



The Effect of "What's Another Way Method" on Creativity Ability in Problem Solving

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Creativity is one of the necessary skills in problem solving. One method in problem problem is What other way. The study was conducted to find out information about other way about the ability and problems in the students in the field of Advanced Mathematics Education of integer material. The study involved 76 students from University in Yogyakarta. This research method is quasi experiment. Instrument of creativity problem solving of pre test and post test conducted in experiment class and control class. The results of that test include creativity in the problem that includes three indicators, fluency, flexibility, and novelty. Then, the data were analyzed by comparing the results of pre test and post test in the control and experimental class. Data analysis is also reinforced by gain score. The results of this study is being the response of students towards learning by using the "what's another way" is positive

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INTRODUCTION

The education curriculum now directs learning towards being more active and innovative. The purpose of the curriculum is considered important, because every individual must have a problem. Active and innovative learning can develop students' creative thinking skills. With the ability to think creatively, students will not have problems. Even more than that, students will feel challenged to solve problems in different ways. One of the lessons that can improve the ability to think creatively is learning mathematics.

Mathematics learning is not just an eye for learning which gives students the ability to understand mathematical concepts. but more than that, students are also required to have reasoning skills in patterns and traits and to solve mathematical problems. Problem solving abilities are obtained by students from learning to solve problems. The general process of problem solving does not depend on the topic of the problem being taught, but is a process that will provide a vehicle to obtain the concepts and skills of the students that they get in learning.

Mathematical learning does not forget subjects that give students the ability to understand mathematical concepts. Moreover, by learning mathematics students can develop creativity through reasoning on patterns and traits as well as solving mathematical problems. Solving mathematical problems is a difficult activity, because it requires a high level of mental activity. LeBlanc et al. (1980) Polya (1973) says the problem solving lies in the idea of drafting a plan. While Orton (1992) said that in solving difficult problems is planning and implementation. Because, the second stage must be done to have high creativity. Posamentier and Stepelman (1990) stated that one way to improve student creativity is to create a learning environment that gives students the freedom to express themselves. Therefore, teachers as educators want to pay attention to the learning method that will be carried out.

Creativity is an individual means to produce "new" ideas or ideas to solve problems fluently, and flexibly. Krutetskii (1976) says detail three indicators in fluency creativity (fluency), punch (flexibility), and renewal (flexibility). Fluency in finding problems in diversity (various) Answers to problems that students make correctly. Flexibility in solving problems in student performance solves problems in a variety of different ways; students are able to make problem changes different from others. Novelty in answering problems in student performance to answer answers with several different but valuable answers that are not commonly done by students in those who are developing according to Musser et al. (2011); Bennet and J (2012) . Several different, visible and inappropriate answers with certain patterns, for example a combination of several flat builds. So creativity can be interpreted as an individual's ability to develop "new" ideas or ideas in ways that can be used to answer questions (problems) fluently, and flexibly according to Warli and Yuliana (2011) .

In this study the method of handling is another way. What other ways are put forward according to Krulik et al. (1999) . The steps in the method What another way is as follow **Table 1**

[Table 1 about here.]

This learning method is a learning method that challenges students after answering a problem. This challenge makes stu-

dents think again to look for alternatives, in addition to the answers they have made. Krulik et al. (1999) stated, "... students are forced to think of other ways to approach problems. This activity is the best way to practice creative thinking. Although contrived, the following problem raises solutions that provide insight into students' reasoning." In the What Other Way method, students are given freedom in finding alternatives that can solve problems. However, that answer can be accepted if you find a creative indicator that matches the previous explanation.

METHOD

This research is a quasi-experimental type study with a static group comparison design according to Ruseffendi (2005) . The study used two class categories, namely the experimental class and the control class. Before the treatment is carried out, students are given a question of creativity in problem solving. Furthermore, the experimental class was carried out by using what method is another way. While the control class is carried out conventional learning. After learning is complete, students are given a creativity test in problem solving.

The population of this study was all fourth semester students of PGSD in the city of Yogyakarta. Next, two sample classes were chosen, namely the experimental and control classes. Class division is not carried out randomly, but uses classes that are already available. In the experimental class there were 41 students, while the control class consisted of 35 students. So, the total students involved in this study were 76 students. The creativity test in problem solving has three indicators, namely fluency, flexibility and renewal. The test material carried out is an integer. Here is an example of the problem of creativity in problem solving

The temperature in the PD A class in the morning is 31°C. whereas during the day, because the temperature increases, the air conditioner is turned on so that the room temperature becomes 20°C. What is the difference in temperature of PD A class in the morning and during the day when the cooler is turned on, use several ways of solving that can be understood by elementary school children

Answers that have creativity are answers that have different ways and do not have the same pattern. Besides that the answer must be fluent (correct in the answer) and flexible. Here is an example of an analysis of answers to the test questions above

[Figure 1 about here.]

[Figure 2 about here.]

In the example of completing the problem **Figure 1** , the student gives 3 ways of solving. These three methods meet the criteria for fluency, which means they are correct in the answers. However, the settlement has not met the newness indicator, because it has the same settlement pattern. Unlike the second example **Figure 2** . The three ways of solving meet the indicators of creativity, namely fluency and novelty.

Furthermore, data analysis is carried out by scoring indicators on each answer. Each indicator has a maximum score of 3 and a minimum of 0. Then the average data is searched and compared between the experimental and control classes.

RESULTS AND DISCUSSION

The data analyzed in this study is the gain score. The results of this study indicate that the mean value of pre-test and post-test in the experimental class is superior to the control class. The average value of the control keals is 66.46 while the experimental keals are 68.93. Furthermore, the post-test scores on the contro class were 66.88 and the experimental class was 71.27. This proves that after being given a learning method with what is another way, the experimental class posttest value is superior to the control class. While in the independent t-test on SPSS shows the significance of $0.003 < 0.05$ means that H_0 is accepted and H_a is rejected [Table 1](#) . This means that there is an influence on what method is another way to problem solving creativity.

[Table 2 about here.]

[Figure 3 about here.]

Based on the table [Table 2](#) and graph [Figure 3](#) above, there are significant differences in creativity in solving between students who use what is another way of learning and conventional learning. Judging from the average gain score, the creativity in problem solving in the class that uses what is another method is higher than the average value of students in conventional classes. The gain score in the control class is 0.1 while the experimental class is 0.6.

Learning by using what is another method, students are not only required to be able to solve mathematical problem solving, but also challenge students to find other ways that can be used in problem solving. In addition, the method of what is another way gives students the freedom to develop their creativity without looking at students subjectively.

[Table 3 about here.]

Based on the table [Table 3](#) above, the indicators in the post-test are creativity problems using what other methods have increased. The indicator that has the highest increase is the novelty, then fluency and the last flexibility.

The advantages of what is another method that is applied in learning can be explained as follows. The habit of exploring mathematical ideas in a series of learning with what is another way based on problems encourages students to think flexibly. This way of thinking allows students to obtain various solutions or problem-solving strategies. It is very possible that one of these solutions or strategies is new or unique. Thus, these habits can develop aspects of creative thinking skills, namely flexibility and novelty. With the creative thinking skills possessed, especially for PGSD students is one of the skills that must be possessed in carrying out learning. Because, mathematics is not a subject that has one sure way to answer mathematical problems. Rather, there are many ways that can be used to solve mathematical problems in accordance with the level of education or the ability of elementary school students.

[Warli and Yuliana \(2011\)](#) and [Tatag and Widhia \(2009\)](#) examined the method of what is another way to problem solving creativity in junior high school students on flat and algebraic material. Both of these studies are the types of PTK conducted in one class VII in Semanding, Tuban and Sidoarjo.

The results of their second study are learning that uses what's another way to give a positive impact on students' problem solving creativity. The difference between the two studies with this research lies in the material and respondents used in carrying out the method of What's another way. This study focuses on integer matter. While the respondents used in this study were fourth semester students of PGSD. Furthermore, the results of this study are in accordance with [E \(2011\)](#) , who said that cognitive abilities at the elementary stage according to Piaget, elementary students were at the concrete operation stage.

The use of media and methods that are appropriate and appropriate in the level and ability of students, will facilitate them in receiving learning materials. Therefore, as a candidate for elementary school teachers the ability to solve problem creativity needs to be possessed. Because students have different thoughts in looking at a problem. As prospective teachers should master several ways of solving mathematical problems. In addition, it can also encourage students in creative fishing. The use of media and methods that are appropriate and appropriate in the level and ability of students, will facilitate them in receiving learning material. Therefore, as a candidate for elementary school teachers the ability to solve problem creativity needs to be possessed. Because students have different thoughts in looking at a problem. As prospective teachers should master several ways of solving mathematical problems. In addition, it can also teach students to provoke creativity in solving problems. Providing creative thinking to students. Because in this study the method of what is another way has an impact on kretaitas in solving student problems, then this method can be one of the choices of methods used in printing more professional teacher candidateslater research.

CONCLUSION

Based on the results of research and discussion, it can be concluded that the ability to think creatively can be improved by using the method of What's another way. Based on these conclusions, the author gives several suggestions, namely as follows. First, for educators who will carry out mathematics learning using the What's another way method, should pay attention to: (a) readiness in presenting several alternative answers that are appropriate to students' thinking characteristics and abilities, (b) learning time, (c) media willingness to learn . Third, other researchers can then expand the research method of what is another way with alternative variables that are considered to be influenced. For example the ability to solve problems or student learning outcomes.

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TABLE 1 | Steps of the Method What Are Other Ways

1.	Understand the problem	In this step begins by reading the questions carefully, using what you know, available data.
2.	Prepare a settlement plan	The second step is to make a strategy using many strategies and techniques that also use systematic steps.
3.	Implement the plan	If in the second step has been completely detailed, then in the implementation of the plan is to be a simple form and perform the necessary calculations
4.	Check the plan	In these steps after the answer is found, answer the problem solution, whether the right answer is right.
5.	Reflection (answering challenges)	The next step is another way. Another way to answer that answer.

TABLE 2 | Average score of creativity in problem solving

Average score	Pre test	Post test
Control class	66.46	66.88
Experiment class	68.93	71.27

TABLE 3 | Score indicator of creativity in problem solving

	Fluency		Novelty		Flexibility	
	control	experiment	control	experiment	control	experiment
Pre test	7.8286	8.2683	6.1143	6.1220	1.0000	1.1295
Post test	9.1143	9.2195	7.6286	8.0488	1.3143	1.9756

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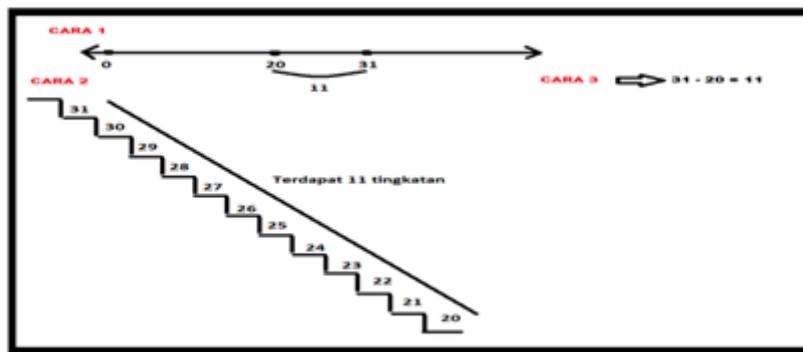


FIGURE 1 | Examples of problemsolving in solving problems that do not contain creativity

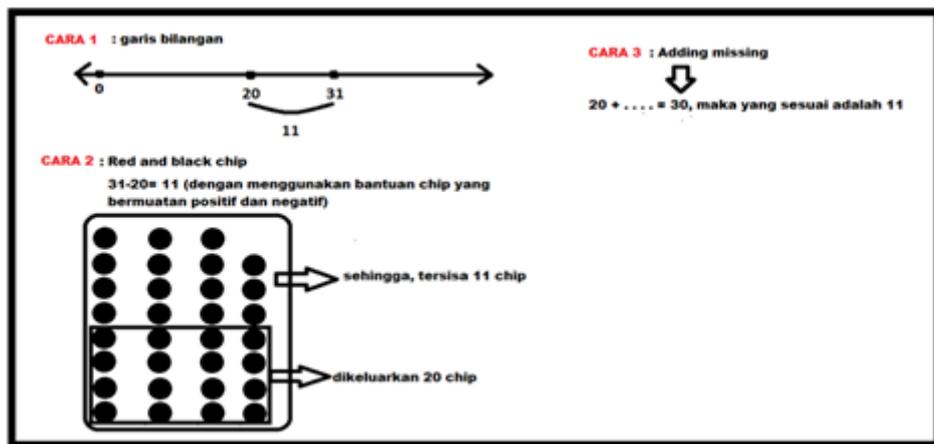


FIGURE 2 | Example of solvingproblem solving problems that contain creativity

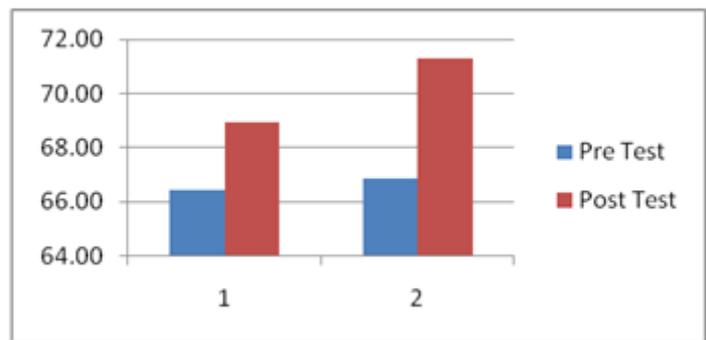


FIGURE 3 | Graphs of pre-test and post-test on control and experiment classes