	1608	28	58,3	91,7	73,507	11,127	123,821
Control class	1525	27	40	75	59,385	11,884	141,224

Test the Normality of Mathematics Learning Outcomes

Table 7. Summary of Normality Test Results Mathematics Learning Outcomes

Class	χ^2_{count}	χ^2_{table}	Significant level	df	Information
Experimentation Class	6,59	9,49	5%	3	Normal
Control class	8,27	9,49	5%	3	Normal

Based on the normality test that has been done in the experimental class with degrees of freedom = 3 and a significance level of 5%, it can be seen that $\chi^2_{count} = 6{,}59$ and $\chi^2_{table} = 9{,}49$ so $\chi^2_{count} < \chi^2_{table}$ which means that the experimental class has typically distributed data. Normality test conducted in the control class with degrees of freedom = 3 and a significance level of 5%, it can be seen that $\chi^2_{count} = 8{,}27$ and $\chi^2_{table} = 9{,}49$ so that $\chi^2_{count} < \chi^2_{table}$ which means that the control class has typically distributed data.

Homogeneity Test of Mathematics Learning Outcomes

Table 8. Summary of Homogeneity Test Results Mathematics Learning Outcomes

Kelas	S_i^2	F_{count}	F_{tabel}	df	α	Information
Experiment	123,821	0,8768	2,18	(27,26)	5%	Homogeneous
Control	141,224					

Based on homogeneity tests that have been done in class XI AP-1 and XI AP-2 , it can be seen that $F_{count} = 0{,}8768$ and $f_{0,025}(27,26) = 2{,}18$ because $F_{count} < f_{0,025}(27,26)$ which means that both classes have the same variance (homogeneous). Value of $f_{0,025}(27,26) = 2{,}18$.

Hypothesis Test Results Two Parties Initial Capability Value

H_0: There is no difference in mathematics learning outcomes using the STAD type cooperative learning model with the direct learning model in class XI AP-1 students in the even semester of SMK N 1 Sewon in the academic year 2017/2018.

H_1: There is a difference in mathematics learning outcomes using the STAD type cooperative learning model with the direct learning model in class XI AP-1 students in the even semester of SMK N 1 Sewon in the academic year 2017/2018.

The null pair of hypotheses (H_0) and their counterparts (H_1) to be tested are as follows:

H_0: $\mu_1 = \mu_2$

H_1: $\mu_1 \neq \mu_2$

Test criteria for the two-party t-test: If $t_{count} > t_{\frac{\alpha}{2}}(n_1 + n_2 - 2)$, H_0 is rejected, and H_1 is accepted at a significant 5% level.

Table 9. Summary of Hypothesis Testing of Two Parties Value of Learning Outcomes

S_1^2	S_2^2	n_1	n_2	df	t_{count}	t_{table}	Information
123,821	141,224	28	27	53	4,560	2,00584	H_0 rejected

Based on the analysis results conducted with a significant level of 5% and freedom 53, the value of $t_{count} = 4{,}560$ and $t_{table} = 2{,}00584$ is obtained, so $t_{count} > t_{table}$ cooperative type STAD with direct learning models.

Second Hypothesis Testing:

The null pair of hypotheses (H_0) and their counterparts (H_1) to be tested are as follows:

H^0: $\mu_1 = \mu_2$

H^1: $\mu_1 \neq \mu_2$

With

H_0: Learning mathematics using the STAD type cooperative learning model is no more effective than learning mathematics with a direct learning model for class XI students in the even semester of SMK N 1 Sewon in the academic year 2017/2018.

H_1: Mathematics learning using the STAD type cooperative learning model is more effective than mathematics learning with direct learning models in class XI students in the even semester of SMK N 1 Sewon in the academic year 2017/2018.

One-party test criteria: If $t_{count} > t_{table}$, then H_0 is rejected, and H_1 is accepted. With degrees of freedom dk = $(n_1 + n_2) - 2$ at a significant level of 5%.

Table 10. Summary of the One-Party Hypothesis Test The Value of Mathematics Learning Outcomes

S_1^2	S_2^2	n_1	n_2	df	t_{count}	t_{table}	Information
123,821	141,224	28	27	53	4,560	1,67416	H_0 rejected

Based on the results of the analysis conducted with a significant level of 5% and degrees of freedom 53, nil $t_{count} = 4{,}560$ and $t_{table} = 1{,}67416$, so the value of $t_{count} > t_{table}$ then H_0 is rejected, and H_1 is accepted, which means that mathematics learning using STAD cooperative learning models is more effective compared mathematics learning with direct learning models.

CONCLUSION

1. There is a difference in mathematics learning outcomes using the STAD type cooperative learning model with the direct learning model in class XI students in the even semester of SMK N 1 Sewon in 2017/2018. This is indicated by the first hypothesis test results with a significant 5% level and degrees of freedom = 53, the obtained value of $t_{count} = 4{,}560$ and $t_{table} = 2{,}00584$. So $t_{count} > t_{table}$ Then H_0 reject and H_1 is accepted.
2. Mathematics learning using the STAD type cooperative learning model is more effective than mathematics learning with a direct learning model for class XI students in the even semester of SMK N 1 Sewon in the academic year 2017/2018. This is indicated by the second hypothesis test results, wherewith a significant level of 5% and degrees of freedom 53, the value of $t_{count} = 4{,}560$ and $t_{table} = 1{,}67416$. Was obtained. So the value of $t_{count} > t_{table}$, then H_0 is rejected, and H_1 is accepted.

REFERENCES

Arikunto, Suharsimi. 2016. *Dasar-dasar Evaluasi Pendidikan (Edisi Revisi).* Jakarta: Bumi Aksara.

Hamzah, Ali dan Muhlisrarini. 2014. *Perencanaan dan Strategi Pembelajaran Matematika*. Jakarta: Rajawali Pers.

Hamdayama, Jumanta. 2014. *Model dan Metode Pembelajaran Kreatif dan Berkarakter*. Bogor : Ghalia Indonesia.

Mulyasa, E. 2009. *Manajemen Berbasis Sekolah.* Bandung: Remaja Rosdakarya.

Noormandiri. 2016. *Matematika untuk SMA/MA kelas XI*. Jakarta: Erlangga.

Purwanto, N. 2014. *Evaluasi Hasil Belajar*. Yogyakarta: Pustaka pelajaran.

Rusman. 2016. *Model – model Pembelajaran : Mengembangkan Profesionalisme Guru*. Jakarta : Rajawali Pers.

Saeffudin, Asis dan Ika Berdiati.2014. *Pembelajaran Efektif*. Bandung:PT Remaja Rosdakarya Offset.

Suprihatiningrum, Jamil. 2013. *Strategi Pembelajaran Teori dan Aplikasi*. Yogyakarta: Ar-Ruzz Media.

Slameto. 2010. *Belajar dan Faktor-faktor yang Mempengaruhinya.* Jakarta: Rineka Cipta.

Sudjana, 2001. *Metode Statistika edisi 6.* Bandung: Tarsito

Sugiyono. 2015. *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R&D).* Bandung: Alfabeta.

Suherman, Erman dkk. 2003. *Strategi Pembelajaran Matematika Kontemporer*. Bandung: UPI.

Suparman. 2015. *Metodologi Penelitian Pendidikan.* Yogyakarta : MIPA Universitas Ahmad Dahlan Press.

Shoimin, Aris. 2014. *68 Model Pembelajaran Inovatif Dalam Kurikulum 2013*. Yogyakarta: Ar-Ruzz Media.

Sukmadinata, Nana Syaodih. 2003. *Landasan Psikologi Proses Pendidikan.* Bandung: Remaja Rosdakarya.

Thobroni, M. 2015. *Belajar dan Pembelajaran*. Yogyakarta: Ar-Ruzz Media.

Uno, Hamzah B. 2011. *Model Pembelajaran Menciptakan Proses Belajar Mengajar Yang Kreatif dan Efektif.* Jakarta: Bumi Aksara.