The Function of Limits Mastery on Mathematics Learning Achievement in Derivative Subject at the Eleventh Grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan

Hasna Dewi Ritonga
Mathematics Education Program
Postgraduate School of State University of Medan
Medan, Indonesia
Email: hasnahdewi589@gmail.com

Abstract- **The aim of this research was to emphasize the limits of mastery on mathematics achievement in the derivative subject at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan KaryaSetia Padangsidimpuan. The approach of this research was correlation method. Sample of this research was all the eleventh grade students Madrasah Aliyah Yayasan Pendidikan Karya Setia of Padangsidimpuan which include 36 students.Test was used to collect the data and analyzed by using two ways. They are descriptive analysis and inferential statistics. Based on descriptive analysis, the average of the function of limits mastery was 67.5, it was categorized "enough" while the average of mathematics achievement in derivative subject was 74.05, it was categorized "good". Based on inferential statistics, the writer used r product moment to test the hypothesis. It could be $r_{observed}$ gotten r = 0.378 and r_{table} = 0329 error at the level of 5%. It could be known that $r_{observed}$ was greater than r_{table} (0378> 0329). It could be concluded that alternative hypothesis was accepted. It meant there was a significant correlation of the function of the limitations of the students of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan.**

Keyword: mastery, the function of limits, derivative

I. INTRODUCTION

Education is essentially an attempt to improve the knowledge which is gained from formal and non-formal institutions. To be able to master science and technology, the role of the world of education is required. Education plays an important role to prepare young people who are able to compete.

In line with the development of science and technology and the demand for improving the quality of education, teachers as implementers and learning managers are expected to improve the quality of education through the learning process. Mathematics is one of the basic science that plays an important role for the development of other sciences. In other words, many of the sciences of discovery and its development are inseparable from mathematics. This fact is based on the assumption that the development of other science will be stopped if not supported by adequate mathematical knowledge. In line with the development of the science of technology and the increasing demand of science education, teachers as implementers of teaching managers are expected to study the quality, process and student learning outcomes.

As a teacher the subject of mathematics should have a basic skill in teaching that is dynamic in accordance with existing conditions. What an awkward mathematics teacher if he/she does not have the wisdom to achieve in achieving the desired learning objectives. Therefore, a mathematics teacher should be able to encourage the development of students' understanding of the subject matter in order to improve logical, systematic, and creative thinking.

One of the competence of teachers in the field of mathematics study is to master the subject matter that will be taught. This will bring positive impact for students that can encourage students in order to grow the power of reason, way of thinking systematic and creative, and curiosity among students.

However, the reality of mathematics learning today is still far from achieving that goal. Based on the researcher's daily observation, it shows that many students still do not like math lessons. It begins from the difficulties, especially in understanding the concepts of mathematics and reasoning. One of them is about the derivatives which is studied in grade XI. This is most likely due to the low student's basic ability, while the mathematics is deductive and hierarchical in the sense of mastering a particular concept / rule requires an understanding of the concepts/rules of the previous understanding that is about the mastery of limits function.

This can be seen from the results of early observations which were conducted to the daily test for derivative subject matter of mathematics. The daily value which was obtained by grade XI of IPA Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan was 65. While the Score

Minimum Criteria of (KKM) was 75. It showed the results of students' learning were not maximized.

The obstacles found by the researcher was the lack of basic ability of students, assumption that mathematics subject was difficult, the method used by teachers were not vary, some students were bored to follow the subject of mathematics lessons, lack of understanding and development of the previous material therefore, student mastery would greatly support the understanding mastery of limits function. This was a factor that affected the learning outcomes of mathematics. If this situation was ignored constantly it would cause unfavorable turmoil in the future. For example, students would be overwhelmed to apply derivatives in other fields such as physics, economics and also in college later.

To overcome these obstacles, there were various attempts that have been made such as providing mathematics textbooks, providing learning facilities and infrastructure, forming study groups, providing training, providing additional tutoring, and others. While the efforts made by the principal was to improve the performance of teachers, one of them by holding supervision and monitoring that provided guidance in the schools. In addition, the school also developed more creative learning that can be seen from the way of teachers created the spirit of student learning, such as making concept maps, quizzes, observation, dialogue, question and answer and so forth.

On the other hand the efforts to improve student learning outcomes were also continued further and developed such as through teacher upgrading, MGMP (Subject Teacher Conference), procurement of facilities and learning infrastructure and so forth. But the results obtained were still not satisfactory.

In connection with the problem, the authors were encouraged and willing to conduct research entitles "The Function of Limit Mastery on Mathematics Learning Achievement in Derivative Subject at the Eleventh Grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan".

1. Formulation of the Problems

Based on the background of the problems described above, the authors formulate the research problem, as follows:

a. How is the limit function mastery at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan?
b. How is the description of mathematics subject achievement on derivatives main subject at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan?
c. How far is the relationship between the limit function mastery with mathematics learning achievement on derivatives main subject at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan?

2. Research Objectives

The objectives of the study are the basis for achieving research goals. The objectives of this study are as follows:

a. To see the limit function mastery at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan.
b. To see the description of mathematics subject achievement on derivatives main subject at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan.
c. To see how far the relationship between the limit function mastery with mathematics learning achievement on derivatives main subject at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan.

II. METHODOLOGY

Research method is a series of ways or activities of research implementation based on basic assumptions, philosophical and ideological views, questions and issues encountered. Type of this research method used is correlation method. According to correlation research is a study which is intended to determine whether there is a relationship between two or several variables [1] . According correlation research is research aimed to determine the relationship of a variable with other variables [2] . States that the correlation method is a study that intends to examine and explain the pattern of relationship between two or more variables that this type of support theory has been required both for use as a state in proposing hypotheses as well as to determine the criteria of measurement of the relationship between the variables studied, such as through hypothesis testing [3].

Basically, correlation research involves correlation counting between the complex variable (criteria variable) with other variable which is regarded has the relation (predictor variable). Those steps of research generally described as follows:

The syntax of Correlation Method	
1	Stating the Problem
2	Reviewing the Problem or Literature Study
3	Research Questions or Hypothesis
4	Research Design and Research Methodology
5	Collecting the Data
6	Analyzing the Data, and
7	Conclusion

The population of this research were 36 students of Class XI of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan. Research population was a generalization region consisting of objects or subjects that have a certain quantity and characteristics by researchers to be studied and

then drawn conclusions. The sample was a small subgroup of the target population that represented the population and really researched. The author determined the samples by using *total sampling* technique which were consisted of 36 people.

Technique of data collection in this study was through the instrument. The instrument used was a test. The test was a tool used to obtain information about an individual or an object. Argued, tests were a number of questions given to be answered. The mathematic learning achievement in derivative subject was measured by multiple choice form with option a, b, c, d and e. To conclude the data from both variables then scoring was made if the students answered correctly given score 1, if false given score 0, while for the maximum score was assigned a value 20 [4] .

The multiple correlation coefficient *R*, measures the strength of the relationship between the independent and dependent variables. Similar to *r* and ρ, the coefficient *R*, takes a value between zero and one; however, unlike *r* and ρ, it only indicates the strength not the direction of the association. Regression can be used to model the association of independent variables with dependent variables.

To answer the problems that have been formulated, the researcher processed the data collected into two stages: 1. Descriptive analysis and inferential statistical analysis were used to test whether the proposed hypothesis accepted or rejected, then the data obtained then used statistical analysis techniques with the formula correlation of "r" product moment.

III. RESULTS AND DISCUSSION

Based on data analysis on the mastery of limit function at eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan, it was obtained an average value of 65.5. If it was consulted on the assessment criteria, the average value of limits function mastery was in the "Enough" category. This meant that the value achieved by students on limit function mastery was not appropriate yet with what was expected. The lowest score was 44 and the highest score was 96, whereas the maximum value that might be achieved by the student was 0 - 100 and the theoretical middle value was 50. If it was compared between the mean value of 65.5 with the theoretical middle value 50. the mean value was greater than the theoretical middle value. If the average value was greater than the theoretical middle value then the mastery of the limit function was in accordance with the expected, whereas if the average value was lower than the theoretical middle value then the mastery of the limit function was not as expected. The average value of 65.5 was the accumulation of the value of each indicator, for more details the learning achievement of the limit function mastery was described as follows:

The mastery of the limit function in calculating the unlimited limit function obtained the average value of 66.26 in the category "Enough". The mastery of the limit function in calculating the limit of the indefinite form function reached an average value of 66.11 in "Enough" category. The mastery of the limit function in calculating the trigonometric function limit reached 61.46 in the "Enough" category. The mastery of the limit of function in using the limit in searching the tangent line of a curve reached an average value of 73.89 entered the "Good" category.

Based on the above analysis it can be seen that the highest average gained was in the indicator using the limit in finding the tangent of a curve that was 73.89. While the lowest average value was the indicator to calculate the trigonometric function limit was 61.46.

Based on data analysis conducted on mathematics learning result of main subject of derivative at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan obtained average value 74,05. If consulted on the assessment criteria, the average value of mathematics learning achievement of derived subject matter at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan was in the "Good" category.This meant that the value achieved by students on the subject matter of the derivative was in accordance with the expected. The lowest score was 52 and the highest was 92, while the maximum value that might be achieved by the student was 0-100. The theoretical middle value was 50. If it was compared between the mean values of 74.05 with the theoretical middle value of 50. the average value was greater than the theoretical middle value. If the average value was greater than the theoretical middle value then the result of learning mathematics of the main subject of the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan was in accordance with the expected. The average value of 74.05 was the accumulation of the value of each indicator, for more details the acquisition of the value of mathematics learning achievement derived subject matter per value can be seen below:

The result of learning mathematics of derivative subject matter in calculating the derivative of function by using the definition of derivative reaching average value 72,77 entered in "Good" category. The result of mathematics learning of the main subject of derivative in determining the derivative of a at one point reached the average value of 71,11 entered in "Good" category. The result of the mathematics learning of the main subject of the derivative in determining the rate of change of function value reached the average value of 77.78 in the "Good" category. The result of the mathematics learning of the main subject of the derivative in determining the derivative of algebra and trigonometric functions reached an average value of 80.00 in the "Very Good" category.

Based on the above analysis it can be seen that the highest average value was in the indicators of determining the derivative of algebra and trigonometric functions was 80.00. While the lowest average value was in the indicator of determining the derivative at a certain point of 71.11.

The testing of hypotheses truth that have been formulated in this study were analyzed by inferential statistical analysis

techniques using correlation formula "r" *product moment.* This technique was used to see if there was a relationship of mastery of the limit function with the result of learning mathematics of main subject of the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan.

Based on data analysis it was obtained r_{xy} 0.378, compared with r_{table} at 95% confidence level or error rate of 5% with degrees of freedom (df) = N - nr = 36-2 = 34 was obtained r_{table} 0.329.Then $r_{xy} > r_{table}$ = 0.378 > 0.329. Based on the consultation results of the value of the alternative hypothesis formulated in the study can be accepted or approved truth. This meant that there was a significant relationship between the mastery of limits function with the results of learning mathematics of derivative subject matter at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan. In other words, if the limit function mastery was getting well then the result of learning mathematics of the main subject of derivative would be well also at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan.

As it was stated on the theoretical basis that the initial readiness *(entering behavior)* was crucial to the success of mastering the material to be studied. The limit material was also a prerequisite material for the derivative, since the derivative was discussed about limits function. From the explanation above, it showed that the mastery of the limit function was a basic skill that must be possessed before learning mathematics derivative subject matter. Based on the description described above, "It was strongly suspected that there was influence over the limit of function to the learning achievement of mathematics of derivative subject matter at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan".

That "Learning outcomes are the result of an interaction of acts of learning and teaching [5] ." Meanwhile, according to "Learning outcomes are the abilities that students have after he received his learning experience".

Based on the above description it can be concluded that the learning outcomes were the result of an interaction of learning acts and the act of teaching of the desired individual changes based on the characteristics or variables luggage through a particular teaching treatment.

The results of the research noted that in conducting literature review the authors found a study on the influence of teachers' skills in managing the class on the mathematics learning outcomes of students of the derivative subject matter in class XI SMA Negeri 1 Huristak. From the calculation obtained $t_{observed}$ = 3.622 compared with t_{table} at the level of 95% or 5% error degree with degrees of freedom (df) = N - 2 = 66-2 = 64. So it can be seen that t_{table} was 1.669. By comparing $t_{observed}$ with t_{table} showed that $t_{observed}$ was greater than t_{table} or 3.622 > 1.669. Based on the consultation results of the value of the alternative hypothesis formulated in the study can be accepted or approved truth. This meant that there was a significant influence between the skills of teachers in managing the class and mathematics learning achievement on derivative subject matter at the eleventh grade of SMA Negeri 1 Huristak [6] .

The results of the research noted that in conducting literature review the authors found a study on the Effect of Limit Mastery on Learning Outcomes Matter Integral Principals of Class XI Students of SMA Negeri 6 Padangsidimpuan. Based on calculations performed to test the hypothesis set can be concluded that the 95% confidence level or error rate of 5% with degrees of freedom (df) = N-2 = 46-2 = 44, then t_{table} of 1.678, while $t_{observed}$ equal to 9.502 . Thus, it can be seen that $t_{observed}$ was greater than t_{table} namely 9.502>1.678. This meant that the hypothesis was accepted. Based on the consultation result, the alternative hypothesis formulated in this research can be accepted or approved existence. This meant "There was a significant influence between the Master of Limit on Learning Outcomes Matter Integral Principals of Class XI Students of SMA Negeri 6 Padangsidimpuan" [7].

IV. CONCLUSIONS

Based on data obtained by the data analysis technique using *product moment* formula, which aimed to limit the relationship between the limit function mastery and the learning mathematic achievement on derivatives subject matter at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan this research can be summarized as follows: The limit function mastery at the eleventh grade of MA YPKS Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan obtained the average value 65.5 in the category "Enough". It meant that the values achieved by the students were still not corresponding with what expected. Mathematics learning achievement on derivatives subject matter at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan obtained the average value of 74.05 in the category "Good". It meant that the value achieved by students on the derivative subject matter was already corresponding with what expected.

Based on data analysis can be obtained r_{xy} 0.315, compared with r_{table} at 95% confidence level or error rate of 5% with degrees of freedom (df) = N - nr = 36-2 = 34 was obtained r_{table} 0.329. Then $r_{xy} > r_{table}$ = 0.329> 0.315. Based on the consultation results of the value of the alternative hypothesis formulated in the study can be accepted or approved truth. That was a significant relationship between the limit function mastery and the learning mathematic achievement on derivatives subject matter at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan. In other words, if the limit function mastery was getting well then the result of learning mathematics of the main subject of derivative would be well also at the eleventh grade of Madrasah Aliyah Yayasan Pendidikan Karya Setia Padangsidimpuan.

REFERENCES

[1] Arikunto,Suharsimi. 2009. *Management Research.* Jakarta: Rineka Cipta
[2] Sukmadinata, Nana Syaodih, 2010. *Education Research Methods.* Bandung: Rosda Karya
[3] Ali, Muhammad. 2002 *Methods of Education.* Bandung: Teens Rosda Karya.
[4] Tayibnapis, Farida Yusuf. 2008. *Evaluation of Program and Evaluation Instrument.* Jakarta: Rineka Cipta.
[5] Mudjiono, Dimyati. 2006. *Teaching and Learning.* Jakarta: PT Rineka Cipta.
[6] Hasibuan, Hotrijana 2011. *The authors found a study on the influence of teachers' skills in managing the class on the mathematics learning outcomes of students of the derivative subject matter in class XI SMA Negeri 1 Huristak.* Journal SKRIPSI.
[7] Daulay, Fatimah 2011. *the authors found a study on the Effect of Limit Mastery on Learning Outcomes Matter Integral Principals of Class XI Students of SMA Negeri 6 Padangsidimpuan.* Journal SKRIPSI.

UNIVERSITAS NEGERI MEDAN
UNIMED
THE Character Building UNIVERSITY