Journal Evaluation in Education (JEE)
Vol. 4, No. 3, July 2023, pp. 120~124
ISSN: 2716-4160, DOI: 10.37251/jee.v4i3.430

The Influence of the Gedongsongo Temple Ethnomatematics Problem Based Learning (PBL) Model on the Creative Thinking Ability of Junior High School Students in View of Self Confidence

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Article Info

Article history:

Received Jun 06, 2023
Revised Jun 11, 2023
Accepted Jul 20, 2023
OnlineFirst Jul 31, 2023

Keywords:

Creative Thinking
Ethnomathematics
Problem Based Learning
Self-Confidence

ABSTRACT

Purpose of the study: In analyzing the relationship between the influence of the Problem-Based Learning (PBL) learning model based on ethnomathematics learning at Gedongsongo Temple on the creative thinking abilities of class IX junior high school students regarding self-confidence.

Methodology: The subjects of this study were Junior high school 1 Jambu students. The research method used is quasi-experimental and posttest-only control design research. Data collection techniques using test and non-test instruments in the form of questionnaires. Quantitative data analysis begins with a prerequisite test using the normality and homogeneity tests. Test the hypothesis using the proportion test and test the regression analysis.

Main Findings: There is a difference in Creative Thinking Ability and a difference in self-confidence which is more increased in applying the problem-based learning model based on Gedongsongo Temple ethnomathematics in class IX junior high school students. Thus, there is a relationship between the influence of the Gedongsongo Temple ethnomathematics problem-based learning model on the creative thinking abilities of class IX junior high school students regarding self-confidence.

Novelty/Originality of this study: The expository model through the teacher-centered approach is believed to be unable to empower students' creative thinking abilities and self-confidence, so creative thinking skills and self-confidence are still low, and students do not play an active role in the process of studying the material in class. Therefore, there needs to be an update using the PBL model with ethnomathematics to improve creative thinking skills.

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1. INTRODUCTION

The ability to think creatively is one of the higher order thinking skills that must be developed in the world of education because this ability provides a stimulus to students in developing interest and generating up-to-date ideas on a problem. This is in line with the statement that the ability to think creatively is a thought process that produces new views of a problem and generates various kinds of answers [1]. This is confirmed in Government Regulation Number 17 of 2010 which states that the purpose of providing education is to build the development and potential of students who are knowledgeable, capable, critical, creative and innovative. Besides that, it is also emphasized that the ability to think creatively has a tendency that can train students to issue new

ideas or express themselves in the learning process [2]. Therefore, the ability to think creatively as a high-level ability is important and needs to be developed through education in schools.

In fact, a survey conducted by the Program for International Student Assessment (PISA) in 2015 ranked Indonesia in 62nd position out of 70 PISA participating countries. Indonesia's position is very low when compared to other Southeast Asian countries that took the PISA test such as Thailand in position 54, Vietnam in position 8 and Singapore in position 1. Mathematical ability on the PISA test results shows that Indonesia's average mathematical ability is still below the average of other countries PISA participating countries with an average of 386 while the average PISA score is 490. This certainly indicates that students' ability to think creatively is low. This was also reaffirmed by research that students with very low students' creative thinking abilities were in the sufficient category at 3.57%, less at 60.71% and very lacking at 35.71% [3]. In addition, there is also a TIMSS study result in 2015 relating to the low ability of students' creative thinking which reveals that Indonesian students need to strengthen their ability to integrate information, draw conclusions, and generalize their knowledge to other things and this can be seen as difficulty students prove mathematics clearly because they do not understand the concepts and rules of mathematics [4].

The development of mathematical creative thinking skills is inseparable from an understanding of the factors that influence it. This is in accordance with research which states that someone who is creative is someone who has self-confidence [5]. This opinion is reinforced by the opinion that people who are able to think creatively have self-confidence, are diligent, tenacious, flexible, take initiative, dare to take risks [6]. Students who have self-confidence, these students have the confidence to solve problems using their own way. The link between creative thinking abilities and self-confidence also found that there is a relationship between students' creative thinking abilities and students' self-confidence [7]. So that, self confidence as an affective aspect that students must have in order to develop mathematical creative thinking skills.

It is hoped that ethnomathematics learning innovations will be able to encourage self-confidence so that students are able to think creatively. Ethnomatematics-assisted learning on the Gedongsongo temple object is very useful in growing imagination and creativity in solving mathematical problems. This is reinforced by the opinion that the ethnomathematics nuances in Gedongsongo temple are able to direct creativity to examine mathematical problems in a precise and real way, so that ethnomathematics as a learning approach is very possible to learn with association with culture so that understanding material becomes easy because it is directly related to culture [8]. Apart from that, this is also reinforced by the statement which states that in ethnomathematics learning itself has a tendency to understand, explain, know, and carry out coding, measuring, classifying, and concluding activities [9]. Ethno-mathematics learning does have a close influence relationship with the ability to think creatively, this is reinforced by the statement that the Ethno-Mathematics-based PBL model in improving the ability to think creatively mathematically makes students accustomed to solving problems so that they can develop creative thinking skills [10].

Apart from that, in training students in improving their creative thinking skills, namely by choosing a learning model, one of which is the PBL model. This is certainly highly recommended in the learning process with the aim of increasing creative thinking skills. This statement is reinforced by the opinion that the PBL model is used by presenting real problems or in everyday life, so that students can build new knowledge by finding solutions to solve a problem that is presented and encourage students to think creatively [11]. In addition, the problems in the PBL learning process are open as a context for students to develop problem-solving skills and students' creative thinking to solve a problem and to build new knowledge [12]. The results of other studies show that the application of the problem-based learning model can improve creative thinking skills and student learning outcomes. This is evident from the increase in creative thinking and student learning outcomes in cycle I and cycle II, and are categorized as very creative [13]. Therefore, this model is considered appropriate when it comes to improving students' creative thinking skills in learning.

The ability to think creatively mathematically as one of the high-level skills needed in the world of education, but its achievements in students have not been maximized so far. Therefore, based on this background, researchers developed an ethnomathematics-based PBL learning innovation and its influence in the process of increasing creative thinking skills in terms of self-confidence. The aims of this study were: (1) to find out the differences in creative thinking abilities in the application of the Problem Based Learning model based on the ethnomathematics of Gedongsongo Temple in class IX students of junior high school in terms of self-confidence; (2) to determine differences in students' self-confidence in applying the Problem Based Learning model based on ethnomathematics at Gedongsongo Temple in class IX students of junior high school.

2. RESEARCH METHOD

The location of the research was held at SMP Negeri 1 Jambu, Jambu District, Semarang Regency. The research subjects were class IX students of SMP Negeri 1 Jambu, Jambu District, Semarang Regency. The type of research used is quantitative experimental research. In this study there are two kinds of variables, namely the independent variable and the dependent variable. The independent variable (X) is the variable that influences or

is the cause of the change or emergence of the dependent (bound) variable [14]. In this study the independent variables studied were problem-based learning models based on ethnomathematics. The dependent variable (dependent variable) is the variable that is affected or becomes the result because of the independent variable [15].

The research method used is quasi experiment. Quasi-experimental research is research that aims to directly test the effect of a variable on other variables and test the hypothesis of a causal relationship [16]. The research design used is the Posttest-only control design. In a simple experimental design, there are two groups selected randomly. One group acts as the control group and the other group acts as the experimental group. Data collection in this study used tests and non-tests in the form of questionnaires and documentation of students when carrying out activities according to the research plan.

The data collection technique in this investigation uses test instruments to measure students' creative thinking abilities and non-tests in the form of questionnaires to assess students' self-confidence. Quantitative data analysis begins with a prerequisite test using the normality test and homogeneity test. Hypothesis 1 test uses a proportion test to test the classical completeness of the creative thinking ability test. Testing hypothesis 2 uses a regression analysis test to analyze the effect of self-confidence on creative thinking skills.

3. RESULTS AND DISCUSSION

The process of knowing the effect of learning using the problem based learning model on students' creative thinking skills is by individual completeness test and analyzing how the effect of learning using the problem based learning model is on the creative thinking ability of students in classes using the problem based learning model including using the individual completeness test, comparative test and regression test.

First, the normality test was carried out using the Kolmogrov Smirnov and it was found that the Sig value in the control group was 0.12 > 0.05 and in the experimental group it was 0.07 > 0.05, meaning that the sample here came from a normally distributed population. Likewise, when the homogeneity test is carried out, it can be concluded that the data is also homogeneous. Next, a classical completeness test will be carried out, namely whether the score from the test results for the creative thinking ability of the participants above has reached 75 by carrying out the proportion test, it is found that the sig value = 0.04 <0.05 means here that the proportion of students who get grades the test is more than 75 or has reached 75%. So, it can be concluded that the classical completeness value of the test results of the test of the ability to think creatively of students whose learning uses the problem-based learning model based on ethnomathematics has been achieved. When a comparison is made of the two classes using different samples, it is found that the means of the two samples are different. So, it can be concluded that the average test results for students' creative thinking abilities by using ethnomathematics-based problem-based learning are more than the average learning outcomes of students who are taught without the same treatment. it can be concluded that the treatment given, namely the problem-based learning model, has an influence or is effective on changes that occur in students' creative thinking abilities. it was found that the means of the two samples were different. So, it can be concluded that the average test results for students' creative thinking abilities by using ethnomathematics-based problem-based learning are more than the average learning outcomes of students who are taught without the same treatment. it can be concluded that the treatment given, namely the problem-based learning model, has an influence or is effective on changes that occur in students' creative thinking abilities. it was found that the means of the two samples were different. So, it can be concluded that the average test results for students' creative thinking abilities by using ethnomathematics-based problem-based learning are more than the average learning outcomes of students who are taught without the same treatment. it can be concluded that the treatment given, namely the problem-based learning model, has an influence or is effective on changes that occur in students' creative thinking abilities.

Then, test the effect of ethnomathematics-based problem-based learning on students' creative thinking abilities by using the regression test as follows.

Table 1. Regression Linearity Test Table

Model		Sum of Squares	df	MeanSquare	F	Sig.
1	Regression	13.145	1	13.145	.031	, 862b
	residual	8023,427	19	422,286		
	Total	8036,571	20			

Table 2. Test Results for the Effect of Problem Based Learning on Students' Creative Thinking Ability

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	std. Error	Betas		
1	(Constant)	67,786	8,902		7,615	,000
	Results	.025	,141	.040	, 176	,862

The acceptance criterion is H0. If the Sig value is > 5%, according to Table 7, it is obtained sig = 0.862 = 86.2% > 5%. Because the sig value > 5% means that there is no effect of ethnomathematics-based problem-based learning on students' creative thinking abilities. The magnitude of the effect of ethnomathematics-based problem-based learning on students' creative thinking abilities can be seen in the R square value as shown in table 3.

Table 3. The Influence of Problem Based Learning on Students' Creative Thinking Ability.

Model	R	R Square	Adjusted R Square	std. Error of the Estimate
1	,040a	,002	-.051	20.54959

Based on table 8, it can be seen that the R square value is 0.002. This means that the influence of ethnomathematics-based problem-based learning has an effect of 2.00% on students' creative thinking abilities while the rest are not influenced by other factors.

Based on the description above, information is obtained that the percentage of students who use ethnomathematics-based problem-based learning for creative thinking skills has not been achieved, but the learning outcomes of students in ethnomathematics-based problem-based learning are indeed superior to ordinary expository learning in improving abilities. students' creative thinking. In addition, the average test scores for the ability to think creatively for themselves in the experimental class were superior to those in the control class, meaning that learning using the problem-based learning model itself had an effect on students, however, it did not have a major effect on students' creative thinking abilities. So, From the description above, it can be said that the problem-based learning model based on ethnomathematics has an influence or is effective on changes that occur in students' creative thinking abilities. This is in line with research that increases the creative thinking skills of students who study with problem based learning learning models better than students who learn with conventional learning and in general students' attitudes towards learning mathematics using problem based learning learning models are positive [17]. Other relevant research shows that the results of research in terms of the process by applying the PBL model are proven to be able to improve students' creative thinking skills seen from the increase in results in each learning cycle [18].

Furthermore, how is the influence of the PBL learning model based on ethnomathematics at Gedongsongo Temple on the creative thinking abilities of class IX students of junior high school in terms of self-confidence. We can analyze this through the results of questionnaires from students. Based on data management and data analysis, there is indeed an effectiveness or ideal of learning using an ethnomathematics-based learning model in terms of self-confidence of 68.21%. The ideality of learning using the ethnomathematics-based problem-based learning model in terms of self-confidence can be said to be an indicator of increasing student self-confidence so that it has better results than student self-confidence with conventional learning in schools. This is in line with previous research which stated that self-confidence has a positive effect on students' creative thinking abilities, so that there is a difference between students who have less self-confidence and students who have good self-confidence [19]. Other relevant research also states that there is a significant relationship between self-confidence and students' mathematical creative thinking ability, meaning that the higher the student's self-confidence, the higher the student's mathematical creative thinking ability, and vice versa [20].

Referring to the results of the data analysis above, we can get some information that learning using the problem-based learning model is considered good and effective in supporting students' self-confidence. In addition, through trials conducted students were quite enthusiastic in participating in each series of learning that was carried out.

4. CONCLUSION

From the description of the discussion above, it can be concluded that there are differences in the ability to think creatively in the application of the problem-based learning model based on the ethnomathematics of Gedongsongo Temple in class IX students of junior high school in terms of self-confidence. Therefore, learning using the problem-based learning model is considered good and effective in supporting students' self-confidence. In addition, through trials conducted students were quite enthusiastic in participating in each series of learning that was carried out. So, it can be concluded that there is a relationship between the influence of the problem-

based learning model based on the ethnomathematics of Gedongsongo Temple on the creative thinking abilities of class IX students of junior high school in terms of self-confidence.

In addition, through the results of the analysis and conclusions above, the researcher provides several recommendations, namely, further development in the development of similar research that can make a positive contribution in supporting the success of learning. Research on the effect of the ethnomathematics PBL learning model on creative thinking skills in terms of self-confidence gives positive results in improving the quality of learning in the classroom, so in connection with this study taking limited subjects, the researchers also suggest conducting further research on more advanced subjects. broad and more relevant methods so that generalizations can be drawn.

ACKNOWLEDGEMENTS

We thank Prof. Dr. Isti Hidayah for the corrections, reviews, and also comments in the process of preparing this article. We also do not forget to thank Mrs. Mulyanti, S.Pd as the mathematics teacher who has facilitated this research well.

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