

## THE RELATIONSHIP OF STUDENTS' PERCEPTION TOWARD MATHEMATICS SUBJECT AND LEARNING MOTIVATION WITH MATHEMATICS LEARNING ACHIEVEMENT IN CLASS VIII

Fanny Cyintia Dewi<sup>a</sup>, Sunaryo<sup>b</sup>

Program Studi Pendidikan Matematika Universitas Ahmad Dahlan  
Jalan Ring Road Selatan, Tamanan, Banguntapan, Bantul, Yogyakarta  
<sup>a</sup>fannycyntiad@gmail.com, <sup>b</sup>sunaryo.bener@yahoo.co.id

### ABSTRACT

Many factors can influence the results of mathematics learning. Students' perceptions toward mathematics subject and learning motivation are some factors that are suspected of his relationship with the student's mathematics achievement. This study aims to determine whether there is any positive and significant relationship between students' perception of mathematics subject and learning motivation with mathematics learning achievement in class VIII of even semester Muhammadiyah Junior High School 9 Yogyakarta (SMP Muhammadiyah 9 Yogyakarta) academic year 2016/2017. This study population is all students in class VIII of even semester SMP Muhammadiyah 9 Yogyakarta academic year 2016/2017, which consists of 5 classes with a total of 165 students. The sampling class is using a random sampling technique so that obtained class VIIIC amounted to 34 students. The data collecting technique is using the questionnaire method and the test method. Test the instrument using validity test, differentiation power test, and reliability test. Test prerequisite analysis using tests of normality, independent test, and linearity test. Data analysis using regression analysis and correlation analysis. The results of this study indicate a positive and significant relationship between students' perception of mathematics and learning motivation with the mathematics achievement of students with  $F_{\text{count}} = 3,493$  dan  $F_{\text{table}} = 3,30$  so obtained  $F_{\text{count}} > F_{\text{table}}$ . Multiple correlation coefficient ( $R$ ) = 0,429 with coefficient of determination ( $R^2$ ) = 0,184 with linear regression equation  $\hat{Y} = -7,707 + 0,259X_1 + 0,612X_2$ . The relative contribution of ( $X_1$ ) = 31,897%, relative contribution of ( $X_2$ ) = 68,103%, effective contribution of ( $X_1$ ) = 5,867%, and effective contribution of ( $X_2$ ) = 12,526%.

**Keywords:** Students' Perception Toward Mathematics Subject, Learning Motivation, and Mathematics Learning Achievement

### INTRODUCTION

Education is a means to improve the quality of Human Resources (HR) in ensuring sustainable development. Improving the quality of human resources becomes very important about facing the era of global competition. The importance of mathematics in life shows that mathematics has a function and purpose that is very beneficial for students both in school and in everyday life because, in mathematics, students equip students to think logically and critically in solving problems. Mathematics is also a tool of life and servants for other sciences, such as physics, chemistry, biology, engineering, economics, and mathematics itself.

Based on observations and initial observations at SMP Muhammadiyah 9 Yogyakarta, there are still students who claim that mathematics is a subject that is difficult to learn, even though mathematics has been taught since elementary school level. When the mathematics lesson is taking place, it seems that the behavior of students who are not enthusiastic about the lesson, students also pay less attention to the teacher when explaining the subject matter. Students are busy talking with their peers. Students' perceptions play an important role in determining student behavior. From the results of observations and preliminary observations, the behavior of students who are not good shows that student's perceptions are low on mathematics.

The low perception of students in mathematics lessons can affect student motivation. Motivation is important in the learning process of students. Learning motivation can determine student learning success. Students learn with strong motivation, enthusiastic about mathematics, always curious, persevering in learning, and working hard to get maximum value.

Based on initial observations at SMP Muhammadiyah 9 Yogyakarta. The average value of the odd midterm semester of class VIII of SMP Muhammadiyah 9 Yogyakarta in the 2016/2017 Academic Year in the following table:

**Table 1.** Midterm Values Mathematics Class VIII Students Even Semester of Muhammadiyah 9 Yogyakarta Middle School 2016/2017 Academic Year

| Class VIII     | A     | B    | C     | D     | E     |
|----------------|-------|------|-------|-------|-------|
| Total students | 32    | 32   | 34    | 34    | 33    |
| Mean           | 53.19 | 57.5 | 76.18 | 65.06 | 56.52 |
| Completed      | 0     | 1    | 9     | 1     | 1     |
| Not completed  | 30    | 31   | 25    | 33    | 28    |
| Not present    | 2     | 0    | 0     | 0     | 4     |

(Source: SMP Muhammadiyah 9 Yogyakarta)

Based on the table above, it can be seen that students who have not yet finished learning more than students who have finished learning. This is because there is a difficulty level for students to learn mathematics. Several factors influence the low learning outcomes of mathematics.

Learning motivation is one of the factors that influence student learning outcomes in mathematics. The low midterm results are caused by students' lack of understanding of the subject. The lack of understanding of students with mathematics is due to the lack of student encouragement to learn, and the desire and desire of students to get high learning outcomes. If students persevere in learning, in the end, there are no difficulties in students when working on math problems, so students can get the maximum results of learning mathematics. Based on observations and preliminary observations at SMP Muhammadiyah 9 Yogyakarta, it was found during the learning process that in doing independent assignments, there were often students who copied the work of friends, there was no sense of student curiosity and enthusiasm for working on and looking for answers to the assignment.

Based on the description of the background of the problem, research problems can be formulated as follows:

1. Is there a positive and significant relationship between students' perceptions of mathematics and mathematics learning outcomes of students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year.
2. Is there a positive and significant relationship between learning motivation with mathematics learning outcomes for students of class VIII in the even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year.
3. Is there a positive and significant relationship between students' perceptions of mathematics and motivation to learn with mathematics learning outcomes of students of class VIII even semester SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year.

Based on the formulation of the problem, the objectives of this study are:

1. To find out whether there is a positive and significant relationship between students' perceptions of mathematics lessons with mathematics learning outcomes of students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year.
2. To determine whether there is a positive and significant relationship between learning motivation and mathematics learning outcomes of eighth-grade students of the even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year.
3. To find out whether there is a positive and significant relationship between students' perceptions of mathematics and motivation to learn with mathematics learning outcomes of students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year.

## METHODS

This research is quantitative. The research site was carried out at Yogyakarta Muhammadiyah 9 Middle School, while the research was carried out in class VIII even semester of Yogyakarta Muhammadiyah 9 Middle School 2016/2017 academic year. The population in this study were all students of class VIII, even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year as many as five classes, namely VIII A, VIII B, VIII C, VIII D, and VIII E. The sampling using a random sampling technique by lottery class. After random sampling, the class VIII C was obtained as the research class and class VIII A as the pilot class. There are two kinds of research variables, namely the independent variable and the dependent variable. The independent variables in this study consisted of students' perceptions of mathematics ( $X_1$ ) and learning motivation ( $X_2$ ), while the dependent variable in this study was mathematics learning outcomes ( $Y$ ). Data collection techniques used questionnaires and test techniques. The questionnaire method was used to obtain data on students' perceptions of mathematics and motivation to learn eighth-grade students in the even semester of SMP Muhammadiyah 9 Yogyakarta in the 2016/2017 school year as a research sample. At the same time, the test method in this study was used to determine the mathematics learning outcomes of VIII grade students in the even semester of SMP Muhammadiyah 9 Yogyakarta in the 2016/2017 school year as the research sample.

Analysis of the questionnaire instrument trial and test using the instrument validity test using the product-moment correlation formula (Arikunto, Suharsimi: 2010). To test the power of discrimination using the discrimination index formula (Arikunto, Suharsimi: 2012). As for the reliability test, the questionnaire instrument uses the Alpha Cronbach formula (Arikunto, Suharsimi, 2010: 239), and the test uses the KR-20 formula (Arikunto, Suharsimi: 2010). After the data has been collected, descriptive data analysis, analysis prerequisite testing, and hypothesis testing are carried out. Analysis prerequisite tests that must be met include normality tests using the chi-square formula (Sudjana, 2005: 273), independent tests, and linearity tests. To test the hypothesis used  $t$ -test and  $F$ -test. For  $t$ -test (Sudjana, 2005: 380) using the formula:

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

information:

$r$ : Correlation coefficient

$n$ : Number of Samples

For the  $F$ -test (Sudjana, 2005: 385) using the formula:

$$F = \frac{R^2/K}{(1-R^2)/(n-k-1)}$$

## RESULTS AND DISCUSSION

From the results of the study of the instrument stated that the instrument is feasible to be presented or distributed to be filled by respondents. For the instrument trial analysis, based on the validity test of the mathematics learning achievement test, it was found that from 25 items, 20 items were declared valid, as shown in Table 2.

**Table 2.** Results of Calculation of Test Validity of Research Instruments

| Instrument                   | Num items | Num items failed | No item failed | Num valid items |
|------------------------------|-----------|------------------|----------------|-----------------|
| Mathematics Learning Results | 25        | 5                | 9,10,16,17,21  | 20              |

Based on the results of the test of distinguishing mathematical learning outcomes, it is found that from 20 valid items, there are two items with excellent criteria, nine items with good criteria, and nine items with sufficient criteria, as shown in Table 3.

**Table 3.** Calculation Results of Instrument Distinction Test

| Variable                       | Criteria  | Item Number Question    |
|--------------------------------|-----------|-------------------------|
| Mathematical Learning Outcomes | Very Good | 22,24                   |
|                                | Good      | 1,3,5,7,8,11,15,23,25   |
|                                | Enough    | 2,4,6,12,13,14,18,19,20 |
|                                | Poor      | -                       |
|                                | Very Poor | -                       |

Information:

F: Price F regression line

$R^2$ : The coefficient of double determination

$n$ : Sample size

$k$ : Number of independent variables

Based on the reliability test stated that the instruments of Student Perception of Mathematics ( $X_1$ ), Learning Motivation ( $X_2$ ), and reliable mathematics learning outcomes ( $Y$ ) with high criteria as shown in Table 4.

**Table 4:** Calculation Results of Research Instrument Reliability Tests

| No. | Instrument                                    | $r_{count}$ | $r_{table}$ | Criteria |
|-----|---|-------------|-------------|----------|
| 1.  | Students Perceptions of Mathematics ( $X_1$ ) | 0,848       | 0,349       | High     |
| 2.  | Motivation to learn ( $X_2$ )                 | 0,867       | 0,349       | High     |
| 3.  | Mathematical Learning Outcomes ( $Y$ )        | 0,913       | 0,349       | High     |

For the prerequisite test analysis in the normality test, it was found that the three variables, namely parent's attention, the use of learning resources, and learning outcomes in mathematics, are normally distributed, as shown in Table 5.

**Table 5.** Normality Test Results

| No. | Variable                                      | $\chi^2_{count}$ | $\chi^2_{table}$ | $df$ | Info   |
|-----|---|------------------|------------------|------|--------|
| 1.  | Students Perceptions of Mathematics ( $X_1$ ) | 1,299            | 7,815            | 3    | Normal |
| 2.  | Motivation to learn ( $X_2$ )                 | 1,107            | 7,815            | 3    | Normal |
| 3.  | Mathematical Learning Outcomes ( $Y$ )        | 6,988            | 7,815            | 3    | Normal |

Next, based on the independent test, it was found that the parents' attention variables and the utilization of learning resources were independently related, as seen in Table 6.

**Table 6.** Independent Test Results

| Variable        | $\chi^2_{count}$ | $\chi^2_{table}$ | $df$ | Information |
|-----------------|------------------|------------------|------|-------------|
| $X_1$ and $X_2$ | 31,792           | 37,6525          | 25   | Independent |

Based on the linearity test, it was found that between parents' attention variables with mathematics learning outcomes and the use of learning resources and mathematics learning outcomes have a linear relationship as shown in Table 7

**Table 7.** Linearity Test Results

| No. | Variable      | $F_{table}$ | $F_{table}$ | Information |
|-----|---------------|-------------|-------------|-------------|
| 1.  | $X_1$ and $Y$ | 1,592       | 2,75        | Linear      |
| 2.  | $X_2$ and $Y$ | 1,340       | 2,64        | Linear      |

To test the hypothesis, the results of the first hypothesis test found that there is a positive and significant relationship between student's perceptions of mathematics lessons with mathematics learning outcomes. The results of this study were obtained  $t_{count} = 1,901$  and  $t_{table} = 1,694$  at a significant level of 5% with a simple correlation coefficient ( $R$ ) of 0.319 This can be explained through a linear relationship  $\hat{Y} = 29,723 + 0,449 X_1$ . This means that every increase of one unit  $X_1$  results in a 0.449 increase in  $Y$ ; in other words, if students' perceptions of mathematics are high, then mathematics

learning outcomes will increase. In this study also obtained a coefficient of determination ( $R^2$ ) of 0.102, which means 10.2% of mathematics learning outcomes are related to students' perceptions of mathematics. At the same time, the rest are related to other factors. This calculation indicates that by increasing students' perceptions of mathematics, mathematics learning outcomes will be even better, and vice versa.

From the second hypothesis test results, there is a positive and significant relationship between learning motivation with mathematics learning outcomes with a simple correlation coefficient ( $R$ ) of 0.395 at a significant level of 5%. This can be explained through a linear relationship  $\hat{Y} = 69.346 + 0.007 X_2$ . This means that every increase of one unit of  $X_2$  results in a 0.007 increase of  $Y$ ; in other words, if the motivation to learn is high, then learning mathematics will increase. This study also obtained a coefficient of determination ( $R^2$ ) of 0.156, which means that 15.6% of mathematics learning outcomes are related to learning motivation, while the rest are related to other factors. The results of this calculation indicate that by increasing motivation to learn mathematics learning outcomes will be even better, and vice versa.

The third hypothesis test results are that there is a positive and significant relationship between students' perceptions of mathematics and learning motivation with mathematics learning outcomes with a double correlation coefficient ( $R$ ) of 0.429 at a significant level of 5%. This can be explained through the linear relationship  $\hat{Y} = -7.707 + 0.259 X_1 + 0.612 X_2$ . This means that every increase of one unit  $X_1$  results in a 0.259 increase in  $Y$  and every increase in one unit of  $X_2$  results in 0.612 increase in  $Y$ , in other words, if student's perceptions of mathematics and motivation to learn are high, then the results of learning mathematics will increase. This study also obtained a coefficient of determination ( $R^2$ ) of 0.184, which means that 18.1% of mathematics learning outcomes are related to student's perceptions of mathematics and learning motivation. In contrast, the rest are related to other factors. This calculation indicates the increase and decrease in student mathematics learning outcomes associated with high and low student perceptions of mathematics and motivation to learn. Therefore, by increasing student's perceptions of mathematics and learning motivation, mathematics learning outcomes will be even better.

Furthermore, the magnitude of the relative contribution (RC) and the magnitude of the effective contribution (EC) for each parent's attention variable ( $X_1$ ) and the use of learning resources ( $X_2$ ) with mathematics learning outcomes ( $Y$ ) can be seen in Table 8.

**Table 8.** Relative Contributions and Effective Contributions  $X_1$ ,  $X_2$ , to  $Y$

| Variable | Relative Contributions (RC %) | Effective Contribution (EC %) |
|----------|-------------------------------|-------------------------------|
| $X_1$    | 31,897 %                      | 5,867 %                       |
| $X_2$    | 68,103 %                      | 12,526 %                      |
| Total    | 100 %                         | 18,392 %                      |

## CONCLUSION

1. There is a positive and significant relationship between students' perceptions of mathematics with the learning outcomes of students of class VIII even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year. The t-test indicates this, i.e.,  $t_{count} = 1.901$  and  $t_{table} = 1.694$ , so  $t_{count} > t_{table}$ . Simple correlation coefficient ( $r$ ) students perceptions of mathematics ( $X_1$ ) with mathematics learning outcomes ( $Y$ ) of 0.319 with a regression equation  $\hat{Y} = 29.723 + 0.449 X_1$ .
2. There is a positive and significant relationship between learning motivation and mathematics learning outcomes of VIII grade students in the even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year. This is indicated by the t-test, which is  $t_{count} = 2.433$  and  $t_{table} = 1.694$ , so  $t_{count} > t_{table}$ . Simple correlation coefficient ( $r$ ) between learning motivation ( $X_2$ ) with mathematics learning outcomes ( $Y$ ) of 0.395 with a regression equation  $\hat{Y} = 69.346 +$

0.007  $X_2$ . The results of the second hypothesis test are that there is a positive and significant relationship between learning motivation and mathematics learning outcomes with a simple correlation coefficient ( $r$ ) of 0.395 at a significant level of 5%. This can be explained through a linear relationship.

3. There is a positive and significant relationship between students' perceptions of mathematics and motivation to learn with mathematics learning outcomes of class VIII students in the even semester of SMP Muhammadiyah 9 Yogyakarta 2016/2017 school year. This is indicated by the F test, namely  $F_{count} = 3.493$  and  $F_{table} = 3.30$ , so  $F_{count} > F_{table}$ . The multiple correlation coefficient (R) students' perceptions of mathematics ( $X_1$ ) and learning motivation ( $X_2$ ) with mathematics learning outcomes (Y) of 0.429 with a regression equation  $\hat{Y} = -7.707 + 0.259 X_1 + 0.612 X_2$ . The relative contribution of  $X_1$  is 31.897%, and  $X_2$  is 68.103%. Effective contribution  $X_1$  is 5.867%, and  $X_2$  is 12.526%.

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