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THE ROLE OF BELIEF MATHEMATICS ON STUDENTS' LEARNING OUTCOMES IN DIFFERENTIAL CALCULUS COURSES

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Abstract

The subjects in this study were second semester student of 2020/2021 mathematics education study program, Universitas Muhammadiyah Tangerang. The purpose of this study was to find out how big the role of mathematical belief in student learning outcomes in the differential calculus course which was held in the even semester of 2020/2021. The research method is a survey method with a descriptive correlation analysis technique with instruments in the form of questionnaires and tests. The data were analyzed by regression analysis using SPSS statistic 20 software. The results showed that based on the results of the analysis and discussion, conclusions could be drawn including the role of mathematical belief in giving a significant influence on student learning outcomes in the differential calculus course. The results of the study using SPSS 20 showed that the value of the close relationship between mathematical beliefs and learning outcomes was 0.89, this indicates that there is a very strong relationship between mathematical beliefs and learning outcomes. The results show that the belief in mathematics on the learning outcomes of the differential calculus course contributes 79.2%. Analysis of the Significance Test of the Role of Mathematics Belief on Learning Outcomes for Differential Calculus Courses shows that an increase in the mathematical belief score in the Differential Calculus course will give an increase of 0.830

Keywords: belief mathematics, students' learning outcomes

Abstrak

Mata kuliah dalam penelitian ini adalah mahasiswa semester II program studi pendidikan matematika 2020/2021, Universitas Muhammadiyah Tangerang. Tujuan dari penelitian ini adalah untuk mengetahui seberapa besar peran keyakinan matematis terhadap hasil belajar mahasiswa pada mata kuliah kalkulus diferensial yang merupakan held pada semester genap tahun 2020/2021. Metode penelitian adalah metode survei dengan teknik analisis korelasi deskriptif dengan instrumen berupa kuesioner dan tes. Data dianalisis dengan analisis regresi menggunakan perangkat lunak SPSS statistic 20. Hasil penelitian menunjukkan bahwa berdasarkan hasil analisis dan diskusi, dapat ditarik kesimpulan termasuk peran keyakinan matematis dalam memberikan pengaruh yang signifikan terhadap hasil belajar siswa dalam mata kuliah kalkulus diferensial. Hasil penelitian menggunakan SPSS 20 menunjukkan bahwa nilai hubungan erat antara keyakinan matematika dan hasil belajar adalah 0,89, hal ini menunjukkan bahwa terdapat hubungan yang sangat kuat antara keyakinan matematika dengan hasil belajar. Hasil penelitian menunjukkan bahwa kepercayaan terhadap matematika terhadap hasil belajar mata kuliah kalkulus diferensial berkontribusi sebesar 79,2%. Analisis Uji Signifikansi Peran Keyakinan Matematika terhadap Hasil Belajar Mata Kuliah Kalkulus Diferensial menunjukkan bahwa peningkatan skor keyakinan matematis pada mata kuliah Diferensial Calculus akan memberikan peningkatan sebesar 0,830

Kata kunci: Kepercayaan diri, hasil belajar

INTRODUCTION

Education has a great influence on a person's life journey, moreover the education occurs at the lecture level, where this level affects a person's way of thinking for the future. Various efforts are made to get the best education, both education that starts in the family environment, to the university environment. Education is a component that influences the improvement of the quality of human resources that can be fostered and developed through

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the educational process. Therefore, improving the quality of education is an important thing that is needed at this time. Basically, learning activities carried out in the campus environment are very important internal activities complex. Lecture activities are carried out to gain knowledge, understanding, and useful information which are carried out formally.

Lecture activities are activities that are full of interactions that occur between lecturers and students as well as the environment and all its devices. Whether we realize it or not, all aspects of education cannot be separated from mathematics, so it is not surprising that mathematical concepts are used in various other sciences.

Learning mathematics for students is the formation of a mindset in understanding something and reasoning in a relationship between these understandings. The learning process delivered in this case is a course that is organized and structured with certain goals to be achieved (Syariah, 2017).

Basically mathematics is a field of science that is highly efficient, while one of the fields of mathematics studied at the tertiary level, especially in the mathematics education study program, is the differential calculus course. This course can be regarded as a symbol of the mathematics education study program. At the beginning of the meeting at the beginning of the semester, there were many kinds of reactions from students when they heard the name of this course being mentioned, but most of them reacted with surprise and felt insecure, even though they had not been given any preliminary questions.

Students' belief in mathematics towards the differential calculus course affects how students welcome the course, good beliefs will consider this course enjoyable, while bad beliefs will consider students to be this course is a difficult subject, abstract, full of formulas and can only be mastered by genius students (Widjajanti, 2009). This makes the writer's curiosity and becomes one of the reasons for the author to find out more about the student's self-confidence or belief in this course. Because mathematical beliefs have a great influence on human habits and behavior (Kloosterman, 2002), because based on belief theory that mathematical beliefs have a significant role in learning outcomes, test and measurement activities are carried out to determine a person's learning outcomes. Belief is a force that has an influence on learning outcomes. student assessments to measure their abilities, many things can be measured, for example assignments in the differential calculus course and tests during student mid-semester exams which are held every mid-semester (McDonough, 2014).

The belief that will be measured here is the belief in mathematics, namely the belief needed in carrying out assignments and tests for differential calculus courses

Tests and measurements require tools as data collectors called learning outcomes assessment instruments (Firmansyah, 2017). In addition, mathematical belief is also one of the factors that influence the sense of optimism, so that automatically in lecture activities, this feeling of optimism will appear. With a good level of optimism is expected to play a role in student learning outcomes. Learning outcomes are abilities that a person has after receiving a learning experience (Sudjana, 2010). Learning outcomes are an acquisition as a result of doing an activity or process that results in learning outcomes.

Changes in input functionally, here means that learning outcomes are the result of the process of lecture activities (Purwanto, 2009). Learning outcomes are the end of the lecture process that has been carried out by students, the form of learning outcomes is usually tests, tests and measurements carried out are to find out student learning outcomes that require test equipment or can also be called a data collection tool called an instrument. The instrument that can be used to measure belief is a questionnaire or questionnaire, while the instrument to measure learning outcomes is a test related to differential calculus.

METHODS

The research was conducted using a survey method with a descriptive correlation analysis technique. Descriptive means to explain / explain an event, while correlation is research that looks for the presence or absence of influence. This survey research uses a mathematical belief questionnaire given to students, and a test to measure learning outcomes in mid-event semesters for second semester students. The sampling technique used in this research is random sampling, which means it is a technique of taking samples from members of the population at random without regard to the existing strata in the population (Sugiyono, 2001). The sample in this study was the second semester students of 40 students who were studying differential calculus courses. After the instrument is analyzed for validity and reliability. Data analysis used descriptive analysis techniques to find the standard deviation, mode, mean, median. Data analysis prerequisite test used are normality and linearity tests. The hypothesis testing technique used is simple regression analysis.

RESULTS AND DISCUSSION

The data obtained from the results of measuring student learning outcomes and the results of the calculation of the mathematical belief questionnaire scores are presented below:

Math Belief Data

The measurement data from 40 students obtained a maximum score of 85 and a minimum score of 40, so that a range of 45 was obtained. The results of data analysis obtained a mean of 73.3, a median of 75 mode 75, and a standard deviation of 8.83.

Mathematics Learning Outcomes Data

From the measurement results of 40 students obtained a maximum score of 84 and a minimum score of 40, so that a range of 44 was obtained. The results of data analysis obtained a mean of 72.65, a median of 75, a mode of 75, and a standard deviation of 8.9.

Analysis Prerequisite Test

Prerequisite test of data analysis using normality test and linearity test. Normality test was performed using the Kolmogorov Smirnov test. The results of the normality test using SPSS 20 can be seen in Table 1.

Table 1. Kolmogorov Smirnov . Normality Test Results

		Unstandardized Residual
N		40
Normal Parameters[a,b]	Mean	0E-7
	Std. Deviation	5.14058463
Most Extreme Differences	Absolute	.153
	Positive	.088
	Negative	-.153
Kolmogorov-Smirnov Z		.966
Asymp. Sig. (2-tailed)		.309

The results in Table 1 show that the normality test with Kolmogorov Smirnov is 0.309, the value obtained shows that 0.309 > 0.05, this is means that the variable is normally distributed. While the linearity test with the help of the SPSS 20 program can be seen in table 2.

Table 2. Linearity Test Results

			Sum of Squares	df	Mean Square	F	Sig
hasil_belajar * belief	Between Groups	(Combined)	2488.182	13	191.399	8.199	.000
		Linearity	2064.501	1	2064.501	88.442	.000
		Deviation from Linearity	423.681	12	35.307	1.513	.182
	Within Groups		606.918	26	23.343		
	Total		3095.100	39			

Table 2 shows the results of calculations with SPSS 20 of 0.182. This means 0.182 > 0.05, meaning that the two variables are linear. So that it can be continued with parametric statistical tests using simple regression analysis.

Research Hypothesis Testing

Researchers used simple linear regression analysis using SPSS 20 to determine the role of mathematical belief on learning outcomes in the differential calculus course. The correlation test analysis of the role of mathematical belief on learning outcomes in the differential calculus course is presented in Table 3.

Table 3. Correlation Analysis of the Role of Mathematics Belief on Learning Outcomes in Differential Calculus Courses

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.890[a]	.792	.787	3.805

The results of the study using SPSS 20 showed that the value of the close relationship between mathematical beliefs and learning outcomes was 0.89, this indicates that there is a very strong relationship between mathematical beliefs and learning outcomes. So it can be concluded that there is a significant relationship between mathematical belief and student learning outcomes. To find out the magnitude of the contribution of the influence of mathematical belief on student learning outcomes, it is carried out by calculating the coefficient of determination which can be seen in table 3. The results show that mathematical belief on learning outcomes for differential calculus courses contributes 79.2%. While the rest is influenced by other factors. The regression equation formed can be seen in Table 4.

Table 4. Analysis of the Significance Test for the Role of Mathematics Belief on Learning Outcomes for Differential Calculus Courses

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.174	5.092		2.391	.022
	belief	.830	.069	.890	12.034	.000

Table 4 shows that the regression equation formed is

$$Y = 12{,}174 + 0{,}830x$$

This means that the increase in the mathematical belief score in the differential calculus course will give an increase of 0.830. The results showed that there was a significant relationship between mathematical belief and learning outcomes in the differential calculus

course. This means that there is a positive influence between mathematical belief on learning outcomes in the differential calculus course. Mathematics belief in the differential calculus course is self-confidence in students to be able to learn and understand the material in the course. Students who have good mathematical belief will be able to learn and understand the lecture material given, there is no feeling of pessimism and despair. Meanwhile, students who do not have good mathematical beliefs tend to have obstacles and have a pessimistic feeling in studying and understanding these subjects.

If students want to get good learning outcomes, then they must have high mathematical beliefs too, given the strong linear influence between these two variables, the increase in mathematical beliefs will also be followed by learning outcomes. This is in accordance with theoretical research which states that mathematical belief has a significant influence on learning outcomes (Firmansyah, 2017).

CONCLUSION

Based on the results of the discussion above, it can be concluded that mathematical beliefs on learning outcomes have a strong and significant influence on differential calculus courses, thus if students want to obtain good learning outcomes, students are expected to 5 in student learning outcomes in the differential calculus course.

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