MASTERY ANALYSIS OF THE CALCULUS CONCEPT TOWARD MATHEMATICS EDUCATION STUDENTS: OF STKIP BINA BANGSA GETSEMPENA

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ABSTRACT

As one of scientific thinking means, Mathematics is necessary to cultivate logical, systematic and critical thinking skills. Similarly, mathematics is the basic knowledge that is necessary to support success in higher education, even in everyday life. One branch of mathematics that can cultivate the ability to think logically is calculus. Many mathematical concepts can be explained by the representation of calculus. But in the reality, calculus courses are generally less favored by students. Based on the facts, there are still many students generally less mastering the preconditions of calculus that had been studied in Senior High School (SMA). This study aims to analyze the level of mastery of the concept of calculus in Mathematics Education students. This research used descriptive method with qualitative approach. The research subjects were 17 students of second semester of Mathematics Education STKIP Bina Bangsa Getsempena Banda Aceh academic year 2016/2017. From the result of data processing, there were 12 students (70.59%) out of 17 students who master the 1-mastery category, 9 students (52.94%) who master the 2-mastery category, 12 students (70.59%) who master the 4-mastery category and no one (0%) who master the 3-mastery category. This research was expected to provide useful information and become serious attention in improving student's mathematics learning achievement. Especially mathematics education students to become competent graduates.

Keywords: Student Mastery and Calculus

INTRODUCTION

Mathematics has a very important role in anticipating the increasingly complex and complex challenges of the future. Therefore, mathematics education should be able to equip students with the personality
and ability that can answer future problems. Mathematics education should be directed to fostering a transferable ability in student life.

Mathematics as one of the tools of scientific thinking is necessary to cultivate the ability of logical, systematic and critical thinking. Similarly, mathematics is the basic knowledge necessary to support success in higher education, even required by everyone in everyday life. One branch of mathematics that can cultivate the ability to think logically is calculus. Many mathematical concepts can be explained by the representation of calculus. Calculus is also effective to help solving problems in many branches of mathematics.

According to Burhanuddin (2012), calculus is needed in science in order to improve the power of prediction of science and is something imperative because it is a means to increase higher reasoning deductive. In addition, Calculus is well known for its highly herarchical and systematic nature of the material and produces the structured and efficient language needed by the Science of Nature. The side of the quantitative analysis ability to the problems related to the teaching of MIPA, the mathematical modeling in simple level by applying the understanding of various concepts and principles in science are an absolute matter that needs to be mastered by Calculus. Because without Calculus knowledge will cease at the qualitative stage.

The fact shows that calculus courses are generally less favored by students. Based on the facts in the field are still many students are generally less mastering the preconditions of calculus that had been studied in Senior High School (SMA). This is evidenced by the results of previous research, namely:

The results of Mertasari (2005) identified several reasons for the low learning outcomes of calculus I as follows. (1) Students are less aware of the benefits of learning calculus courses and they argue that calculus is less relevant to the field of study. (2) The way students learn is still like studying in secondary school, which refers to the skills to solve the problems without being supported by mastery or understanding the concept steadily. (3) Learning strategies tend to use the flow of information-giving examples of home work-training questions. (4) Problem-solving problems related to the field of study or the surrounding environment is lacking. (5) Students are less able to learn independently. (6) In general, students are
less knowledgeable about the preconditions of calculus I that have been studied in High School.

Based on the observations that researchers have done so far, the mastery of calculus in mathematics education students is still relatively low. Therefore, to prove the researchers’ hunch, the researchers decided to conduct further research on "Analysis of mastery of the calculus concept of mathematics education students: Qualitative Study of Mathematics Education Students STKIP Bina Bangsa Getsempena Banda Aceh, Indonesia".

METHODS

This research used descriptive method with qualitative approach. The subject of this research was the second semester students of Mathematics Education STKIP Bina Bangsa Getsempena Banda Aceh academic year 2016/2017. Data collection techniques used was test methods, interviews, and documentation studies. Data processing was done continuously since the beginning of the research process started. Each data obtained should be analyzed, in the form of an interpretive effort to know its meaning and be connected with the research. In this study, an analysis of student answers and further confirmed by the criteria that researchers have set was done to see the mastery of students about the calculus material. Meanwhile, to determine the error of students, researchers examined every answer that is answered by students. In this study the data were classified into four categories of mastery namely: Answering certain and uncertain integral; answering integral trigonometric substitution; finding out an integral by using the partial integral formula and Determining the area of a region on the curve.

RESULTS AND DISCUSSION

Quantitative analysis was carried out to describe the mastery of students about the concept of calculus. Based on the results of quantitative analysis, the students obtained test scores of mastery of the concept of calculus with the following details: Minimum score 10, maximum score 75 and average score 26.06. While the ideal score is 100. If this score is expressed in percent, it is as follows: Minimum 10% mastery, maximum mastery 75%, and mastery an average of 26.06%.

The average score obtained by the students is 26.06%, it indicates that the given test of mastery of calculus concept is difficult for the
students. In other words, the students have not mastered the concept of calculus. Based on the results of the distribution of the score shows that there are students who scored only 10% of the ideal score, but there are also students who scored 75% of the ideal score. This suggests that the concept of calculus is possible to be mastered by certain students, but may also not be mastered by anthers, but may also not be understood by other students. Results of data processing student mastery by using the provisions that have been set can be seen in the table of students' mastery of the concept of calculus in Table 2 below:

<table>
<thead>
<tr>
<th>No</th>
<th>Mastery Category</th>
<th>Total (Number of Students)</th>
<th>Percentage of Mastery (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mastery-1: Answering certain and uncertain integral</td>
<td>12</td>
<td>70.59</td>
</tr>
<tr>
<td>2</td>
<td>Mastery-2: Answering integral trigonometric substitution</td>
<td>9</td>
<td>52.94</td>
</tr>
<tr>
<td>3</td>
<td>Mastery-3: Answering integral by using partial integral formula</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Mastery-4: Determining the area of an area on the curve.</td>
<td>12</td>
<td>70.59</td>
</tr>
</tbody>
</table>

From Table 1, it can be seen from the total of 17 students who have the mastery test of calculus concept, there were: 12 students (70.59%) who master the category of mastery-1, 9 students (52.94%) who master the category of mastery-2, 0 students (0%) who master the category of mastery-3 and 12 students (70.59%) who master the category of mastery-4. Of the above mastery that is not mastered by the students at all is mastery-3. To be more clear, the following is Figure 1: graph of Mathematics Student Mastery Level.
From Figure 1 above shows that of the four categories of mastery that is assigned, the 3-mastery category is not mastered by the students at all. This shows that students do not understand trigonometric integrals. While the category of mastery that is somewhat easy to be mastered by students is the category of mastery-1 and mastery-4. This suggests that the students' understanding of the basic understanding of integral and integral applications that cover the area and volume of the rotary objects is relatively better when compared to students' understanding of other categories of mastery.

CONCLUSION

From 17 students who took the mastery test of calculus concept, there were: 12 students (70.59%) who master the category of mastery-1, 9 students (52.94%) who master the category of mastery-2, 0 student (0%) who master the category of mastery-3 and 12 students (70.59%) who master the category of mastery-4. Mastery-3 is the mastery that is not mastered by the students at all.

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REFERENCES


