
The Influence Of Learning Mathematics Software Geogebra On The Ability Of Creative Thinking Of Students

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ABSTRACT

This study aims to determine the ability of creative thinking of students that the process of learning using learning mathematics software geogebra is higher than using conventional learning models. This research is a quantitative type of Quasy Experimental Design. The subjects of this study were students with a population of 184 students. Sample in this research is class as the experimental class using learning mathematics software geogebra, class as the control class using conventional learning models. Data analysis techniques using test normality test Shapiro-Wilk test and homogeneity test with Levene. Proceed with the hypothesis test using t-Test independent sample t-test. Based on the results of the analysis and discussion of the research data obtained the results that the ability of creative thinking of students that the process of learning using learning mathematics software geogebra is higher than models using conventional learning. Students with the treatment of learning mathematics software geogebra, have the ability to think creatively is better compared to students with the treatment of learning using conventional learning models.

Keywords : teaching and Learning Mathematics Software Geogebra, the Ability to Think Creatively

INTRODUCTION

Creative thinking is the use of the basic thought process to find possible answers to a problem. Creative thinking is a form of thinking that is still less attention in formal education, students are only trained to knowledge of the recollection and the ability of logical thinking, or reasoning. Creative thinking skills are the ability that describe the aspects of fluency (fluency), flexibility (flexybility), and originality in thinking (originality), as well as the ability to elaborate (develop, enrich, or refine) an idea (elaboration) (Nurlaela, 2015).

In solving the problems that focuses on students ' ability to answer the problem with the answers that are not normally done by the students at the level of his knowledge. As for the levels, namely: (1) Very creative Students can demonstrate fluency, flexibility, and novelty in solving mathematical problems. (2) the Creative Students can demonstrate the novelty and fluency in solving math problems. (3) Creative Enough that Students can show novelty or flexibility in solving mathematical problems. (4) Less Creative Students can demonstrate fluency in solving mathematical problems. (5) Not Creative that Students can not show the three indicators of creative thinking in solving mathematical problems (Nurlaela, 2015). Based on the results of interviews conducted with teachers mathematics known that mathematics learning in the classroom has developed the ability to think creatively and students but not optimally. Mathematics learning used by teachers in the

classroom by using the conventional model. According to the researchers, the strength/the excess of the conventional model is a model of learning that is done by the teacher because until now this model is considered to be effective and efficient. The conventional Model is the model of the traditional learning because since the first of this model has been used as a tool of verbal communication between teachers and students in the learning process and learning. This Model is not always ugly when it is properly prepared, supported with the tools and media, as well as pay attention to the limits of its use. However, the conventional model is still less attention and less give students the opportunity to develop the mindset, especially in a math lesson that uses a lot of formulas. So the students are still riveted by the formula itself has not yet been able to create the new ideas in the learning of mathematics in particular. This resulted in the ability of creative thinking of the students are still less developed optimally. Understand the problems above, because the teachers already using conventional learning models when learning mathematics, then the efforts of other researchers want to try to use the model of ICT-based learning. The researchers conducted the mathematics learning by using media and props based on ICT during the process of mathematics learning takes place in class on the subject of wake space the flat side that is by using a software tutorial for conveying material, and the software GeoGebra to props and practice and practice. Software GeoGebra is a software that can be used to support the learning of mathematics. GeoGebra is a software with the basic ideas of geometry, algebra, and calculus that can be used for learning and teaching at the ELEMENTARY level, JUNIOR high, high SCHOOL, and University (Siegfried, 2008). This is done so that students are familiar with the use of the computer, the computer is able to visualize most of the materials in mathematics, the curriculum is demanding the use of the computer in learning mathematics, and computer display more interesting compared to the board.

As for the objectives to be achieved in this research is to determine the ability of creative thinking of students learning process with the Software Geogebra is higher than using conventional learning models. And the benefits of this research are the results of this study can provide knowledge of the theoretical level to the readers and teachers in the learning with the software GeoGebra in order to make learning in the classroom even better and is expected to contribute to educational practitioners as a material consideration and an alternative learning model of learning mathematics software GeoGebra as an attempt to improve the ability of creative thinking of students. The results of research Paul Roy Saputra (2016) show that in terms of learning achievement, creative thinking, and self-efficacy of students (1) learning geometry-assisted Cabri effective, (2) learning geometry-assisted GeoGebra effective, (3) there are differences in the effectiveness of learning geometry using GeoGebra and Cabri, (4) pembelajaran geometry-assisted Geogebra more effective than learning geometry-assisted Cabri. Furthermore, research conducted by Fitriyani & Sugiman (2014) suggested that the learning of geometry using the device approaches to the study of the IDEAL assisted GeoGebra effective terms of achievement and learning motivation of students.

RESEARCH METHODS

The type of experiment used was a quasi-experimental design that is the form of design of experiments have a control group, but can not be fully functional to control the variables-outside variables that affect the execution of the experiments Reviewed from the data and data analysis, this research is quantitative research. Because the data collected in the form of numbers as well as data processing and hypothesis testing using statistical analysis of the corresponding. Design of quasi-experiments conducted in this study shaped the design of

the Pretest-Posttest Experiment Control Group Design. This Design there are two groups that each was selected at random, then given a pretest to determine the initial state is the difference between the experimental group and the control group. This research was conducted. The population in this research is all students of class with the amount of 184 students. The sampling technique will be used in making the experimental class and the control class is probability sampling with Cluster random sampling. Sampling technique from the population was randomly without regard to strata that exist in the population. The draw is done by giving the serial number in each class is then taken at random, on the retrieval of the sequence number of the first experimental class and capture the serial number of the second to the control class. Thus obtained samples taken from class with a student population of 30 students as the experimental class learning applied learning mathematics software geogebra and class with the number of 30 students as control class with learning using conventional models. Variants examined in this study include a variant of the former, namely the learning of mathematics with the software GeoGebra and variants bound, i.e. a florid Kakawa. Kennik data collection of his yitu with took his test kemesampuan berkilatir creative math with soalbentuk description uraepan tesukan after treatment wagggle kpran kresprol and class kelenspar kelenspar and kelenstrol and kelenspar kremontium kelensp. The validity of the test using the current products and the reliability of his analyzed is the formula meningoan Alpha Cronbach. Test assumptions in this study covering up the norms and test kembitas variance which dispense with the hypothesis test. Hypothesis test in this research, wear a statistical t-test independent sample t-test

RESULTS AND DISCUSSION

Description Data From The Initial Test (Pretest)

Data from the experiment and control class collected then held normality test and homogeneity. Normality test and homogeneity test was conducted to determine whether the second class has a variance of a normal and homogeneous. The Pretest was also intended to determine the initial state between the experimental group and the control group. As for the data the results of the pretest creative thinking abilities of students in the wake of the space the flat side is summarized in the table below:

Table. 1 Description Of The Data Scores Pretest Ability Of Mathematical Creative Thinking

Group	X _{maks}	X _{min}	The Size Of Central Tendency			The Size Of The Variance Of The Group	
			\bar{x}	Mo	Ma	R	S
Experiments	90	61	77	81	76	69	8,32
Control	90	61	77	81	81	54	7,38

Based on the above table it can be seen that the value of the test results before the learning process with the highest value of the experimental class and the control class that is equal to 90, while the lowest value for the class experiment and control was 61. Size terdenti central which includes the average (mean) for the experiment and control class of 77, while for the value of the middle-class experiment that is equal to 76 and the control class of 81, while the mode in the experimental class and the control class was 81. The size of the variance of the group that includes the range or ranges for the experimental class is 69 and

the control is 54. The standard deviation of the experimental class was 8.32 and the control class of 7.38. Based on these results there is a difference between the experimental class and the control class is already significant. Thus, the ability of creative thinking of students in the experimental class the same average with the ability of creative thinking of students in the control class.

Testing Requirements data Analysis

a. Normality test Score of Creative Thinking skills of the Experimental Class

Normality test used to determine whether the two samples derived the normal distribution or not. Normality test used in this study is the Shapiro-Wilk with a significant level of 5%. Normality test was performed on the data the dependent variable is the ability to think creatively matematis. Test of normality of data, the ability of creative thinking mathematically performed against each of the groups, namely the experimental group and the control group. The results of the normality test score mathematical creative thinking abilities of students of the experimental class.

Based on the analysis of unknown significance value $0,113 > \alpha = 0.05$ so that H_0 is accepted. This means that the data of pretest the ability of creative thinking of students in the experimental class treatment learning with learning mathematics Software Geogebra population derived from a normal distribution.

b. Normality test Score Creative Thinking skills Grade Control

Based on the analysis of unknown significance value $0,097 > \alpha = 0.05$ so that H_0 is accepted. This means that the data of pretest creative thinking abilities of students in the control class treatment math learning with conventional learning models derived from the population distribution is normal

c. Homogeneity Test Scores The Ability To Think Creatively Initial Test (Pretest)

Based on the analysis of unknown significance value of $0.071 > \alpha = 0.05$ so that H_0 is accepted. This means that the data of pretest ability to think kreatif students of the control class and the experimental class of homogeneous.

Discussion Of Research Results

This study aims to determine whether the ability of creative thinking of students that the process of learning using the learning with the Software geogebra is higher than on the use of learning model konvensional. The process of learning the Software geogebra is a computer application that can display the variation of the three-dimensional shape, giving the facilities to do the exploration, interpretation, and solve the problem with a quite interactive. Learning with the Software geogebra emphasizes the students to be actively involved, are able to express their ideas as freely as possible during the learning process.

It is supported on the ground that during the process of learning on the material up the space the flat side with the learning software geogebra look more enthusiastic and more active in following the learning process. It is seen during the learning takes place. Researchers provide stimulation to give a picture that is associated with waking up the space the flat side shown with the software geogebra. The researchers gave the problem to be solved by each group, in this process, students are expected to exchange thoughts or work together to solve a given problem. Students try to find a solution of the problems given by the teachers in the group discussion. In some occasions, students were also asked questions related to the material that is considered to be difficult to be understood. This activity can be used to try to resolve problems with the help of the software geogebra. In conventional class different from class learning using the software geogebra. In this class not to use the software GeoGebra, so that

students in the following subjects is not as enthusiastic class using the software geogebra. Students tend to be passive and only rely on a friend in his group to work on. This study uses a test of a description as much as 9 questions as a test to find creative thinking skills of students. Based on the hypothesis test a preliminary test or pretest ability of mathematical creative thinking on the material up the space the flat side can be seen that the $t_{count} \geq t_{table} = 0.871$ this means at a significance level of $\alpha = 0.05$ H_0 is accepted. It is concluded that there is no difference in the average value of pretest creative thinking skills of the students in the experimental class and the control class. Because in preliminary tests showed that the ability of creative thinking of students in experiment and control class there is no difference, so the researchers wanted to see if after learning using learning mathematics with the software geogebra in the experimental class the ability of creative thinking of students will be higher than the control class that in learning only using conventional learning models. Based on the results of data analysis the value of the final test or posttest creative thinking skills of the experimental class and the control class, it is obtained the hypothesis t_{count} of 0.004 while the significance level $\alpha = 0.05$, because $t \leq t$ which shows that H_0 is accepted and H_a is rejected. Concluded the ability of creative thinking of students using the Software geogebra is high compared with the ability of creative thinking of students using conventional learning models. This research was supported in previous research, namely research conducted by Risqi Rahman (2010) which shows the influence of learning-assisted geogebra on the ability of creative thinking of students. Furthermore, research conducted by Umi Fariyah (2015) which shows the influence of the program geogebra on motivation and student learning outcomes in the material graph the equation of a straight line. This is in accordance with research conducted Ferdinandus, et al (2017) about the Model of Discovery Learning assisted Geogebra to Improve the Ability of Creative Thinking have the conclusion that the model of discovery learning assisted geogebra is effective to improve the ability of creative thinking of students.

CONCLUSION

Based on the results of the analysis and discussion of the research on the Influence of Learning Mathematics with the Software Geogebra against the Ability of Creative Thinking of students Island People on the tree happiness Wake up the Space Side of the Flat found that:

“The ability of creative thinking among the students who are learning using the software geogebra higher than with the ability of creative thinking of students using the model of conventional learning. Students with behavior learning using the software geogebra has the ability to think creatively better compared with students with behavior learning using learning model conventional.

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