

Improving the Ability of Creative Thinking Mathematically and Self-Confidence Student through Application Model Eliciting Activities (MEAs) Review from Student Gender

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Abstract The purpose of this research was to determine: improving the ability of mathematical and self-confidence of students of class X of SMA Negeri 1 Barus taught by Model Eliciting Activities (MEAs), and to view whether there was interaction between learning with student's gender to the ability of Creative Thinking Mathematically and student self-confidence. This type of research was a quasi-experiment research. The population in this study was all students of SMA Negeri 1 Barus. The sample in this research were 32 students of X-1 class as experiment class and 32 students of class X-2 as control class through purposive sampling method. The data in this research were analyzed by using ANAVA 2 Path. The validation result on the test of creative thinking ability got the significance value 0,82, meanwhile the test reliability value got the result 0,87. The results obtained: (1) Increased ability of creative thinking mathematically and self-confidence of students who gained learning Eliciting Activities Model (MEAs) was higher than the ability to think creatively mathematically and *self-confidence* students who obtained conventional learning; (2) There was no interaction between learning and gender of students towards the improvement of the ability of creative thinking mathematically and student *self-confidence*.

Keywords: *the ability of creative thinking mathematically, self-confidence, model eliciting activities*

Cite This Article: Nihdayati Pane, Edi Syahputra, and Mulyono, "Improving the Ability of Creative Thinking Mathematically and Self-Confidence Student through Application Model Eliciting Activities (MEAs) Review from Student Gender." *American Journal of Educational Research*, vol. 6, no. 4 (2018): 319-323. doi: 10.12691/education-6-4-4.

1. Introduction

Mathematics is a subject that can train students in developing a critical, logical and creative way of thinking. Therefore, in the curriculum of education in Indonesia, mathematics as a compulsory education is given to elementary school students to high school.

Description of the curriculum in 2013 in the implementation of the class, formulated in regulation of the Minister of Education and Culture Number 103 Year 2014 on learning lesson 2 paragraph 1, namely learning on primary and secondary education carried out activity-based and characteristics: (a) interactive and inspiring; (b) fun challenging, and motivate learners to participate actively; (c) contextual and collaborative; (d) provide sufficient scope for the initiative, creativity, and independence of learners; and (e) according to the talents, interests, abilities, and development of psychic and psychological learners.

Wardhani (2011) [1] stated that Indonesian students have attended *Trends In International Mathematics And Science Study* (TIMSS) in 2011, Indonesia is in the top 5 position from below (Together Syria, Morocco, Oman,

Ghana), with Indonesia ranked 36 out of 40 countries with a score of 386 and a PISA rating made in 2012 by Organization Economic Cooperation and Development (OECD) which is called the Program for *International Student Assessment* (PISA) to get results that Indonesia is ranked 64 out of 65 countries (Kompas, 5 December 2013). This was certainly a concern for educational actors to what extent the effectiveness of education in Indonesia. Remembering mathematics as the parent of science, mathematics plays an important role as a tool, science, guiding mindset and attitude formers; therefore the process of learning mathematics must be conducted good.

Marliani (2015:15) [2] stated that mathematics is enabled to develop systematic, logical, creative, disciplined, and effective thinking skills in a competitive modern life. One of the factors that influence the achievement of learning mathematics is student creativity. The low creativity of students was caused by the learning process that occurs was still one direction, emphasizing only the cognitive aspects of the students only, while the affective and psychomotor aspects of the students were noticed. According to Rahman (2012: 19) [3] obtained information based on research conducted by Hans Jellen of the University of Utah, United States and Klaus Urban of the

University of Hannover, Germany, states from 8 countries studied the creativity of the lowest children of Indonesia.

Another cause of low learning outcomes of students in math lessons was that teachers tend to be passive and the activity of students was less attention. As a result, students only imitate what the teacher conducted, and sometimes just follow the steps in the package book or the way that already exists. These causes the students lack the ability to solve problems with other alternatives. The low fact of student self-confidence was indicated by the results of the Mullis study, et. All in TIMSS 2011 International Result in Mathematics (2012: 338) [4] which stated that on an international scale only 14% of students have high self-confidence related to their mathematical ability. While 45% of students included in the category of being, and the remaining 41% included in the low category. Similarly, only 3% of students had high self-confidence in mathematics, while 52% were in the category of students with moderate self-confidence and 45% were included in the category of students with low self-confidence, low ability creative thinking mathematically as well as self-confidence of learning mathematics, one of which is a model of learning applied by the teacher.

In the implementation of learning in class, generally using conventional model learning. In this conventional learning to make students only hear, record, ask questions, and conduct the problem individually or in groups. The importance of a mathematics learning approach that trains and improves the ability of creative thinking, absolutely necessary learning mathematics activities train students in increasing creativity. The writer considers this to be realized in learning by Model Eliciting Activities (MEAs) Students learn more active, this learning model was good for classroom learning (Siregar, 2013: 526) [5]. In an effort to improve the ability of creative thinking and *self-confidence*. Require a learning approach that given more flexibility for students in exploring while learning. To improve self-confidence necessary activities in which there was dynamics or group interaction.

Research conducted by Celik (2017: 20) [6] and found that the use of MEAs not only affects the cognitive abilities of students, but also could build student self-confidence. Through MEAs learning, students could be more active in developing creative thinking ability can also develop positive nature of math and confidence in following the process of learning in the classroom. Baker & Galanti (2017) [7] also conducted research on the use of MEAs in mathematics learning. Baker & Galanti ([7]: 13) found that through MEAs learning students were invited to solve real problems in groups, but the impact of group activity in the MEAs reflected on each individual student.

In addition to the cognitive and affective students, several studies have been conducted to examine gender differences related to mathematics learning in that the biological differences in the brains of male and female known through observation, that females were generally superior in the field of language and writing while males were superior in math in that their better spatial abilities.

Females were generally concerned with concrete, practical, emotional, and personal matters, while males were focused on things that were intellectual, abstract, objective [8,9,10].

Prayitno, (2013: 567) [11] mentioned that many recent research results that present differences in learning achievement, attitudes, and participation were influenced by differences in gender factors. According to Amir, (2013: 25) [12] explained that differences in learning achievement of males and females was more due to differences in intelligence levels. Males were more active than females. However, the liveliness of these male then causes male to become more difficult to manage. This was what causes males to have a lower learning achievement than females, while on the aspect of self-confidence, females who were better than males in completing the tasks of learning, also support the achievement of education. From the above explanation, the researcher assumes that the gender factors affect the learning process, both in terms of cognitive (in this case the ability to think creatively) or in terms of affective (in these case self-confidence students). The results showed different results. From some research results was not played a role in the success of learning, in the sense could be concluded that gender difference have contributed to explain the profile of a person in constructing mathematical models and solve problems, but this difference was not consistent that whether males or females better in learning mathematics, showed there were many females who were successful in their math career [10,13,14].

Thus the inconsistency of result in studies involving the study of gender factor differences in a different age group and cultural group could not be explained only by sex. Referring from several research results about gender factors and their interaction in the process of learning mathematics, the researchers are interested to lift it in a study. Therefore, differences in gender factors still need to be investigated further, including in this study, which is related to the ability of mathematical creative thinking of a student in solving math problems.

2. Research Method

This study was categorized into quasi-experimental research (*quasy experiment*). The research design used in this research was Pretest Posttest Control Group Design There are group of sample in this research that was Experiment group and control group given pretest and posttest by using equal instrument. Sugiyono (2013:114) [15] stated that experimental research was a study that seeks to influence the effect of certain variables on other variables in strictly controlled conditions. In this study there were three types of variables were independent variables, dependent variables and intermediate variables. The independent variable was learning using Model Eliciting Activities (MEAs) while the dependent variable was the ability to think creatively mathematically and self-confidence students. The control variable was student's gender.

2.1. Subjects and Objects of Research

The population in this study was all students of SMA Negeri 1 Barus Academic Year 2016-2017 consisted of 521 students. The sampling technique in these research was using purposive sampling technique from all students

of class X that was class X-1 as experiment class with treatment of Model Eliciting Activities and class X-2 as control class with conventional learning.

2.2. The Technique of Instrument Data

This research data was obtained from the test of mathematical creative ability and self-confidence questionnaire of students. Data analysis in this research consisted of normality test, homogeneity test, normalized gain test and hypothesis testing. Testing statistical hypothesis in this study using two-way ANOVA formula, all statistical calculations using SPSS computer program assistance 17. Statistical model of this Research Trial (Syahputra, 2016 : 169) [16]:

$$Y_{ijk} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + \varepsilon_{ijk} \text{ [16]}$$

Withal: $i : 1, 2, j : 1, 2, k: 1, 2.$

Explanation:

Y_{ijk} : observation on the group to- k which received treatment of learning models to- i and gender to- j

μ : general average

α_i : influence of learning model to- i

β_j : gender influences to- j

$(\alpha\beta)_{ij}$: the influence of interaction between learning models to- i and gender to- j

ε_{ijk} : error component.

3. Research Result

The results showed that there was an increase in ability think mathematically creative students who were taught using the MEAs approach. It could be seen from Table 1 calculation of two way ANOVA test result as follows:

Table 1. ANOVA Test Result on Improving Student ability of creative thinking mathematically Based on Learning

Tests of Between-Subjects Effects					
Dependent Variable: Berpikir_Kreatif					
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	.312 ^a	3	.104	7.579	.000
Intercept	15.749	1	15.749	1147.194	.000
Learning	.252	1	.252	18.345	.000
Gender	.000	1	.000	.023	.881
Learning * Gender	.052	1	.052	3.768	.057
Error	.824	60	.014		
Total	16.976	64			
Corrected Total	1.136	63			

a. R Squared = .275 (Adjusted R Squared = .239)

Based on Table 1 it could be seen that for the learning factor, the value was obtained F count of 18.345 and a significant value of 0.000. Since the value was significantly smaller than the significant level of 0.05, then H0 was rejected and H1 was accepted. Thus, it can be concluded that the improvement of creative thinking

ability of mathematic students who gained MEAs learning was higher than the ability of creative thinking mathematically of students who obtained conventional learning. The results of further research indicate that there was an increase in the questionnaire results *self-confidence* students who were taught using the MEAs approach were higher than students taught using a conventional approach. The results of two way ANOVA calculation could be seen in Table 2 below:

Table 2. ANOVA Test Result on Increasing Student Self-Confidence Based on Learning

Tests of Between-Subjects Effects					
Dependent Variable: Self_Confidence					
Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	.055 ^a	3	.018	2.701	.054
Intercept	11.404	1	11.404	1665.011	.000
Learning	.046	1	.046	6.750	.012
Gender	.001	1	.001	.099	.754
Learning * Gender	.010	1	.010	1.490	.227
Error	.411	60	.007		
Total	11.866	64			
Corrected Total	.466	63			

a. R Squared = .119 (Adjusted R Squared = .075)

Based on Table 2. it could be seen that for the learning factor, the value of F arithmetic amounted to 6.750 and significant value of 0.012. In that the value was significantly smaller than the significant level of 0.05, then H0 was rejected and H1 was accepted. Thus, it could be concluded that the increase of self-confidence of students who gained learning MEAs was higher than the self-confidence of students who obtained conventional learning.

Research related to the influence of gender on improving the ability of mathematical creative thinking and self confidence of students presented in Figure 1 below:

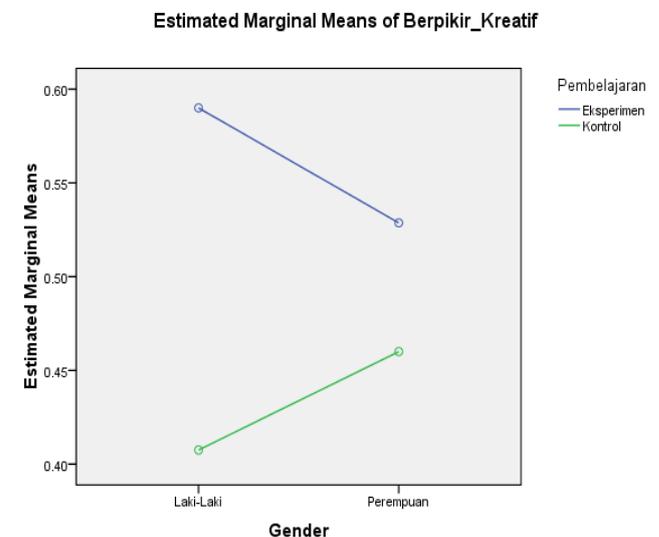


Figure 1. There was no interaction between learning and gender in improving students' mathematical creative thinking ability.

From Figure 1 above showed that MEAs learning was more influential in achieving the potential of mathematical creative ability that the average score obtained by students in this class was higher than the average score obtained in the conventional class. So there was no interaction between learning and gender of students to improve students' mathematical creative thinking ability. This means there was no mutual influence contributed by the students' learning and gender to the improving ability of students' creative thinking mathematically. While Figure 2 showed that the interaction between gender and students' self confidence ability could be seen in Figure 2 below:

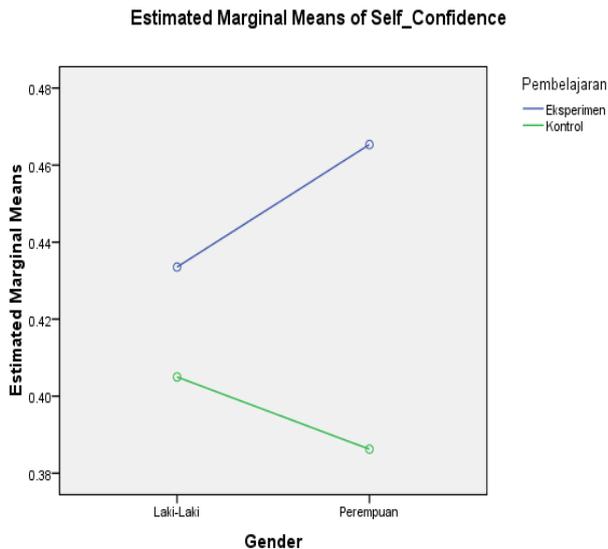


Figure 2. There was no interaction between learning and Gender towards improving student self-confidence

From Figure 2 above showed that MEAs learning was more influential in achieving student self-confidence potential in that the average score obtained by students in the experimental class was higher than the average score obtained in the conventional class. So there was no interaction between learning and gender of students to increase student self-confidence. These mean there was no mutual influence contributed by the students' learning and gender to the increase of student self-confidence.

4. Conclusions

Based on the results of research that has been described in the previous section, it could be concluded as follows:

1. The enhancement of students' mathematical creative thinking ability that obtains MEAs learning was higher than the students' mathematical creative thinking ability that obtains conventional learning.
2. Improving self-confidence of students who gained learning by using MEAs was higher than that of self-confidence students who gain conventional learning.
3. There was no interaction between learning model and student's gender toward improving students' mathematical creative thinking ability.
4. There was no interaction between the learning model and the student's gender toward the increase of student self-confidence. It also means that the

interaction between the learning model (MEAs and conventional learning) and the gender of the students (males and females) It had not significant joint effect on the improving of creative thinking mathematically and student self-confidence.

5. Differences in the improvement of the ability of creative thinking mathematically and student self-confidence were caused by difference the learning used is not due to the students' gender.

5. Suggestions

Based on the results of research and findings in the implementation of research, researchers gave some suggestions as follows:

1. To Teacher
 - a. The learning of mathematics by using MEAs learning could be expanded, not only on trigonometric material but also on other mathematics subject matter.
 - b. In applying learning by using MEAs learning, teachers should be able to provide various views and problems relating to the material taught and could be used as a perception to students.
 - c. Learning using MEAs requires a relatively large amount of time, so in the implementation the teacher was expected to make the best time possible. Thus, all learning steps could be well organized.
2. To Related Institutions
 - a. Learning using MEAs with emphasis on students' mathematical creative thinking and self-confidence of students was still very strange for teachers and students alike, therefore it need to be socialized by schools or related institutions in the hope of improving students' mathematical creative thinking and student self-confidence.
 - b. Learning using MEAs could be used as an alternative in improving students' mathematical creative thinking and student self-confidence on trigonometric subject so that it could be used as input for school to be developed as an effective learning model for other mathematics subject.
3. To Advanced Researchers
 - a. For further investigators, should conduct research on MEAs on different subjects.
 - b. For further research this research should be supplemented by incorporating various different factors, such as student attitudes and interest factors, students' family economic background, and so forth. So research on the creative thinking mathematically students and self-confidence of students was not solely influenced by the model of student learning and gender only.

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