THE EFFECTIVENESS OF USING THINK PAIR SHARE (TPS) AND JIGSAW COOPERATIVE MODELS IN MATHEMATICS LEARNING ON PROBLEM SOLVING ABILITY IN CLASS VII SMP

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ABSTRACT

Common student problem-solving ability is related to several factors. The use of cooperative models in learning is one of the possible factors that can improve student problem-solving abilities. This study aims to determine the effectiveness of using the think pair share cooperative model and the cooperative jigsaw model on seventh-grade students' problem-solving ability of the odd semester of SMP Negeri 1 Tembarak in 2018/2019 academic year. The research population consisted of class VII students of SMP Negeri 1 Tembarak in the odd semester of the 2018/2019 academic year, which consisted of classes VII A, VII B, VII C, VII D, VII E, VII D, VII F, totaling 169 students. Samples were taken from class VII A as the first experimental class using the think pair share cooperative model and class VII D as the second experiment class using the jigsaw cooperative jigsaw techniques using essay questions to obtain data on students' problem-solving abilities. The research instrument test includes a validation test, reliability test, difference power test. The analysis prerequisite test includes the normality test, homogeneity test, initial ability test, hypothesis test. The results showed differences in students' problem-solving abilities who used the think pair share cooperative model using the cooperative jigsaw model. This is indicated by $t_{count} = 4{,}76 > t_{table} = 2{,}006$ then $H_{0.1}$ rejected $H_{1.1}$ received. From the research results, students' problem-solving ability using the cooperative model, think pair share, is higher than using the cooperative jigsaw model. This is indicated by $t_{count} = 4{,}76 > t_{table} = 1{,}675$ then $H_{0.2}$ rejected $H_{1.2}$ received.

Keywords: Problem-solving ability, Think Pair Share (TPS), and Jigsaw.

INTRODUCTION

Education is the main factor determining the quality of life of a nation; therefore, if the government's rate wants to improve, the quality of education (quality of instruction) is also improved. The quality of education means that education graduates have the appropriate abilities to make a high contribution to development. In teacher education is very influential on the quality of education. This agrees with Slamet (1991), stating that school quality and teaching quality are teacher quality (Jatirahayu, Warih, 2013: 49). Therefore teachers are the spearhead in education so that the quality of teachers must always be improved. In the world of education, much knowledge must be taught, mathematics. Mathematics is a universal science that underlies the development of modern technology and can be said to be the basis of all experience and can advance the power of human thought. Therefore, mathematics is a subject available at every education level in Indonesia, ranging from elementary schools to elementary schools above (high school).

Based on the results of research observations conducted at SMP Negeri 1 Tembarak, teachers still often use the lecture learning method. Still, sometimes the teacher also uses the question and answer learning method and discussion. Lecture learning methods that are often used are more centered on the teacher and are one-way so that students only listen to and record the teacher's material. Sometimes, the teacher uses the question, and answer method and discussion used when the teacher gives the task to students. When learning occurs, students are also very passive because they feel afraid to ask the teacher so that students feel difficulties in learning mathematics.

The main role in teaching itself is a formidable and robust method of teaching activities. Regarding the effectiveness of teaching, to achieve active learning, one crucial aspect is the problem of the method used by the teacher in creating an active atmosphere. Moreover, the technique used is

expected to provide quality education and positively impact the learning process. For example, it can improve students' ability to solve problem-solving. Problem-solving is a basic ability that must be mastered by every student. Even reflected in the concept of competency-based curriculum. The importance of students' problem-solving skills in mathematics is also emphasized by Branca (1980), namely (1) The ability to solve problems is a general goal of teaching mathematics. (2) Problem-solving, including methods, procedures, and strategies, is the core and primary process in the mathematics curriculum. (3) Problem-solving is a necessary ability in learning mathematics (Radiyatul, Hadi Sutarto, 2014: 55). so problem-solving is an important thing that must be taught to students in learning mathematics. Still, in learning mathematics, it is needed to think critically and think logically so students must be active.

In improving problem0solving abilities, active, innovative, and creative learning methods are needed. In this study, learning will be applied using the cooperative pair think type share model. The two cooperative models' jigsaw method will be compared to find which cooperative model is more effective in improving students' problem-solving skills. An understanding of the Think Pair Share cooperative model is confirmed by Suparno (2007), stating that with Think, it is expected that students can think individually or answer questions given by the teacher. Pair, students discuss in pairs and finally. Share, students share the results of discussions with all students in one class and then combine them and make conclusions together (Nurnawati et al.: 2012).

While the jigsaw method According to Aronson (2009), the steps of learning the jigsaw method are as follows: (1) Placing students in groups, each group consisting of 5-6 people (2) Assigning a student from each group as a leader (3) Divide the subject matter into 5-6 parts (4) Assign each student to study one part of the material (5) Give the student time to study the material that is part of at least twice so that he becomes familiar with the material. (6) Forming "expert groups" whose members are students from each "homegroup." They join together as a group (experts) to learn the same piece of material. The teacher gives time to each "expert group" to discuss the critical points of their subject matter sub-section as a guide to the presentation they will make in the "homegroup" (7). Ask each student to return to the "homegroup" they. (8) Asking each student to present their part material in the "homegroup." The teacher encourages other group members to ask questions aimed at clarification. (9) The teacher observes the process of discussion from one group to another. If the group experiences obstacles (for example, some dominate or misbehavior), the teacher intervenes. (10) At the end of the session, give a quiz related to the material so that students can immediately realize that what they are doing is not a wasted activity (Alsa, Asmadi, 2010: 166).

METHODS

This research was conducted at SMP Negeri 1 Tembarak which is located on Jalan Tembarak, Kecamatam Tembarak, Temanggung Regency. The time of this study was odd semester 2018/2019.

Table 1. Description of Research Implementation Data

Class	VII A	VII B
Treatment	Think Pair Share	Jigsaw
Implementation date	1 Oktober 2018 (3 MH) 2 Oktober 2018 (3 MH)	2 Oktober 2018 (3 MH) 6 Oktober 2018 (3 MH)
Theory	Venn diagram	Venn diagram

The design used in this study is the posttest control group design. There are two groups, namely experimental class one and experimental class two, where experimental class one is given treatment to apply a cooperative model of think pair share type in mathematics learning, and experimental class two is given a cooperative jigsaw model in mathematics learning.

The population is the subject of all research in this study. The population is class VII students of SMP Negeri 1 Tembarak. The sample is part of the population, and as the subject under study, the sample in this study is class VII A as experimental class one and VII D as experimental class two. The

intake of the class is based on random sampling. This study's independent variables are the cooperative model of think pair share and the cooperative jigsaw model, while the dependent variable is the problem-solving ability.

Data analysis was performed to test the hypotheses in order to conclude achieving the research objectives as for the following steps:

1. The normality test using the formula used is the Chi-Square formula with a 5% significance level testing criteria where the data is said to be normally distributed Ir x ^ (2) <⟦x ^ 2⟧ table. Formula

$$X^2 = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i}$$

Information

X^2 = Chi Squared

O_i = The expected frequency of i (i = 0.1 ... 3)

E_i = Frequency of observation

Where I = 0,1,2 ....., k

(Heryono Ekawati Heni 2016 :74)

2. Homogeneity test of 5% significance level

test the statistics $F_0 = \frac{biggest\ variant}{smallest\ variant} = \frac{S_1^2}{S_2^2}$ and the level of significance H_0 rejected if $F_0 < F_{1-\frac{\alpha}{2}}(n_1 - 1, n_2 - 1)$ or $F_0 > F_{\frac{\alpha}{2}}(n_1 - 1, n_2 - 1)$

(Heryono Ekawati Heni 2016 :75).

3. Initial ability test to measure initial ability is used statistical test is a t-test with the following formula:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s\sqrt{\frac{1}{n_1} + \frac{1}{n_1}}}$$

$$s^2 = \frac{(n_1 - 1)s^2 + (n_2 - 1)s^2}{n_1 - n_2 - 2}$$

Information

$\bar{x}_1$= The average grade of the class with the type of cooperative learning model think pair share (experimental class 1)

$\bar{x}_2$ = The average value of the class with a jigsaw cooperative learning model (experimental class 2)

n_1 = Number of students in the cooperative learning model group think pair share type (experimental class 1)

n_2= Number of students in the jigsaw cooperative learning model group (experimental class 2)

$s_1{}^2$= Variance in the value of students in the cooperative learning model think pair share type (experimental class 1)

$s_2{}^2$= Variance in the value of students in the Jigsaw type cooperative learning model (experimental class 2)

s = Standard deviation combined.

t = Price t arithmetic

(Heryono Ekawati Heni 2016:75)

RESULTS AND DISCUSSION

Results of initial data analysis $x^2 < x^2{}_{table}$ data distribution are normal and $F_0 < F_{1-\frac{\alpha}{2}}(n_1 - 1, n_2 - 1)$ or $F_0 > F_{\frac{\alpha}{2}}(n_1 - 1, n_2 - 1)$. Both the experimental class 1 and experimental class 2 are normal and homogeneous. after the two classes get the experimental class 1 treatment with the think pair share cooperative model and the experimental class 2 cooperative jigsaw model, it is known that the experimental class TPS $x^2_{count} = 6.31 < x^2_{table} = 11.1$ and in the experimental class jigsaw $x^2_{count} = 5.74 < x^2_{table}$ so that both classes are normally distributed. In the homogeneity test carried out with a significant level of 5%, the data obtained $F_0 = 1.59 > F_{0,975(27,27)} = 0.46$ or $F_0 =$

$1{,}59 < F_{0{,}025(27{,}27)} = 2.16$ so H_0 is accepted, it is concluded that the data resulting from problem solving abilities in students are homogeneous. Based on the results of the test of problem-solving ability in students with two-party significant t-test of 5% with a degree of freedom, 54 obtained $t_{count} = 4{,}76 > t_{table} = 2{,}006$ so that $H_{0.1}$ is rejected $H_{1.1}$ is accepted, so it is concluded there is a difference between the results of problem-solving abilities on students who take part in learning using cooperative learning models think pair share type with the results of problem-solving abilities in students who take part in learning using jigsaw type cooperative learning models Based on the results of problem-solving ability tests on students with one-party t-test significant 5% with a degree of freedom 54 obtained $t_{count} = 4{,}76 > t_{table} = 1{,}675$ then $H_{0.2}$ rejected $H_{1.2}$ accepted, so it was concluded that the cooperative learning model of think pair share type is higher than using the jigsaw cooperative learning model towards the results of problem-solving skills in class VII semester students odd school year 2018/2019.

CONCLUSION

Based on the discussion, it can be concluded: (1) There is a difference between the ability to problem-solve with the TPS type cooperative learning model and the results of the problem-solving ability by using the jigsaw type cooperative learning model for VII grade students of SMP Negeri 1 Tembarak in the odd semester of 2018/2019. (2) TPS type cooperative learning model is more effective than using cooperative jigsaw model learning on the results of problem-solving abilities in VII grade students of SMP Negeri 1 Tembarak in the odd semester of the 2018/2019 school year.

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