EFFECTIVENESS OF JIGSAW TYPE COOPERATIVE LEARNING MODEL ON THE MATHEMATIC COMMUNICATION SKILLS OF STUDENTS IN SMP UNGGULAN AISYIYAH BANTUL

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ABSTRACT

The Learning model applied in SMP Unggulan 'Aisyiyah Bantul featured still tends to be teacher's centered and makes students become passive in the process of learning so that student learning outcomes are still low. Jigsaw is one of many kinds of teaching and learning model which provides opportunities to the students to be actively involved in the class activity. The objectives of this research are (1) to know the diversities in the math learning marks of the eighth-grade students which are taught using the conventional learning model in the odd semester of SMP Unggulan 'Aisyiyah Bantul in the academic year of 2016/2017, (2) to know the effectiveness of the cooperative learning model type Jigsaw towards the conventional learning model to the eighth-grade students in the odd semester of SMP Unggulan 'Aisyiyah Bantul in the academic year of 2016/2017. This research used the quantitative research method. The population of the research was the eighth-grade students in the odd semester of SMP Unggulan 'Aisyiyah Bantul in the academic years of 2016/2017. To obtain the sample, this research used the random sampling technique. As the sample, this research managed the VIII B class as the Experiment Class and VIII A as the Controlled Class. A test was applied for the data collecting technique of this research. To calculate the instrument validity and reliability, this research used the product-moment correlation and the Alpha formula. The data analyzing technique of this research are the t-test, the normality test used the Chi-Quadrate formula, and the homogeneity test used the Bartlett test. Based on the research findings at the 5% significance level and a degree of freedom of 39, thus the accumulations are (1) t_{table}= 1,6835 and t_{count} = 2,2470. It collected $t_{count}>t_{table}$ so H_0 is rejected. Henceforward, there are diversities in the math learning marks of the students who were taught using the cooperative learning model type Jigsaw towards those which were taught using the conventional learning model. (2) t_{table}= 1,6835 and t_{count}= 2,2470, collected $t_{count}>t_{table}$ so H_0 is rejected. To put it briefly, the cooperative learning model type Jigsaw is more effective than the conventional learning model towards math learning marks.

Keywords: the effectiveness, Jigsaw, Math Learning Marks**.**

INTRODUCTION

Human culture is characterized by the development of science and technology in order to determine the state of the surrounding environment. Science was created to be able to help human life become easier and more directed. Science has become something substantive that controls human life. However, science that has developed so rapidly has also caused various humanitarian crises in life. This is due to solving humanitarian problems that are more sectoral in nature. One effort to solve these increasingly complex humanitarian problems is to provide quality education. Education is a process of maturation of quality of life. Through this process, it is expected that humans can understand the meaning and nature of life, and carry out the tasks of life and life correctly. Education is essentially a process of liberating students from ignorance, incompetence, helplessness, untruthfulness, dishonesty, and from bad hearts and faith.

Based on the data on the learning outcomes of eighth-grade students of SMP Unggulan Aisyiyah Bantul, 2016/2017 academic year, the average student learning outcomes are still low, not in accordance with the Minimum Mastery Criteria (KKM) set by the school. KKM for mathematics is 75 (seventy-five). From the observations obtained information that student learning outcomes in learning mathematics are still low, students are less than optimal in following the ongoing learning process. There are still many students who think mathematics is a difficult subject to understand, so students are less enthusiastic in following the ongoing mathematics lessons. This causes students difficulties when

taking quizzes or daily tests given by the teacher. From these observations obtained low student learning outcomes, especially in mathematics subjects. Whereas from the information of one of the teachers, Mr. Syahlan Romadon S.Pd, as a mathematics teacher who teaches in class VIII of SMP Unggulan 'Aisyiyah Bantul said that the learning model that is usually implemented is a conventional type of learning, namely lectures and assignments. In this case, learning outcomes are less than optimal. Students do not evaluate their mathematical ideas, making it very difficult for students to understand the mathematical concepts being studied. If the question and answer and discussion methods have been implemented, sometimes students also lack the courage to express their opinions. This can be an obstacle to the development of student learning outcomes in the learning process. These facts reveal that student learning outcomes are still very low. Many learning models and strategies can be applied in class. Whatever model or strategy is applied, the most important thing is to be able to create active students who are able to improve student learning outcomes, so as to create an active, creative, and innovative learning process. The application of a cooperative learning model is very appropriate to use, one of which is a Jigsaw cooperative learning model.

Jigsaw has been developed and tested by Elliot Aronson et al at the University of Texas, then adapted by Slaven et al at Jhon Hopkins University. In terms of etymology, jigsaw comes from English which means "carved saws". There are also those who call it the puzzle itself, which is a puzzle that arranges pieces of the picture. This type of cooperative learning jigsaw also takes the pattern of how to work a saw (jigsaw), ie students do learning activities by working with other students to achieve common goals.

According to Stephen, Sikes and Snapp in Rusman (2012: 218), the steps for a type of jigsaw cooperative learning are as follows:

1) Students are grouped with approximately 4 members;
2) Each person on the team is given different material and tasks;
3) Members from different teams with the same mastery form new groups;
4) After the expert group discusses, each member returns to the original group and explains to the group members about the sub-section they control;
5) Each expert team presents the results of the discussion;
6) Discussion;
7) Closing.

By implementing Jigsaw cooperative learning, students are required to work together to bring out mathematical ideas in the learning process. Learning outcomes are not only measured by expressing ideas through writing but more broadly namely the ability of students in terms of speaking, explaining, describing, listening, asking, clarifying, cooperating (sharing), writing, and finally reporting what they have learned. , research. Deni, Yolmita (2012), showed that learning using learning methods using Jigsaw type cooperative learning methods to increase student collaboration in each cycle has increased both in the expert group and the origin group. In addition, Dwi's research, Agustin Nugraheni (2012), stated that there was no significant difference between students' learning independence using jigsaw type cooperative learning methods and those using expository learning methods. The linkage of the above research with this research is both using the Jigsaw cooperative learning model. While the difference in the above research with the research conducted by researchers is that the above study did not examine the comparison of Jigsaw type cooperative learning models with conventional learning models.

METHODS

The type of this research is the type of experimental research. This study uses two classes, the experimental class I conducted learning with the Jigsaw cooperative learning model, while the experimental class II conducted conventional model learning. In this study, the posttest used was the same for Experiment I class and Experiment II class. The research design used was a posttest-only control design. In this design there are two groups, each randomly chosen (R). The design is as follows:

$$\boxed{\begin{array}{ccc} R & X & O_1 \\ R & & O_2 \end{array}}$$
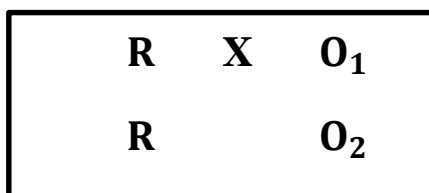
Picture 1. Research Design
(Sugiyono, 2015:76)

The study was conducted in the SMP Unggulan 'Aisyiyah Bantul class VIII Odd Semester 2016/2017 Academic Year. The population in this study were eighth-grade students of SMP Unggulan Aisyiyah Bantul School Year 2016/2017 which were divided into 2 classes, namely class VIII A and VIII B. The number of class students per class can be seen in Table 1:

Table 1. Research Population

No.	Class	The number of students
1.	VIII A	20
2.	VIII B	21
	Total Population	41

(Source: SMP Unggulan 'Aisyiyah Bantul)

Determination of the sample with consideration of the class that has a low level of learning outcomes in mathematics as an experimental class (a class that uses a type of jigsaw cooperative learning model) and a control class (a class that uses conventional learning models). Class VIII B was selected as experimental class I and class VIII A as experimental class II. Data collection techniques used were test and observation methods. The test is used to obtain the value of student mathematics learning outcomes in class VIII SMP Unggulan 'Aisyiyah Bantul in a class that is taught a Jigsaw type cooperative learning model and the class taught using conventional learning models. While the observations used in this study regarding the behavior of students of class VIII odd semester SMP Unggulan Aisyiyah Bantul 2016/2017 academic year.

The instruments used in this study were tests and observation sheets of learning outcomes. The test is used to measure the learning outcomes of SMP 'Aisyiyah Bantul students in the form of a description of 3 items. Sedamgkan observation sheet is used to examine what variables will be observed. A structured interview guide can be used as a guide for making observations. After the test instruments are arranged, they are then tested in class. After the test questions were tested, the test items were analyzed by validity test using the product-moment correlation formula (Arikunto, 2012: 87) and reliability testing using the alpha formula (Arikunto, 2012: 122). The analysis prerequisite test used the normality test with the Chi-Square test (Suparman, 2012: 66) and homogeneity test with a Bartlett test (Sudjana, 2005: 263). Hypothesis testing used t-test (Sudjana, 2005: 239) two parties or one party.

RESULTS AND DISCUSSION

Based on the research that has been carried out obtained data in the form of initial abilities and student learning outcomes.

1. **Initial Ability**

Adapun deskripsi statistik nilai awal hasil belajar dapat dilihat pada Tabel 2.

Tabel 2. Hasil Uji Normalitas Nilai Awal Hasil Belajar

Class	χ^2_{count}	χ^2_{table}
Experiment I	3,3616	5,9915
Experiment II	0,2976	5,9915

From the table above it appears that $\chi^2_{count} < \chi^2_{table}$, this shows that the initial mathematical scores of students in each sample are normally distributed data.

Homogeneity Test Initial Value of Learning Outcomes is carried out to confirm that the group taken (sample) has the same learning outcome value. The formula used in the homogeneity test is the Bartlett test. The summary of the homogeneity test results of the initial mathematical ability of students in the experimental class and the control class can be seen in Table 3:

Table 3. Homogeneity Test Results Early Value Learning Outcomes

$\chi^2{}_{count}$	$\chi^2{}_{table}$
1,2504	3,8415

From the table above it appears that $\chi^2{}_{count} < \chi^2{}_{table}$, so H0 is accepted, this shows that both classes have the same initial value.

The summary of the results of the initial ability similarity hypothesis test can be seen in Table 4.

Table 4. Summary of the First Hypothesis Test Results Initial Ability Score

t_{count}	t_{table}
-0,1281	1,6853

From the table above it appears that $t_{stat} < t_{table}$ so it is said the hypothesis H_0 is accepted and concluded that there is no difference in the initial value of student mathematics learning outcomes.

2. **Mathematics Learning Outcomes**

The normality test is used to determine whether the learning outcomes of the experimental class and control class are normally distributed or not. The normality test uses Chi-Square. The summary of the normality test results for the initial ability can be seen in Table 5:

Table 5. Normality Test Results learning outcomes

Class	$\chi^2{}_{count}$	$\chi^2{}_{table}$
Experiment I	3,4331	5,9915
Experiment II	1,7592	5,9915

From the table above it appears that $\chi^2{}_{stat} < \chi^2{}_{table}$ this shows that the initial mathematical scores of students in each sample are normally distributed data.

Summary of the homogeneity test results of the learning outcomes of the experimental class and control class students can be seen in Table 6.

Table 6. Homogeneity Test Results Learning Outcomes Value

$\chi^2{}_{count}$	$\chi^2{}_{table}$
0,0082	3,8415

From the table above it appears that $\chi^2{}_{stat} < \chi^2{}_{table}$ so H0 is accepted, this shows that both classes have the same (homogeneous) mathematics learning outcomes.

The null hypothesis (H_0) and its counterpart (H_1) submitted for the first hypothesis test are as follows:

Table 7. Results of the First Hypothesis Test Learning Outcomes

t_{count}	t_{table}
2,2470	2,0226

From the table above it appears that $t_{count} > t_{table}$ so it is said that the H_0 hypothesis is rejected and it is concluded that there are differences in mathematics learning outcomes of students taught using Jigsaw type cooperative learning models with students taught using conventional learning models in class VIII Odd Semester SMP Unggulan 'Aisyiyah Bantul.

The summary of the results of the second hypothesis test student learning outcomes of the experimental class and the control class can be seen in Table 8.

Table 8. Results of the Second Hypothesis Test Learning Outcomes

t_{count}	t_{table}
2,2470	1,6835

From the table above it appears that $t_{count} > t_{table}$ so it is said that the H_0 hypothesis is rejected and it is concluded that the Jigsaw type of cooperative learning model is more effective than the conventional learning model of student learning outcomes on the subject of Algebra class VIII Odd Semester SMP Unggulan 'Aisyiyah Bantul.

CONCLUSION

Based on the results of the research and discussion above, the following research conclusions can be drawn:

1. There is a difference in the learning outcomes of students who are taught using the Jigsaw cooperative learning model with students who are taught using conventional learning models in class VIII Odd Semester SMP Unggulan 'Aisyiyah Bantul. This is indicated by the results of the first hypothesis test with a significant level of 5% and a degree of freedom 39, obtained t_{table}=1.6835 and t_{countt} = 2.2470. So we get t_{countt}> t $_{table}$ so H_0 is rejected.
2. The Jigsaw type of cooperative learning model is more effective than the conventional learning model of class VIII Odd Semester Featured Junior High SchoolSMP Unggulan 'Aisyiyah Bantul. This is indicated by the results of the one-party hypothesis test with a significant level of 5% and degrees of freedom 39, obtained t_{table} = 1.6835 and t_{count} = 2.2470. So we get t_{count} > t $_{table}$ so H_0 is rejected.

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