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Improving student learning outcomes using research-based think pair and share models

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Abstract. The purpose of education is not only the provision of subject matter in the classroom, but can provide an invitation to students to find and build their own knowledge through the experiences gained. Knowledge gained from oneself is easier for students to remember than is obtained from others. This required an effective learning model to improve learning outcomes. Research-based learning trains students to solve problems, and make decisions and develop critical thinking skills by connecting existing theories. The purpose of this study is to examine the effectiveness of research-based Think Pair and Share (TPS) learning on student learning outcomes. The research method uses the correct experimental design with the posttest-only control design. The results showed student learning outcomes using the TPS model based on research had high results compared to normal learning.

1. Introduction

Education has a very important role in the progress of a country. Education has the aim not only to provide subject matter in the classroom, but can provide an invitation to students to discover and build their own knowledge through the experiences gained. According to Prihatiningtyas opinion that the rapid development of science and technology needs to be balanced with the quality of education [1]. Knowledge gained from oneself is easier for students to remember than knowledge gained from others.

Students must be active and directly involved in learning in order to have direct experience, life skills and mastery of concepts. In addition to direct experience and mastery of concepts. Heong [2] said that the thinking knowledge involved in using meaningful knowledge. Critical thinking skills are very important because they help students learn, improve their performance and reduce their weaknesses. According to Fithriani [3] said that every human being has the potential to grow and develop into a critical thinker because actually the activity of thinking has a relationship with the pattern of self-management (self organization) that exists in human beings themselves.

In geographical material, especially the environmental subjects in its implementation are still monotonous. All information is only from the teacher and research is not added so students are not active in classroom learning [12]. This is in line with Nurdin's opinion [4] who said that geography learning in its implementation was not only done with theory but combined with research. This can be seen from students still do not understand the material. So that there needs to be improvement through a learning model that can develop students' critical thinking skills, namely by learning research-based Think pair and Share (TPS).



The research-based TPS model is one of the models that lead to work-based learning that is designed to influence student interaction patterns in the research process. In the opinion of Eggen and Kauchak [5] states that TPS is a group work strategy that asks students in pairs to learn to find answers and share answers with other colleagues. This is added by Nurdin's opinion [6] that the use of TPS can create interactions that can encourage curiosity, want, try, be independent, and feel like going forward. This opinion is reinforced by Huber [7] that the research model can make students design experiences and reflect the research process both from problem identification to research report.

TPS learning has appropriate characteristics according to Komalasari [8] namely cooperative learning models can provide time to think, respond, and help each other for students. So as to be able to shape students' knowledge about science through research and verify the research evidence, and be able to develop students' skills to determine novelty and relevant research. The results of previous studies written by Elan [6] are that there is an effect of using think pairs and sharing of models on social studies learning outcomes that are proven to be true. This is reinforced by nursofah [9] namely there is a significant influence of the creative thinking ability of students on learning outcomes of environmental pollution materials. The difference between this study and previous research is this study to test the effect of research based on Think Pair and Share learning models. Based on the description above, the formulation of the problem in this study is whether research-based learning is helped to influence student learning outcomes in geography.

2. Methods

The design of this study uses quasi-experimental methods. In the opinion of Sudjana [10] states that learning activities are applied with rotation of the learning model, this is so that all research subjects in both classes both experiment and control receive all the same treatment. The population in this study was all 2018 geography students in the Geography Education Study Program FKIP Universitas Jember.

Table 2.1 Research design

Class	Pretest	Treatment	Posttest
Eksperimen	O1	X1	O2
Control	O1	-	O2

Source: Sugiyono [11]

Description:

O1 : Pretest before learning

O2 : Posttest after learning

X : Treatment using research-based think pair and share models

- : Treatment using lectures, discussions, question and answer, and assignments

The treatment in this study was to measure student geography learning outcomes between classes using the research-based TPS model (experimental) and classes using the usual learning model (control). There are several different treatments given in two classes including:

First, determine which class treatment is suitable as an experimental class and a control class with purposive random sampling. From the sampling results it was found that class A was treated using a research-based TPS model, while class B was given conventional model treatment. Then give pretest questions to the experimental class and the control class to find out the student's initial ability before getting the teaching and learning process. Pretest takes the form of 5 essay questions.

Second, the experimental class is given treatment using the TPS model where the teacher asks questions related to the material to be taught then students are asked to think about the answer to the question (think), then the teacher asks students to pair up with other students to discuss by seeking research the latest research about the material. In the final stage the teacher asks to share with other groups according to the research they have obtained about environmental material.

Third, after being given a treatment the TPS model then groups students into high, medium, and low ability groups according to the value of student learning outcomes.

Fourth, each class in both the experimental and control classes was given posttest to get the final grade in learning. Then the final value is calculated using the N-Gain Score.

After that the calculation is done with the help of SPSS 16.0 software for windows and analyzed to get conclusions in the effectiveness of the use of research-based TPS models on student learning outcomes.

3. Result and Discussion

In this study there are two classes, namely the experimental class and the control class which have differences. The experimental class uses the think pair and share learning model, while the control class uses the conventional model. The goal is to get data on student geography learning outcomes in each class. The data will be obtained gaincore ie pretest scores collected posttest. The value of learning outcomes in geography is the results of learning geography of students on environmental material. From the results of research conducted in July 2019 obtained pretest and posttest data in the experimental and control classes for the pretest data.

Pretest and posttest were obtained using essay tests with 5 items. Previously the items were first consulted with experts to validate the feasibility of questions related to environmental material and learning design. If it is feasible, it can be tested. Based on the test results of the geography learning achievement test instrument conducted on the 2018 geography student at the FKIP Universitas Jember on September 5, 2019, the prerequisite test results have met and are suitable to be used in this study. There are several trials that are assessed include the different power of questions, the validity of the questions, the reliability of the questions, and difficulty of the questions. The results can be seen in the following table 3.1.

Table 3.1 Test Results of Test Instruments

No	Difficulty level	Criteria	Difference	Criteria	Validity	Criteria	Reliability	Criteria
1	33%	Good	0,38	Enough	0,779	Valid		
2	40%	Good	0,45	Good	0.877	Valid		
3.	34%	Good	0,36	Enough	0.767	Valid	0,701 > 0,273	Reliable
4	36%	Good	0,43	Good	0.839	Valid		
5	45%	Good	0,50	Good	0.871	Valid		

Source: Results of Data Processing in 2019

Based on the results in table 3.1 shows that the assessment of the feasibility test includes a test of distinguishing power, difficulty level, validity, and reliability of all valid questions. So it can be concluded that the five questions that have been tested are good enough and deserve to be used as a measure of learning outcomes of students' critical thinking skills in the experimental class and the control class.

In this study the first step is to look at the students' initial abilities related to environmental material. To see the initial ability, the teacher gives a pretest to students. Pretest is given to the experimental class and the control class. The results are used as a reference for the division of high, medium, and low value groups.

After being given the teaching and learning process, the next step is to measure the student's final ability by providing posttests. The questions given in this post are no different from the pretest questions. For the design of the hypothesis can be seen below.

H_0 : there was no significant effect between the research-based TPS model on student learning outcomes

H_1 : there is a significant influence between the research-based TPS model on student

learning outcomes

This study uses parametric statistical tests as hypothesis testing. Testing this hypothesis by looking at the independent sample test obtained at 3,675, then the results of the significance show at 0,000. So that it was found that the results were rejected H_0 . Based on this, H_1 is used as the result of research. The recapitulation of the results of the pretest can be seen in the following table.

Table 3.2 Recapitulation of Pretest Results

Class	n	Value			
		Ideal Score	Minimum Value	Maximum Value	Average
Eksperimen	41	100,00	15	45	30,85
Kontrol	43	100,00	20	50	35,58

Based on table 3.2 above, it is obtained the mean pretest between the experimental class and the control class. From the test results it can be seen that the control class has an average higher than the experimental class. This shows that for class A (experimental) it is very suitable to be given treatment using a research-based TPS model.

Then analyzed with SPSS 16 for windows to test data normality. The results of the pretest normality test can be seen in the following table:

Table 3.3 Recapitulation of Pretest Normality Test Results

Class	Asymp. Sig. (2-tailed)	A	Decision	Information
Experiment	0,189	0,05	Accept H_0	Normal
Control	0,524	0,05	Accept H_0	Normal

From table 3.3 above, if it is seen for the pretest normality test on the experimental class and the control class using the 5% confidence level, the H_0 accept decision is obtained which means that the data is normally distributed. In addition, there is a recapitulation of the results of the posttest as follows.

Table 3.4 Recapitulation of Posttest Results

Class	n	Value			
		Ideal Score	Minimum Value	Maximum value	Average
Experiment	41	100,00	45	90	73,17
Control	43	100,00	40	90	67,67

Based on thickness 3.4 above, it can be seen that the experimental class has the highest average value compared to the control class. So that it can be described that the experimental class using a research-based model can improve student learning outcomes.

Then analyzed using SPSS 16 for windows to test posttest normality. The recapitulation results can be seen in the following table.

Table 3.5 Recapitulation of posttest normality test results

Class	Asymp. Sig. (2-tailed)	A	Decision	Information
Experiment	0,524	0,05	Accept H_0	Normal
Control	0,406	0,05	Accept H_0	Normal

From the table 3.5 above, if seen for the posttest normality test in the experimental class and the control class using a 5% confidence level, the decision to accept H_0 also means that the data is normally distributed.

After knowing the homogeneous and normal results of the pretest and posttest, the next step is to know the Normalized Gain (N-Gain Score) or referred to as the Normalized Gain. The aim is to determine the effectiveness of certain treatments in a study. The N-Gain results can be seen in the following table.

Table 3.6 Recapitulation of N-Gain results

Class	n	Value			
		Ideal Score	Minimum Value	Maximum Value	Average
Experiment	41	100,00	15,38	86,67	60,47
Control	43	100,00	14,29	80,00	49,48

From table 3.6 above, it can be seen that the experimental class has a higher N-Gain value with a difference in the value of 10.99 compared to the N-Gain value of the control class. The results of the N-Gain normality test can be seen in the following table.

Table 3.7 Recapitulation of N-Gain normality test results

Class	Asymp. Sig. (2-tailed)	A	Decision	Information
Experiment	0,412	0,05	Accept H_0	Normal
Control	0,307	0,05	Accept H_0	Normal

Based on the table, the N-Gain Score normality test results with a confidence level of 5% are normally distributed. Next is the Levene Test homogeneity test which functions to determine whether or not the sample is homogeneous. Homogeneity test results can be seen in the following table.

Table 3.8 Recapitulation of the results of the pretest-posttest homogeneity test and N-Gain

Class	Asymp. Sig. (2-tailed)	A	Decision	Information
Pretest-posttest Experiment	0,325	0,05	Accept H_0	Homogen
Pretest-posttest Control	0,572	0,05	Accept H_0	Homogen
Ngain – experiment and Control	0,325	0,05	Accept H_0	Homogen

In table 3.8 above, all the classes tested have homogeneous data. This means that student geography learning outcomes do not have significant differences based on student groups.

The research-based TPS learning model in its implementation is able to have a significant influence on learning outcomes. This can be proven that student learning outcomes show an increase in the acquisition of the average score of the experimental class from 30.85 to 73.17 or with an increase in the score of 42.32. In the control class also increased scores by 32.09 or from 35.58 to 67.67. If the average value of the score is compared between the experimental and control scores the experimental class will see an increase in the value of learning outcomes, the difference is only 10.23 with a significance value of 0.000.

Based on research that has been done, students involved in the experimental class were able to improve learning outcomes through the *Think-Pair-Share* model. Students who are grouped can discuss in depth about the environment [4]. Environmental learning will be more meaningful if each student collaborates to build constructive knowledge [6]. The results of the process of thinking and discussing in pairs will make students better understand the problems given, so that during the *share* stage students were able to explain what has been obtained in the previous process. The findings of the teaching and learning process took place in the experimental class using a research-based TPS model. The findings after using the model obtained are:

- a. Students dare to reveal the results of their research in front of the class. This was proven during the "*Sharing*" phase, students were given the opportunity to describe explanations related to the findings they got.
- b. Students are more interested in taking lessons because they can interact with friends and the environment. This is evidenced during the "*pairing*" phase they can discuss with their friends.

4. Conclusion

One of the research-based TPS models can be recommended as a good model because it is able to facilitate students to be more motivated in learning and find something new learning, able to give students the courage to express their findings in learning, with the aim to improve learning outcomes. Suggestions that can be given, among others, for teachers, can apply the model combined with existing research to be able to provide the latest learning. While for students can apply the model when teaching later.

Aknowledment

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