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Some Factors Effected Student's Calculus Learning Outcome

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Abstract
The purpose of this study is to determine the factors effected calculus learning outcome of the student. This study was conducted with 176 respondents, which were selected rodomly. The data were obtained by questionnaire, and then analyzed by using multiple regressions, and correlation, at level of $\alpha = 0.05$. The findings showed there is the significantly correlation between the basic mathematics competence of the learners, learners' attitude towards calculus, students' assessment on lecturers' teaching competence with learners' achievement on calculus separately and simultaneously.
Keywords: Basic mathematic competence, Students' attitude, Students' chievement on calculus.

1. Introduction

Learning results about calculus is important because it is one of the supporting components of the intellectual development of students. There are several aspects related to learning outcomes calculus, which has been studied by previous researchers, namely contextual learning strategies, problem-solving approach, giving regular formative test, and remedial teaching can improve learning outcomes of calculus (Sunandar, 2008; Mestari, 2005). Zhang (2003) shown that student centred teaching leads to a strong tendency for students to adopt a deep learning approach (focusing on meaning and understanding) which then results in good teaching and learning outcomes. Student-centred teaching focuses on the student and, inparticular, on the cognitive development of the student. The teacher's goal is to help students grasp the development of knowledge as a process rather than a product.

The focus of classroom activities and assignments is on the studentcentred process of inquiry itself, not on the products of inquiry. Students create their own conceptual or cognitive models. Content, teaching style, and methods are adapted to aid the cognitive and intellectual growth of students. Student-centred teaching combines an understanding of the way that humans process information with other factors that affect learning such as attitudes, values, beliefs, and motivation' (Committee on Undergraduate Science Education 1997). Student-centred teaching may increase student involvement by drawing them into the learning process and help students make the transition from passive listeners to active participants in their own learning. Students learn best if they are engaged in active learning, if they are forced to deal with observations and concepts before terms and facts, and if they have the sense that they are part of a community of learners in a classroom environment that is very supportive of their learning (Fraser 1986; McDermott 1991).

The communication language used in learning is also one of the factors contributing to the student learning outcomes obtained. Form of questions submitted by teachers is determined by mathematical thinking perspective of teachers (Edwards, 2000; Leigh et al, 2013). Basic math competency related to communication, mathematizing, representation, reasoning and argument, strategic thinking, using symbolic and formal and language and operations (Turner, 2011).

From several previous studies, no one has explained the link between the basic aspects of mathematical competence of students, student attitudes toward calculus, and teaching competence of the faculty of the calculus of student learning outcomes. This is used as a basis for assessing the relationship between learning outcomes of calculus with basic mathematical competencies, attitudes towards calculus student and student assessment of the competence of the teaching faculty.The teachers' abilities, motivation, and work situations could explain teachers' effects on students' performance in mathematics (Rowan, Chiang, and Miller, 1997; Hill et al. ,2005). Teacher ability was defined in terms of teachers' knowledge of subject matter and teaching strategies.
In schematic form, the relationship between variables is described as Figure 1.

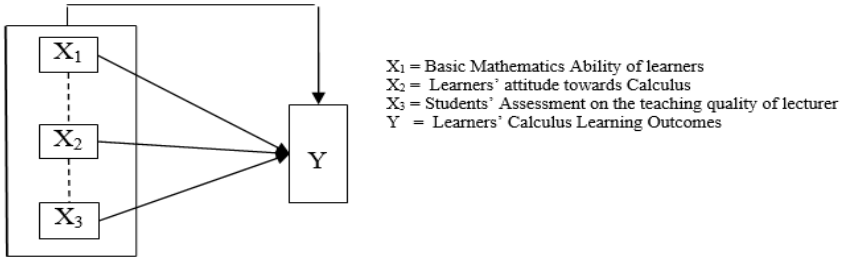

Figure 1. The constellation of relationships between variables

2. Method

This study was conducted in Mathematic Education Department, Faculty of Mathematic and Science, State University of Medan, and took a sum of 176 samples out of 775 students randomly. There are two kinds of instrument which were developed and tried out first, namely questionnaire and test sheet used to take data. Based on the data of the tried out, is found the reliability and validity of these instruments is fullfiled. The data of the skills in basic math and the learning outcomes on calculus of learner is gathered by the test sheet. Instrument in the form of questionnaires is used to find data of the students' attitude towards calculus and the students' assessment towards the lecturers' teaching quality. Before testing data, assumption test is done and found that the requirement of normality, homogenity, linearity, and colinearity of the data is fullfiled. The data was analyzed by correlation and regression technic, at the significant level of $\alpha = 0,05$.

3. Results

The results of significance tests and linearity of the regression equation $Y = 5,71 + 0,59\ X_1$, were shown in Table 1.

Table 1. Significance tests and Linearity test of the relation of regression $Y = 5,71 + 0,59\ X_1$

Variance Source	Degree of feedom	Sum of Squares	Mean Square	$F_{account}$ value	F_{table}	
					0,05	0,01
Total	176	57047				
Regression(a)	1	53237,032				
Regression (b/a)	1	2273,588	2273,588			
Residual	174	1536,380	8,830	257,495**	3,90	6,78
Unmatched	19	146,003	7,684	$0,857^{ns}$	1,64	2,00
Error	155	1390,357	8,970			

**: very significant regression ($F_{account\ value} = 257,495 > F_{table} = 6,78$)

ns : linearity form ($F_{account\ value} = 0,636 < F_{table} = 1,64$)

In Table 1, it appears that a regression coefficient (b) of 0.59 and a constant value (a) 5.71. The regression equation is Y = 5.71 + 0.59 X1. To determine the degree of simple regression equation performed on the F_{test} with the criteria if $F_{account} > F_{table}$ (0.01) (1:176) is significant. Base on calculations, $F_{account\ value}$ yield 257.46 while F_{table} is 6.78 which means significant.

Linearity test is performed to determine whether the obtained regression equation is linear or not. The criteria used was, if $F_{account} < F_{table}$ (0.05) (19: 155). $F_{calcualted\ value}$ is 0.857 while the F_{table} is 1.64 , thus $F_{account} < _{table}$ showed linear regression equation. Based on these results we can conclude the regression equation of Y = 5.71 + 0.59 X1 is significant and have linear relationship. This means that every increase of one unit on basic math skills will result in an increase of 0.59 units of learning calculus in the same direction with a constant of 5.71. With that, it can be used as a tool to describe and draw conclusions about the relationship between basic skills of mathematics with calculus learning outcomes.

To determine the strength of the relationship between basic math skills (X1) with the results of studying calculus (Y) correlation calculations has been done.

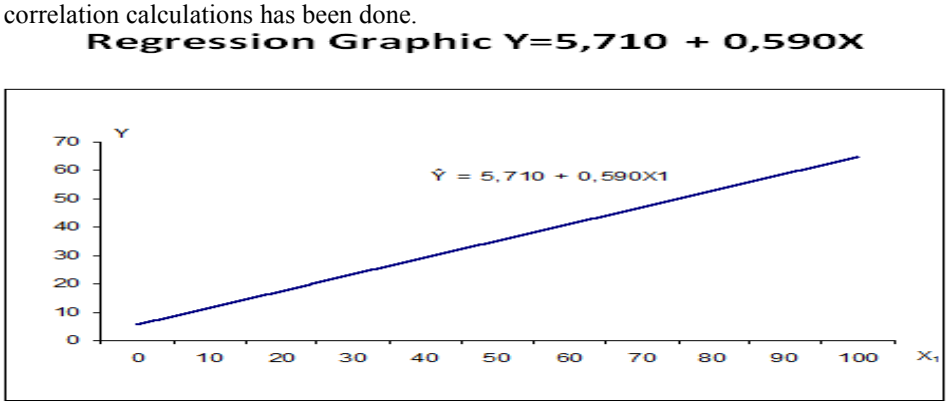

Figure 1. Regression graphic Y = 5,710 + 0,590 X The calculation shows a correlation coefficient equal to 0.66. To determine the significance of the correlation coefficient, t_{test} was performed with criteria: if $t_{account\ value} > t_{table}$ relationship is significant. From the t_{test} results, it obtained a $t_{account\ value}$ of 5.50 and t_{table} of 2.57 (Table 2).

Table 2 : Table of Siginficance Test between the Correlation of X_1 with Y

N	Coefficient of Correlation Korelasi (r_{y1})	$T_{account\ value}$	T_{table}	
			$\alpha = 0.05$	$\alpha = 0.01$
176	0,66	15,50	1,96	2,57

Description:

** = Coefficcient of Correlation is very significant ($t_{account\ value} = 15,50 > t_{table} = 2,57$ for $\alpha = 0.01$)

n = total of sample

Based on the results of significance test, the correlation coefficient between variables Basic Mathematics Ability (X_1) with Calculus Learning Outcomes (Y), it obtained an amount of 0.66 which is significant. This proves that the relationship between the ability on Basic Mathematics with Calculus Learning Outcomes are positive. That is, the higher the ability on Basic Mathematics it would result to higher Learning Outcomes on calculus. The results of this study is to reject the null hypothesis (Ho) which states there is no positive relationship between the ability on Basic Mathematics with Calculus Learning Outcomes, and accept H1 which states that there is a positive relationship between the ability on Basic Mathematics with Calculus Learning Outcomes.

The coefficient of determination of 0.432 explained that 43.2% of variance on Calculus Learning Outcomes can be determined by the variable on Basic Mathematics Skills and the rest were influenced by other factors. The results of the calculation of partial correlation coefficient between the variable Basic Math Skills (X_1) with dependent variable Calculus Learning Outcomes (Y) by controlling the variable Attitude towards Calculus (X_2), and Student Assessment on Teaching Quality of Lecturer (X3) variable, individually or jointly, it obtained a partial correlation coefficient ry1.2 = 0.53, ry1.3 = 0.57, and r1.23 = 0.49.

Based on Table 3, it can be explained that: (1) the relationship between variables Basic Mathematics Ability (X1) with the variables Mathematics Learning Outcomes (Y) by controlling the variable Attitude towards Calculus (X2), it obtained ry1.2 = 0.53 and significant, (2) the relationship between variables Basic Mathematics Ability (X1) with variable Calculus Learning Outcomes (Y) with controlling the variables Student Assessment on the Quality of Lecturer (X3), it obtained a partial correlation coefficient of ry1.3 = 0.57 which is significant, (3) the relationship between variables Basic Mathematics Ability (X1) with variable Calculus Learning Outcomes (Y) by controlling the variable Attitude towards Calculus (X2), and Student Assessment on Quality of Lecturer (X3), it obtained a partial correlation coefficient of ry1.23 = 0.49 and significant. Summary of testing the partial correlation coefficients between the Ability on Basic Mathematics with Calculus Learning Outcomes were shown in Table 3 and Table 4.

Table 3: Result of Significance Test on Partial Correlation Coefficient Between X1 and Y

Correlation	Controlled	Notation	Coefficient Correlation	$T_{account\ value}$	t_{table}	
					$\alpha = 0.05$	$\alpha = 0.01$
X_1 and Y	X_2	$r_{y1.2}$	0,53	9,70**	1,96	2,57
X_1 and Y	X_3	$r_{y1.3}$	0,57	11,10**	1,96	2,57
X_1 and Y	X_2 and X_3	$r_{y1.23}$	0,49	8,62**	1,96	2,57

** : very significant correlation coefficient ($T_{account\ value} = 9,70 > T_{table} = 2,57$, $\alpha = 0.01$)

** : very significant correlation coefficient ($T_{account\ value} = 11,10 > T_{table} = 2,57$, $\alpha = 0.01$)

** : very significant correlation coefficient ($T_{account\ value} = 8,62 > T_{table} = 2,57$, $\alpha = 0.01$)

X_1 = Basic Mathematics Ability
X_2 = Attitude towards Calculus
X_3 = Student Assessment of the Teaching Quality of Lecturer
Y = Learning Outcome on Calculus

Table 4 : Significance test on Correlation Coefficient between X1 and Y

N	Correlation Coefficient	$F_{account\ value}$	F_{table}	
			$\alpha = 0.05$	$\alpha = 0.01$
176	0,66	15,50**	1,96	2,57

Description :

** = very significant correlation coefficient ($F_{account\ value} = 15,50 > F_{table} = 2,57$ for $\alpha = 0.01$)

n = total sample

From the above description, it can be concluded that there is a positive relationship between Basic Mathematics Ability (X1) with Calculus Learning Outcomes (Y) either variables X2 and X3 are controlled or not.

a. Hypothesis Testing Regarding the Relations of Attitude towards Calculus Learning Outcomes

Students who have positive attitude towards learning calculus will give a huge influence on the results of Learning Calculus.

The second hypothesis of the study is, there is a positive relationship between attitude towards Calculus with Calculus Learning Outcomes. In other words, the more the attitude is positive towards calculus, the more Calculus Learning Outcomes increase, or vice versa. A negative attitude towards Calculus, the Calculus Learning Outcomes would decrease. From the results obtained by calculating, the regression coefficient (b) is 0.548 and a constant value (a) of -38.345.

Table 5. Table ANOVA (Analysis of Variance) Significance Test and Linear Regression Equation = -38,345 + 0,548 X_2

Source of Variance	Df	SS	MS	$F_{account\ value}$	F_{table}	
					0,05	0,01
Total	176	57047				
Regression(a)	1	53237,032				
Regression (b/a)	1	2273,588	2273,588	250,163**	3,90	6,70
Residual	174	1536,380	8,830			
Unmatched	20	67,515	3,376	$0,348^{ns}$	1,64	2,00
Error	154	1495,401	9,710			

**: very significant regression ($F_{account\ value}$ = 250,163 > F_{table} = 6,70)

$_{ns}$: linearity form ($F_{calcualted\ value}$ = 0,348 < F_{table} = 1,64)

Description :

SS = Sum of Squares

df = Degree of freedom

MS = Mean Square

From the results of these calculations, it can be made a regression equation that shows the relationship between attitude towards the Calculus (X2) with variable Calculus Learning Outcomes (Y) through the regression equation Y= -38.345+0.548X_2. The summary results of analysis of variance can be seen in Table 5.

To determine the significance of the regression equation, F test is then performed with the assessment criteria as: if $F_{account\ value} > F_{table}$, it means significant. The calculation shows that $F_{account\ value}$ is 250.163 while F_{table} is 6.70 (significant). From the results of the calculations, it can be concluded that the regression equation Y=-38.345+.548X_2 can be used as a tool to describe and draw conclusions about the relationship between attitude towards the Calculus (x2) with Calculus Learning Outcomes (Y).

From the data in table 5 above, it can be concluded that the regression equation Y = -.38.345+0.548X_2 is significant. To determine the relationship between attitude towards Calculus with Calculus Learning Outcomes performed when the F_{test} with criteria: if $F_{account\ value} < F_{table\ (0.05)\ (20:154)}$, the equation regression is linear. From the Table 5 above, it can be seen that $F_{account\ value}$= 0.348 <Ftable (0.01) (20:154) = 1.64. This shows that the shape of the relationship between attitude towards Calculus (X_2) with Calculus Learning Outcomes (Y) is linear.

From the above description, it can be concluded that the regression equation Y = -38.345+0.548X_2 is significant and linear. This means that every increase of one (1) unit of Attitudes toward Calculus (X_2) will cause an increase of 0.55 units of Calculus Learning Outcomes (Y) in the same direction with a constant of 38.34.

Simple Linear Regression Graph Y = -38.345 + 0.548X_2

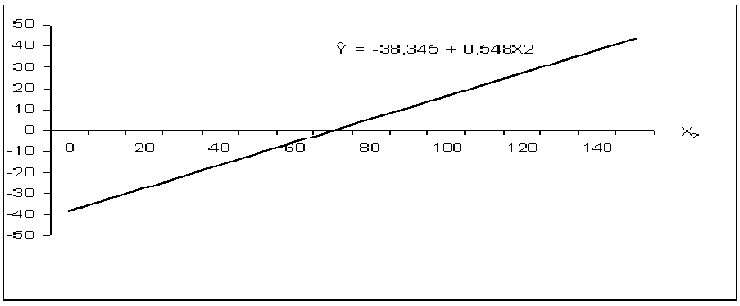

Figure 2. Simple Linear Regression Graph Y = -38.345 + 0.548X_2

Correlation Coefficient was done to determine the strength of the relationship between attitude towards the Calculus (x2) with Calculus Learning Outcomes (Y). The results of the correlation coefficient calculation showed that ry2 = 0.68. To demonstrate the significance of the correlation coefficient, the t test was as shown in Table 6.

Table 6 : Significant Test on Correlation Coefficient between $X_{1\ and}$ Y

N	Correlation Coefficient	$T_{account\ value}$	t_{table}	
			$\alpha = 0.05$	$\alpha = 0.01$
176	0,68	16,78**	1,96	2,76

Description :

** = correlation coefficient is very significant ($F_{aaccount\ value} = 16,78 > F_{table} = 2,57$ at $\alpha = 0.01$)

n = total sample

As shown in Table 6, the results of significance test of correlation coefficient between the variable attitude towards Calculus (X2) with variable Calculus Learning Outcomes (Y) is 0.68. This shows that the relationship between attitude towards calculus and the Calculus Learning Outcomes is positive. That is, the more positive the attitude towards learning Calculus, the higher the results. Based on the result of this study, null hypothesis (H_o) is rejected, that stated, there is no positive relationship between attitude towards Calculus with Calculus Learning Outcomes and H_1 is accepted, which states that, there is a positive relationship between attitude towards Calculus with Calculus Learning Outcomes. The coefficient of determination is 0.459, which means that 45.9% of variance for variable Calculus Learning Outcomes can be determined by the variable attitude towards Calculus and the rest is influenced by other factors.

The results of the calculation of partial correlation coefficients between the attitude towards the Calculus (X2) with the dependent variable Calculus Learning Outcomes (Y) with variable controlling the ability on Basics Mathematics (X1), and variable Student Assessment on Teaching Quality of Lecturer (X3), be it individually or collectively, the partial correlation coefficient obtained is $r_{y2.1} = 0.57$, $r_{y2.3} = 0.59$ and $r_{y2.13} = 0.51$.

As shown in Table 6, it can be explained that: (1) the relationship between attitude towards Calculus variable (X2) with Calculus Learning Outcomes variable (Y) by controlling the variable of ability on Basics of Mathematics (X1), the obtained ry2.1 = 0.57 which is significant. (2) the relationship between attitudes towards Calculus variable (X2) with Calculus Learning Outcomes variable (Y) with controlling the variable of Student Assessment on Teaching Quality of Lecturer (X3), the obtained partial correlation coefficient is ry2.3 = 0.59 and is significant. (3) the relationship between attitude towards Calculus (X2) with Calculus Learning Outcomes (Y) by controlling the ability on Basics Mathematics (X1), Assessment of Student on Teaching Quality of Lecturer (X3), the obtained partial correlation coefficient is ry2.13 = 0.51 and is significant. The summary of testing the partial correlation coefficients between the ability on Basic on Mathematics (X1) with Calculus Learning Outcomes (Y) are presented in Table 7.

Table 7: Summary Calculated Partial Correlation Coefficient and Significance Test Between X_2 and Y

Correlation	Controlled	Notation	Correlation Coefficient	$T_{accout\ value}$	t_{table}	
					$\alpha = 0.05$	$\alpha = 0.01$
X_2 and Y	X_1	$r_{y2.1}$	0,57	11,10**	1,96	2,57
X_2 and Y	X_3	$r_{y2.3}$	0,59	11,90**	1,96	2,57
X_2 and Y	X_1 and X_3	$r_{y2.13}$	0,51	9,06**	1,96	2,57

Description :

**very significant partial correlation coefficient ($t_{calculated\ value} = 11,10 > t_{table} = 2,57$ $\alpha = 0,01$)

** very significant partial correlation coefficient ($t_{calculated\ value} = 11,90 > t_{table} = 2,57$ $\alpha = 0,01$)

** very significant partial correlation coefficient ($t_{calculated\ value} = 9,06 > t_{table} = 2,57$ $\alpha = 0,01$)

X_1 = Ability on Basics of Mathematics

X_2 = Attitude Towards Calculus

X_3 = Student Assessment on Teaching Quality of Lecturers

Y = Learning Quality Outcomes

The table above provides information that the relationship between the attitude towards Calculus variable (X2) with Calculus Learning Outcomes variable (Y), be it controlled or not by the Ability on Basics of Mathematics variable (X1), and Student Assessment on Teaching Quality of Lecturer variable (X3), still generate a positive relationship.

b. The Relationship of Student Assessment on Teaching Quality of Lecturers Towards Calculus Learning Outcomes

Student Assessment on Teaching Quality of Lecturer (X_3) will determine its success whe the student goes to college. The third research hypothesis exists a positive relationship between Student Assessment of Teaching Quality of Lecturer (X3) with Calculus Learning Outcomes. In other words, if the Student Assessment on Teaching Quality of Lecturer is good, then the Calculus Learning Outcomes is also good, and vice versa.

From the results of hypothesis testing by using a simple regression to pairs of Student Assessment on Quality of Lecturer variable towards Calculus Learning Outcome variable, it obtained a regression coefficient (b)

of 0.577 and a constant value of (a) -36.178 with a regression equation $\hat{Y}$= -36.178+0.577X_3. Summary results of analysis of variance can be seen in Table 8.

Tabel 8. ANOVA (Analysis of Variance) Significant Test Linear Regression Equation Y = -38,34 + 0,58 X_2

Source of Variance	Df	SS	MS	$F_{account\ value}$	F_{table}	
					0,05	0,01
Total	176	57047				
Regression(a)	1	53237,051				
Regression (b/a)	1	2475,218	2475,218	322,678**	3,90	6,70
Residual	174	1334,731	7,671			
Unmatched	20	123,642	6,507	$0,833^{ns}$	1,64	2,00
Error	154	1211,089	7,813			

**: very significant regression ($F_{calculated\ value}$ = 322,678 > F_{table} = 6,70)
$_{ns}$: linearity form ($F_{calcualted\ value}$ = 0,833 < F_{table} = 1,64)
Description :
SS = Sum of Squares
df = Degree of Freedom
MS = Mean of Squares

To find the regression equation significant or not, Ftest was performed with the criteria: if Fcalculated value > Ftable, it is significant. The results of the calculation showed that Fcalculated value equal to 322.678 while Ftabel = 6.70 (significant). From the results of these calculations, it can be concluded that the regression equation can be used as a tool to describe and draw conclusions about the relationship between the quality of teaching faculty with Calculus Learning Outcomes.

As shown in table 8 above, it can be concluded that the regression equation is significant. To determine the relationship between Student Assessment on Teaching Quality of Lecturer and Calculus Learning Outcomes, F_{test} was performed with the criterion, when $F_{calculated}$ value> Ftable (0.01) (19:155), regression equation is linear. From the data in table 8, it can be seen that Fcalculated value = 0.833> Ftable (0.05) (15:154) = 1.64. This means that the shape of the relationship between the Student Assessment on Teaching Quality of Lecturers with Calculus Learning Outcomes is linear.

Graphic of Simple Linear Regression Y= -36,34 +0,577X_3

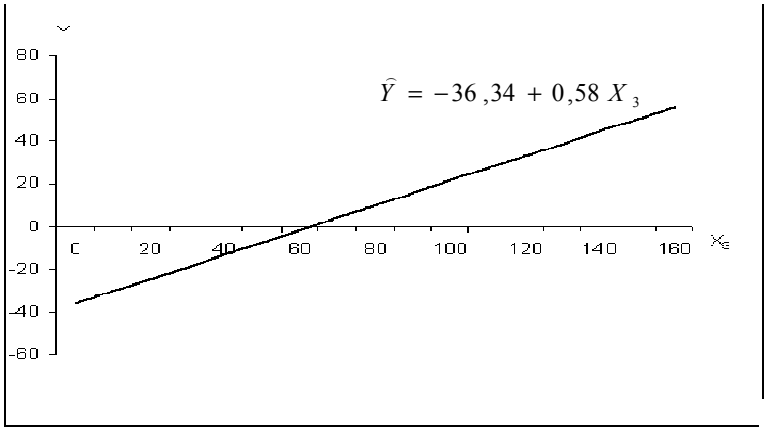

Figure 3. Grphic of simple linear regression Y = 36,34 + 0,577X_3

Calculating the correlation coefficient is done to determine the strength of the relationship between the Student Assessement on Teaching Quality of Lecturers towards Calculus Learning Outcomes. The results of the correlation coefficient calculation showed ry3 = 0.71. Ttest was doen to prove its significant correlation

coefficient as shown in Table 9.

Table 9. : Significant Test on Correlation Coefficient Between X_3 and Y

N	Correaltion Coefficient	$T_{account\ value}$	t_{table}	
			$\alpha = 0.05$	$\alpha = 0.01$
176	0,68	16,78**	1,96	2,76

Description :

** =very significant correlation coefficient ($F_{calculated\ value} = 30,37 > F_{table} = 2,57$, with $\alpha = 0.01$)

n = total sample

From the data in table 9, it showed a significance test results of the correlation coefficient of 0.68 between the variables of the Student Quality Assessment on Teaching Quality of Lecturers with variable Calculus Learning Outcomes. This suggests that the relationship between the two variables is positive. That is, the better the quality of the teaching faculty, the higher the result of Calculus Learning Outcomes. The results of this study rejects the null hypothesis (H0) which states that, there is no positive relationship between the Student Assessment on Teaching Quality of Lecturers with Calculus Learning Outcomes, H1 is accepted, which states that there is a positive relationship between the Student Assessment on Teaching Quality of Lecturer and Calculus Learning Outcome.

c. The Relationship Between the Ability on Basic Mathematics, Attitude towards Calculus, and Student Assessment on Teaching Quality of Lecturer together with Calculus Learning Outcomes

The fourth hypothesis is "there is a positive relationship between the ability on Basic Mathematics, Attitude towards Calculus, and Student Assessment on Teaching Quality of Lecturer with Calculus Learning Outcome. From the calculation result, it obtained multiple regression coefficient for Basic Mathematics Ability of 0.230; for Attitudes toward Calculus of 0.257; for Student Assessment on Teaching Quality of Lecturer of 0.304 with a = -41.51. From the results of these calculations, multiple regression equation is $\hat{Y} = -41{,}515 + 0{,}230X_1 + 0{,}257X_2 + 0{,}304X_3$.

To determine the significance of multiple regression equations, Ftest was performed as shown in table 10 below. From the results, it obtained that $F_{calculated}$ value > F_{table} (328.197> 3.90) this proves that there is a positive relationship between the Ability on Basic, Attitude towards Calculus jointly with Calculus Learning Outcomes.

Tabel 10. ANOVA (Analyssis of Variance) Significant Test and Linear Regression Equation

$\hat{Y} = -41{,}515 + 0{,}230\ X_1 + 0{,}257\ X_2 + 0{,}304\ X_3$.

Source of Variance	Df	SS	MS	$F_{account\ value}$	F_{table}	
					$\alpha = 0.05$	$\alpha = 0.01$
Total	176	57047				
Coefficient	1	53237,051				
Total Corrected	175	3809,949				
Regression	3	3243,361	1081,12	328,19**	2,66	3,90
Residual	172	566,588	3,294			

Description :

**very significant multiple regression ($F_{calculated\ value} = 328,197 > F_{table} = 3,90$)

SS = Sum Squares

df = degree of freedom

RJk = Mean of Squares

From the table above, it can be concluded that the relationship between the Ability on Basic Mathematics, Attitudes towards Calculus and Student Assessment on Teaching Quality of Lecturer together with Calculus Learning Outcomes are positive and significant. Therefore, multiple regression equation models is $\hat{Y} = -41{,}515 + 0{,}230X_1 + 0{,}257X_2 + 0{,}304X_3$., it can be used as a tool to determine the relationship between dependent variable with independent variables.

The results of multiple correlation coefficient between the Ability on Basic , Attitudes towards Calculus and Student Assessment on Teaching Quality of Lecturers and Calculus Learning Outcome obtained a multiple correlation coefficient of ry 123 is equal to 0.86 as presented Table 11.

Tabel 11 : Correlation Coefficient Test for X_1, X_2, X_3 with $\hat{Y} = -41,515 + 0,230\ X_1 + 0,257\ X_2 + 0,304\ X_3$.

First Correlation	Coefficient of Correlation	Coefficiente of Determination	$F_{account\ value}$	F_{table}	
				$\alpha = 0.05$	$\alpha = 0.01$
X_1,X_2,X_3 with Y	0,86	0,75	164,06**	2,66	3,90

Description :

** = very significant correlation coefficient ($F_{calculated\ value} = 321,06 > F_{table} = 164,06$ for $\alpha = 0.01$)

n = total sample

From the significant test results of multiple correlation coefficient, it can be concluded that the relationship between the Ability on Basic Mathematics, Attitude towards Calculus, and Student Assessment on Teaching Quality of Lecturers with Calculus Learning Outcomes Assessment of Student Learning Outcomes Lecturer in Calculus with multiple correlation coefficient of ry.123 = 0.86. By squaring the correlation coefficient, the coefficient of determination resulted to 0.749 which means that 74.9% is the variance from Calculus Learning Outcomes as explained by Ability on Basic Mathematics, Attitude towards Calculus and Student Assessment on Teaching Quality of Lecturers, the rest is determined by other variables. Recapitulation ranked about the strength of the relationship between variables Ability on Basic Mathematics with Calculus Learning Outcomes, Attitudes towards Calculus and Student Assessment on Quality of Teaching of the Lecturer are presented in Table 12.

Table 12: Rating Summary of the Relationship Between Ability on Basic Mathematics, Attitude towards Calculus, Student Assessment on Teaching Quality of Lecturer with Calculus Learning Outcomes

Partial Correlation Coefficient	$T_{accout\ value}$	Rank
$r_{y1.23} = 0,49$	8,62**	Third
$r_{y2.13} = 0,51$	9,06**	Second
$R_{y.12} = 0,59$	11,10**	First

From table 12, it shows the strengths of the relationship among the three independent variables with the dependent variable. It also showed that Student Assessment on Teaching Quality of Lecturers ranks first with ry3.12 = 0.59. Attitude towards Calculus ranks second with ry3.12 = 0.51. Ability on Basic Math ranks the third place with ry1.23 = 0.49. From the calculation of correlation coefficient, it can be explained that the quality of teaching faculty is the most fundamental to any students in achieving a higher Calculus Learning Outcomes. Positive attitude towards Calculus develops attention and awareness in order to have a better Calculus Learning Outcomes. With the quality of the teaching faculty coupled with a positive attitude towards the Calculus improves competence in achieving the goal in teaching calculus. Ability on Basic Mathematics is also one of the factors that determine the results in achieving Calculus Learning Outcome.

4. Discussion

Hypothesis Testing Regarding the Relations of Attitude towards Calculus Learning Outcomes

Students who have positive attitude (motivation) towards learning calculus will give a huge influence on the results of Learning Calculus. It is showing positive relationship between attitude learning calculus and calculus learning outcomes. But according to study by Zakaria:2008 students with high anxiety will be less motivated in doing things related to mathematics. The significant low positive correlation between motivation and achievement showed that all the variables were interrelated with one another. The results of this study provide evidence that mathematics anxiety has an important effect in mathematics education that cannot be ignored. Therefore, teacher should be thinking on how to reduce students' anxieties by finding a better ways to teach mathematics. This finding is consistent with the studies of Ma (1999) and Woodard (2004).

The Relationship of Student Assessment on Teaching Quality of Lecturers Towards Calculus Learning Outcomes

Student Assessment on Teaching Quality of Lecturer (X_3) will determine its success when the student goes to college. The third research hypothesis exists a positive relationship between Student Assessment of Teaching Quality of Lecturer (X_3) with Calculus Learning Outcomes. In other words, if the Student Assessment on Teaching Quality of Lecturer is good, then the Calculus Learning Outcomes is also good, and vice versa. According of Effective teachers support students to make connections by providing them with opportunities to engage in complex tasks and by setting expectations that they explain their thinking and solution strategies and that they listen to the thinking of others. It is satisfied of studied by Glenda (2009), Regina (2007), and Hennesi (2010)

Hypothesis is about the relationship of Ability on Basic Mathematics, Attitude towards Calculus, and Student Assessment on Teaching Quality of Lecturer together with Calculus Learning Outcomes

From the calculation, a multiple regression coefficient of b which equal to = 0.230 was obtained for the Ability on Basic Mathematics; for Attitude towards Calculus resulted to 0.257; for Student Assessment on Teaching Quality of Lecturer resulted to 0.304 with a equal to -41.5. From the results of calculations, multiple regression equation is express as $\hat{Y} = -41{,}515 + 0{,}230X_1 + 0{,}257X_2 + 0{,}304X_3$.

From the calculation of correlation coefficients, it can be explained that the quality of teaching faculty is the most basic thing for every student in achieving a Learning Outcomes Calculus better. Positive towards Calculus improves attention and awareness for which will result to a higher Calculus Learning Outcomes.

A good Teaching Quality of Lecturer accompanied with positive attitude towards Calculus, this shows that competency in teaching calculus is being achieved. Ability on Basic Mathematics is also one of the factors that determine the results achieved Learning Calculus. So thus educational institution, should pay attention to these three variables in teaching and learning activities, especially Mathematics and Natural Sciences (FMIPA) in Universitas Negeri Medan to achieve an optimal teaching and learning activities in achieving its goal.

5. Conclusion and Recommendation

a. Conclusion

Based on the results of data analysis and hypothesis testing presented some results of the study as follows:
There is a significant positive and linear relationship between Ability on Mathematics Ability, Attitude towards Calculus, and Student Assessment on Teaching Quality of Lecturer together with Calculus Learning Outcomes. From these findings, it can be concluded that the Ability on Basic Mathematics, Attitude towards Calculus, and Student Assessment on Teaching Quality of Lecturers have a positive relationship with Calculus Learning Outcomes, either individually or jointly. This means that the higher the Ability on Basic Mathematics and an increasingly positive attitude towards the Calculus and a better Teaching Quality of Lecturer, will result to a higher Calculus Learning Outcomes.

Subsequently, it was found that ranking on its relationship strength between the three independent variables with the dependent variable, that, Student Assessment of Teaching Quality of Lecturers ranked which is equal to 0.59. Attitude toward Calculus was ranked second with a correlation of 0.51. Ability on Basic Mathematics ranks the third with a correlation of 0.49.

From its rankings based on its strength as described earlier, it can be explained that the quality of teaching faculty is the most fundamental thing for students in achieving a better results in Learning Calculus. Positive attitude towards Calculus grows an attention and awareness to improve Calculus Learning Outcome.

Similarly, a good quality of teaching faculty coupled with a positive attitude towards Calculus is very helpful in achieving the goal in teaching Calculus. And finally, the Ability on Basic Mathematics is also one of the factors that determine the achievement of Calculus Learning Outcomes. From the findings that have been described individually above, it can be concluded that the three variables: Ability on Basic Mathematics, Attitude towards Calculus, Student Assessment on Teaching Quality of Lecturers are inseparable from one another. A full effort that consistent is needed to improve the results in learning Calculus as these three variables are taken into considerations.

b. Recommendation

Based on the findings, discussion, and conclusions the researcher present some suggestions in relation to: Improve Ability on Basic Mathematics, Improve Attitude towards Calculus, Improve the Teaching Quality of Lecturer in order to enhance Calculus Learning Outcomes as follows:

1. To improve Ability on Basic Mathematics

a. Elevate the ability on Basic Mathematics for students who have already accepted as a student at the Mathematics and Natural Sciences (FMIPA) Universitas Negeri Medan, , State University of Medan through crash program, provide library materials.

b. Hold a matriculation for students of FMIPA Universitas Negeri Medan for the students to prepare themselves in terms of learning strategies and apply them in teaching and learning activities.

c. Provide complete mathematics textbooks.

2. To improve attitudes towards Calculus

Efforts to improve attitude towards Calculus is certainly not that easy, it needs an approach that is able to motivate students to improve the attitude towards calculus optimally. In this dissertation, the researcher did not intent to deeply and widely elaborate the techniques in improving the attitude towards calculus.

3. To Improve the Teaching Quality of Lecturers

To improve the teaching quality of Lecturers, there is a need to basically view if from different comprehensive approaches, both qualitatively and quantitatively.

In this dissertation, the researcher did not intent to discuss the efforts to improve the Quality of

Teaching for Lecturer, be it qualitatively or quantitatively.

However, in order to further provide a concrete illustration, the researcher had attempted to describe examples of efforts that should be done to improve the Quality of Teaching for Lecturers such as workshops, seminars, training that highlights the fields of educational technology on a continuous basis.

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