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The Influence of Learning Method toward Learning Outcome Kalkulus Diferensial of Students' Mathematic Education

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Abstract

This article aimed to find out the effect of learning methods on differential calculus learning outcomes and knowing how much influence learning methods on differential calculus learning outcomes of Mathematics Education students at Universitas Nahdlatul Ulama Lampung. This research was quantitative research with survey method. The research sample was 34 students. The collecting data used close questionnaire to measure the variables of learning methods and documentation to determine the learning outcomes of the differential calculus course. The test of the learning method questionnaire obtained 43 valid statement items with a reliability of 0.90. The result shows that there was an influence between the way of learning on the learning outcomes of Differential Calculus in Mathematics Education students at Nahdlatul Ulama University Lampung. Analysis of the data used is simple regression, with the results obtained by the correlation t_{count} of 3.148, t_{table} of 1.694 at a significance level of 5%, and R2 of 0.236, then the results obtained t_{count} 3.146 > t_{table} 1.694. Hence, it can be concluded that there was an effect of learning methods on the learning outcomes of Differential Calculus in Mathematics Education Students at Nahdlatul Ulama University Lampung.

Keywords: Learning Outcome, Kalkulus Diferensial, Learning Method

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INTRODUCTION

Learning for students is an obligation, a good student should learn the good course segingga can result in an increase in knowledge, attitudes or skills. In this case, the learning method used to achieve learning outcomes may differ from one student to another (Van Alten, et al., 2019; Supena, et al., 2021). This is in accordance with the ability in self-development, personal diversity, family economic status and the environment. According to Slameto (2010), several ways of learning with certain methods (eg preparation of facilities, infrastructure, physiology, physics, etc.) are known to have a significant effect on learning outcomes.

Students of Mathematics Education at Nahdlatul Ulama University Lampung have different ways of learning. Some students study while listening to music or something else. Some students study seriously and choose a quiet place away from the disturbing atmosphere and there are students who choose to study

all night before the exam (Interview Result, Susanti Widyawati, Universitas Nahdlatul Ulama Lampung, December 07, 2021). How to learn is a problem that needs attention in the student learning process. Many students study hard but the results are not as expected, because in addition to the ability to learn, an efficient method is needed. It is this efficient way of learning that must be known, understood and developed by students to be successful.

Success in learning can be seen from the learning outcomes obtained by students. This success is generally associated with the high and low scores achieved by students during exams, student absorption and student GPA. According to Sanjaya (2011) & Hidayati, N. (2020) learning outcomes are a description of students' abilities in fulfilling a stage of achieving a learning experience. Student learning outcomes can be seen from the value of Quiz, Mid-Semester Examination and Final Semester Examination. To achieve optimal learning outcomes from the learning process, a student is influenced by internal and external factors (Jiang, et al., 2019) . According to Dalyono (2001) internal factors are factors that arise from within oneself, including physical conditions, intelligence, talents, interests and attention, ways of learning, while external factors are factors that arise from outside students including lecturers, parents, friends. peers, learning facilities and others (Leong, 2015; Sahin, Gulacar, & Stuessy, 2015; Kuldas, et al., 2015). From these internal factors, the way students learn now really needs attention. Based on the results of initial observations and interviews with lecturers and several students conducted by researchers at Nahdlatul Ulama University Lampung, a lecturer stated that students who often cheated on assignments from their friends who had already worked on them. In addition, many students whose learning method is not good, this can be seen from the number of students who come as they please, do assignments as they please, prepare lecture materials as they please.

Furthermore, the researcher also conducted interviews with several students that most students study only when they have assignments or are about to take an exam, there are even students who study shortly before the exam starts, and there is a lack of awareness to study independently on a regular basis. Hamalik (2008) states more clearly that the way of learning is an activity of doing things that are actually, learning what to do and doing what is learned from the environment in order to get something meaningful for him. The quality of the way of learning will affect the quality of learning outcomes achieved, a good way of learning will result in good learning success, while a bad way of learning will result in learning failure. This is in line with the opinion of Sagala (2010) that the secret to successful learning is mastering good learning methods. According to Slameto (2010) the way students learn can be seen from the way students learn at school and at home. Sudjana (2005) argues that there are several ways of learning to be more optimal, namely how to follow lessons on campus is an important part of the learning process because in the learning process students are given directions about what and how the material is mastered. In addition, self-study at home is the most basic task of every student. The main requirement for studying at home is the regularity of learning. Studying in groups is also important as a variation to avoid boredom and boredom when studying alone, besides learning together basically solving problems together because discussion is the best way to learn. In addition

to those already mentioned, reading is a capital in learning. For students, the most critical moment is when facing exams. Students who have regular notes and have good reading capital then the exam event is an opportunity to pour out what has been understood and mastered. The aim of this study was to find out the effect of learning methods on differential calculus learning outcomes and knowing how much influence learning methods on differential calculus learning outcomes of Mathematics Education students at Universitas Nahdlatul Ulama Lampung. This research was quantitative research with survey method.

METHOD

This study uses a survey method using a questionnaire. In this study, the independent variable is the way of learning. Learning method is a method used by students with the aim of acquiring knowledge, attitudes, and skills in the Differential Calculus course in order to achieve the desired results. Learning methods consist of: (1) how to take lectures on campus, (2) how to study at home, (3) how to study in groups on campus, (4) how to study Differential Calculus material and (5) how to face the Differential Calculus exam. The dependent variable in this study is learning outcomes in the Differential Calculus course. The learning outcomes in this study are the final grades obtained by students in the Differential Calculus course.

The population in this study were all 34 students in the first semester of Class 2021 at the Mathematics Education Study Program, Nahdlatul Ulama University, Lampung. The sampling technique in this study used a purposive sampling technique, namely sampling based on certain considerations. The considerations in this study are students who are currently or have received the Differential Calculus course. Based on these considerations, the sample used in this study amounted to 30 people in the class of 2021. The data collection technique in this study used questionnaire (questionnaire), Interivew, and documentation. The questionnaire used in this study is in the form of a closed questionnaire, where students only choose the answers that have been provided. In this study, documentation is in the form of scores from the end of semester assessment (PAS) in the First semester (Odd) Differential Calculus course, class of 2021 in the 2021/2022 school year.

Researchers tested the instrument on 20 third semester students of 2020 class who had taken the Differential Calculus course. After being tested, the results were processed using SPSS 25 to determine valid and invalid question items. For a significance level of 5% obtained r_{table} of 0.79. A total of 54 questions on how to learn, there are 11 questions declared invalid or invalid. Meanwhile, based on the results of the instrument reliability test conducted with SPSS 25, a value of 0.89 was obtained and it can be concluded that the research instrument is reliable and feasible to use. Determination of categories using a scale according to the opinion of Riwidikdo (2010) in the following table:

Table 1. Determination of Category

Scale	Category Category	
	Learning	**Outcomes**
Score min X Mean - 1.5 SD	Less	Less
Mean - 1.5 SD < X Mean	Enough	Enough
Mean < X Mean + 1.5 SD	Good	Good
Mean + 1.5 SD < X Max Score	Very Good	Very Good

RESULT AND DISSCUSSION

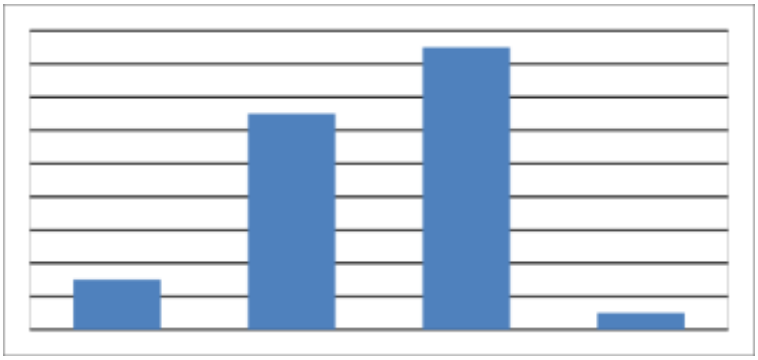
Learning method is a way that students do which aims to gain knowledge, attitudes, and skills in the eyes Differential Calculus course in order to achieve the desired result. There are 5 indicators of learning method variables. The instrument used in this study was a closed questionnaire consisting of 20 positive questions and 23 negative questions so that the total questions were 43 questions. The instrument lift has four answer choices, namely always, often, sometimes and never.

Based on the data obtained regarding student learning methods, the highest score was 153, the lowest score was 91, the mean (average) was 128.5 and the standard deviation was 14.4. From the average and standard deviation, the data on learning methods can be categorized as follows:

Table 2. Category and Percentage of Learning Method Variables

No.	Category	Interval	Frequency	Percentage
1	Poor	91 X 107	3	8.8%
2	Enough	107 < X 128.5	13	38.2%
3	Good	128.5 < X 150	17	50.0%
4	Very Good	150 < X 153	1	2.9%
Total			34	100%

Figure 1. Frequency Distribution of Research Results Variables How to Learn Differential Calculus



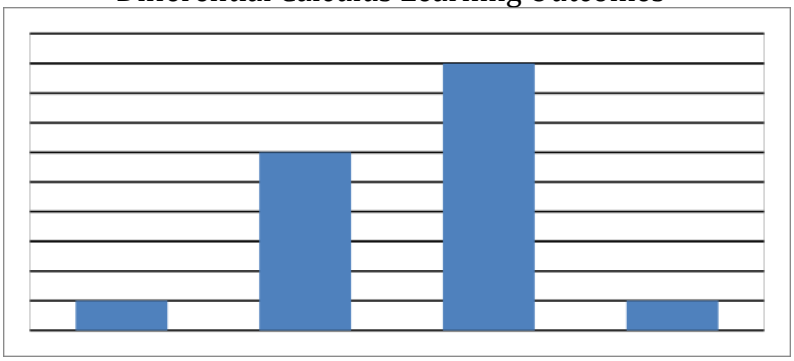
Based on the table and figure above, it can be seen that most of the students of the 2021 Batch of Mathematics Education at Nahdlatul Ulama University Lampung have a way of learning that is in a good category with the number of respondents 17 students (50.0%) and 13 students have a sufficient category

(38.2%). The learning outcomes in this study are the results of the 2021 Final Semester Assessment of students in the Differential Calculus course. Based on the data obtained regarding the results of the Final Semester Assessment, the highest score was 88, the lowest score was 54, the mean (average) was 74.4 and the standard deviation was 8.2. From the average and standard deviation, the data regarding learning outcomes can be categorized as follows:

Table 3. Category and Percentage of Learning Outcomes Variables

No.	Category	Interval	Frequency	Percentage
1	Less	54 X 62.1	2	5.9%
2	Enough	62.1< X 74.4	12	35.3%
3	Good	74.4 < X 86.8	18	52.9%
4	Very Good	86.8 < X 88	2	5.9%
Total			34	100%

Figure 2. Frequency Distribution of Research Results Variables of Differential Calculus Learning Outcomes



Based on the tables and figures above, it can be seen that most of the students of the 2021 Batch of Mathematics Education at Nahdlatul Ulama University Lampung obtained learning outcomes in the good category with the number of respondents being 18 students (52.9%) and 12 students having sufficient categories (35.3%). Based on the research results, students often find the Differential Calculus course very difficult. This assumption is caused by various things, one of which is the many concepts that must be understood so that students often feel confused when applying them in solving problems. To deal with this, it is necessary to learn a good way and do it regularly. A good way of learning is a method used by students to gain knowledge, attitudes, and skills in the Differential Calculus course in order to achieve the desired results. The learning method consists of 5 indicators, namely how to take the Differential Calculus course, how to study independently at home, how to study in groups, how to study Differential Calculus material, and how to face the Differential Calculus course exam.

Table 4. Normality Test

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
How to Learn	.200.967.373	34	*		34	.120
Learning Outcomes	.200.952	34	*	.119	34	.145
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

Source: SPSS processed data

Table 5.Linearity Test

ANOVATable							
			Sum of Squares	df	Mean Square	F	Sig.
* How to Learn Learning Outcomes	Between Groups	2008,382787,245.127		26		2,311	(Combined)
		Linearity	530 252	1	530 252	15 862	.005
		Deviation from Linearity	1478.130	25	59 125	1,769	.223
	Within Groups		234,000	7	33 429		
	Total		2242.382	33			

Source: Data processedSPSS

By normality test results can seen that for a significance level of 0.05, the significance value in the Kolmogorov-Smirnov . test is 0.2 for learning methods and 0.2 for learning outcomes. sig value. on the Kolmogorov-Smirnov test > 0.05 so it can be said that the data is normally distributed. Meanwhile, based on the significance value of the output in the bag, the Deviation from Linearity value is 0.223 which is greater than 0.05. So it can be concluded that there is a significant linear relationship between the learning method variable (X) and the learning outcome variable (Y).

Table 6. Test R^2

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.486[a]	.236	.213	12,742
a. Predictors: (Constant), Learning Outcomes				

Source: SPSS processed data

Table 7. Simple Linear Regression

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	65,442 20,149		(Constant)		3,248	.003
	Learning Outcomes	.269 .486		.847	3,148	.004
a. Dependent Variable: Learning Method						

Source: SPSS processed data

In general, the simple linear regression equation formula is Y=a+bX. Based on the table above, we get a=65,442 and b=0,847. This means that if there is no good way of learning (X), the consistent value of learning outcomes (Y) is 65,442, and for every 5% addition of good learning methods (X), learning outcomes (Y) will increase by 0.847. The value of the regression coefficient (b) is positive, so it can be said that the way of learning (X) has a positive effect on learning outcomes (Y). So the regression equation is Y=65,442+0,847X.

The hypothesis test or influence test serves to determine whether the regression coefficient is significant or not. The hypotheses in this study are:

H_1 = way of learning (X) affects learning outcomes (Y) Differential Calculus on Mathematics Education students at Nahdlatul Ulama University Lampung

H_0 = way of learning (X) does not affect learning outcomes (X) Differential Calculus on students of Mathematics Education, Nahdlatul Ulama University, Lampung.

Based on the result of correlation$_t$ of 3.148and t table 1.694 at a significance level of 5%, and R2 of 0.236, then the results obtained t_{count} 3.146 > t_{table} 1.694. To test whether the variable X (way of learning) has an effect on the variable Y (learning outcomes), the researcher tested this hypothesis by comparing it with a significance value (Sig.) of 0.05. Based on the output results, obtained significance value (Sig.) 0,004 less than 0.05 so it can be concluded that $H_{0\ is}$ rejected and H_1 accepted. This means that the way of learning (X) affects learning outcomes (Y) Differential Calculus on Mathematics Education students at Nahdlatul Ulama University Lampung.

Based on the results obtained, it can be stated that learning methods are one of the factors that influence learning outcomes in the Differential Calculus course for Mathematics Education students batch 2021, Nahdlatul Ulama University Lampung. If students have a good quality of learning, then the learning outcomes in the Differential Calculus course are also good. The results of this study are in line with the opinion of Hamalik (2008) which says that the right way (habits) of learning will bring satisfactory results, while the way of learning that is not suitable will cause learning to be less successful. Pitajeng (2006) specializes in how to learn mathematics, that is, many make mistakes in using learning methods by not studying regularly, even though in addition to mathematical concepts that

must be understood, in mathematics, continuous exercises are also needed to hone their skills. From the description of the opinion, it is very clear that the method or way of learning has an effect on learning outcomes.

How to learn is not an absolute factor that determines success or learning outcomes. Many other factors that affect learning outcomes, including factors that come from within (internal) and factors that come from outside (external). Internal factors include interest, motivation, intelligence, and health, while external factors are factors that come from family, school and community. If all these factors can be developed properly, of course learning outcomes will also be good. This study has limitations, including the research subjects are students of Mathematics Education, Nahdlatul Ulama University, Lampung who are currently or have taken the Differential Calculus course so that the results of this study cannot be generalized widely. In addition, there are many factors that affect learning outcomes, but researchers only use the learning method as an independent variable.

CONCLUSION

Based on the results of the study, it is known that most of the students of the 2021 Mathematics Education Class at Nahdlatul Ulama University Lampung have a way of learning that is in a good category with 17 students (50.0%) and 13 students having sufficient (38.2%) categories. In addition, most students from the 2021 Nahdlatul Ulama University Mathematics Education students obtained learning outcomes that were in a good category with 18 students (52.9%) as respondents and 12 students having sufficient (35.3%) categories. Meanwhile, based on a simple linear regression test at a significance level of 5% or 0.05, the results obtained are a significance value of 0.0004 <0.05 so it can be concluded that there is an influence of learning methods on learning outcomes for Differential Calculus courses in Mathematics Education students at Nahdlatul Ulama University. Lampung.

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