

HASIL CEK_Analysis toward relationship between mathematical literacy and creative thinking abilities of students

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Analysis toward relationship between mathematical literacy and creative thinking abilities of students

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Abstract. The skills that need to be possessed by teachers, especially mathematics teachers in the revolution 4.0 to deal with 21st century students include critical, creative, collaborative and communicative. Another skill needed is mathematical literacy. The aim of this research is to examine how the relationship between mathematical literacy and student's creative thinking abilities. In this study, mathematical literacy has three aspects, namely interpret problems, formulate problems, and use mathematics inside solve the problem. And, creative thinking abilities has 4 aspect, namely fluency, flexibility, originality and elaboration. The type of the research using correlation ex-post facto research which the researcher does not give treatment to the respondent so that this study only reveals the variable as it is without connecting with other variables. Population used is all first semester students in the 2018/2019 academic year at Ahmad Dahlan University, which numbered 315 people with a total sample of 206 people. Technique data collection carried out in this study is data on mathematical literacy and student's creative thinking abilities taken by distributing test instruments and interview. Test description is tested as much as 5 items which is a matter of mathematical literacy and creative thinking ability. Data analysis using regression analysis and correlation coefficient test using Pearson product moment correlation technique. The results of the study indicates there is significant relationship between literacy skills mathematics with creative thinking of students.

1. Introduction

Mathematics is one of the lessons students learn from elementary school to college and In daily life students are faced with problems related to the application of mathematics [1]. The National Research Council purported that students learn mathematics well only when they construct their own mathematical understanding and that this understanding requires them to examine, represent, transform, solve, apply, prove, and communicate [2-3]. To solve mathematical problems, students must first master mathematical concepts[4]. More and more problems are faced and can be resolved in everyday life, requires some level of understanding of mathematics, mathematical reasoning before the problem can be fully understood and handled. Mathematics is an important tool for students when they face problems and challenges in various aspects of life [5-7].

The demands of students' ability to learn mathematics not only have numeracy skills, but logical and critical reasoning skills in problem solving. Solving this problem is not merely a problem in the



form of a routine problem but rather a problem faced daily [8-9]. Such mathematical abilities are known as mathematical literacy abilities. Furthermore, there is a positive relationship between attitude and mathematical literacy [10-11].

In addition to mathematical literacy skills, the ability to think creatively in mathematics is a part of life skills that need to be developed especially in the face of the information age and increasingly fierce competition. The development of creative activities is to involve imagination, intuition and discovery by developing divergent, original thinking, curiosity, making predictions and predictions and experimenting. [10] The problem is that the mathematical literacy abilities of Indonesian students, from the results of an international ranking of mathematics, are very poor compared to other countries. This was revealed by PISA (The Program for International Student Assessment) which divides the achievement of students' literacy skills in six levels of skills, from level 1 (lowest) to level 6 (highest) for mathematics. In addition to low literacy skills, students' mathematical creative thinking ability is relatively low. Based on the results of the Trend International Mathematics and Science Study (TIMSS), the level of students' creative thinking ability in Indonesia is relatively low, because only 2% of Indonesian students can work on high and advanced categories of questions that require creative thinking skills in solving them [12].

2. Method

This research is correlational research. The type of research using correlation ex-post facto research, which the researcher does not provide treatment for this study, only reveals the variable as it is without connecting with other variables [13]. The research aims to find the relationship between mathematical literacy skills and creative thinking. The research instrument used was in the form of an instrument with an indicator of testing mathematical literacy skills and thinking creative, followed by interviews. The subjects in this study were first semester students of the 2018/2019 school year Primary School Teacher Education Study Program at Ahmad Dahlan University which numbered 310 people with a total sample of 206 people. Technique used to take samples is by technique Simple Random Sampling that is taking sample members from the population done randomly regardless of the strata in the population. The instrument used is five objective test which contains aspects of creative thinking and mathematics literacy.

3. Result and Discussion

Efforts to develop abilities and skills in learning activities have been carried out by improving the quality of learning both in terms of mastery of the material, the use of methods, the use of media and classroom management that is conducive [14-16]. Learning in schools must be interactive, inspiring, fun, challenging, and motivating students to participate actively, and provide sufficient space for initiative, creativity, and independence in accordance with their talents, interests and physical development psychological learners [17-18].

Creative thinking skills must also be developed one of them is through learning activities at school. The ability to think creatively is also an important competency that students must possess. This is because the ability to think creatively will be able to help students in making decisions that make sense in their lives [19-20]. Creative thinking is also not a hereditary factor, so it can be developed and taught with methods and strategies certain learning that can support the development of the ability to think creatively. Thinking ability Creative students cannot develop with both if in the learning process the teacher does not actively involve students in concept formation, the learning methods used in schools are still conventional, namely learning that is still centered on teacher [21]. Such learning can inhibit student creativity and activity development as in terms of communicating ideas and idea. So that this situation is no longer appropriate with the targets and objectives of learning mathematics [22].

The result of this research about descriptive statistic about creative thinking abilities and mathematics literacy can be presented in table 1.

Table 1. descriptive statistics of creative thinking and mathematics literation

	Mathematics Literation	Creative Thinking Ability
Skor Maksimum	4	4
Skor Minimum	0	0
Mean	2.69	2.86
N	206	206

Based on the table 1 above it is known mathematical literacy and thinking abilities creative there is no difference because the results of descriptive data obtained does not exist significant differences namely the ability of mathematical literacy to obtain an average value 2.59 and creative thinking skills obtain an average value 2.86. This is in accordance with previous research which said that it is known mathematical literacy and thinking abilities creative there is no difference [23-24].

Testing the hypothesis in this study using a simple regression test, regression simple to use to measure relationships one variable with another variable. Hypothesis testing uses simple regression analysis obtained by calculating the SPSS Statistics 24.0 for Windows program. Hypothesis test results can be seen in the following table 2.

Table 2. Hypotesis testing of creative thinking and mathematics literation

	r count	r ²	P value (t test)	Coef	Constanta
Mathematics Literation (x) - Creative Thinking (y)	0.671	0.465	0.00	0.546	7.891

Based on the table 1 above it is known mathematical literacy and thinking abilities creative there is significant and positif. because correlation coefficient (r count) between x to y (r_{xy}) of 0.671. Coefficient r_{xy} correlation is positive, then there is a correlation the positive is 0.671. the same thing has been done which shows that it is significant and positively related [24-26].

Moreover, based on table 2, coefficient value determination (r²_{xy}) sebesar 0,465. r²_{xy} can it means that mathematical literacy can influence 46.5% changes in creative thinking skills r² value xy shows that there are still 53.5% factors or other variables influence mathematical literacy in addition to the ability to think creatively. Creative thinking process becomes one of the factors of student learning achievement [27-28].

Testing the significance of aiming for knowing the significance between creative thinking and mathematics literation. Relationship the significance of the research hypothesis is known by t test, if p value is greater than sig (0.05) then independent variables have a significant effect to the dependent variable. Based on table 2 p value for t test is greater than sig so can be included there is between creative thinking and mathematics literation [29].

The values for coefficient mathematical literation is 0.546 and constanta 7.891. regression equation can be written

$$\hat{Y} = 7.891 + 0,546X_1 \quad (1)$$

The equation shows that the value of the x coefficient is 0.546 meaning that if mathematical literacy (x) increases by one point then the ability to think creatively (y) will increase by 0.546.

Based on the description of the regression test results simple, it can be concluded that there is a significant influence between creative thinking ability and mathematics literacy. Creative thinking occurs when learners are involved with what is they know in such a way as to change it, meaning that students are able to change and create the knowledge they know and produce something that is new. Through creative thinking students will be able to distinguish ideas or ideas clearly, arguing well, able to solve problems, able constructing explanations, being able to hypothesize and understand complex things it becomes clearer, where this ability clearly shows how participants are reasoning students. As with literacy, mathematical literacy and creative thinking abilities are not only limited to numeracy skills, but also how to apply mathematics in everyday life to solve a problem, how to communicate it, thus it can be seen how the students mathematical thinking process.

4. Conclusion

Based on the results of research and discussion, it can be concluded that there is significant relationship between mathematical literacy and student's creative thinking abilities with the influence of literacy mathematics for creative thinking skills is 46.5% and the rest is influenced by other factors which was not measured in this study. Students who have high mathematical literacy relatively have ability to think creatively. Meanwhile, students who have high mathematical literacy relatively have high ability to think creatively.

5. References

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