
THE EFFECT OF MOTIVATION AND SELF-CONCEPT ON MATHEMATICS LEARNING OUTCOMES SENIOR HIGH SCHOOL STUDENTS

A. Rasul¹, Pandu Adi Cakranegara², Yunus Shobrun³, Rendi Hadian A Tamagola⁴

¹Mathematics Education Program, STKIP Hermon Timika, JL. Budi Utomo Ujung, Mimika, Papua, Indonesia.
arasulmtka.unm@gmail.com

²Management Program, Universitas Presiden, JL. Ki Hajar Dewantara, Cikarang Utara, Indonesia.
pandu.cakranegara@president.ac.id

³Early Childhood Islamic Program, STIT Internasional Muhammadiyah Batam, Jl. Prof. Dr. Hamka No.3, Batam, Indonesia
immsac@ymail.com

⁴Mathematics Education Program, Universitas Tompotika, Jl. Dewi Sartika, Luwuk, Indonesia
rendyhadian@gmail.com

ARTICLE INFO

Article history:

Received Jun 28

Revised Jun 29

Accepted Jun 30

Keywords:

Self-concept

Motivation

Mathematics Learning

Outcomes

ABSTRACT

High mathematics learning outcomes become a benchmark for student success in learning mathematics. Students need self-concept and motivation to achieve high mathematics learning outcomes. This study aims to determine how much self-concept and motivation influence the learning outcomes of Senior High School students. This type of research is ex-post facto research. The population in this study were one of school in Mimika. The number of samples collected using cluster random sampling were 355 students. Data collection techniques used self-concept questionnaires, motivation questionnaires and mathematics learning outcomes tests. The research data were analyzed by descriptive analysis and multiple linear regression analysis. The results showed that: (1) The mathematics motivation of students were categorized as very high, (2) Students' mathematical self-concept were categorized as very high, (3) the mathematics learning outcomes of students were categorized as very high, (4) motivation has a positive effect on mathematics learning outcomes for students, (5) self-concept has a positive effect on mathematics learning outcomes for students, (6) motivation and self-concept have a positive effect on mathematics learning outcomes. Based on the results, we conclude that there is no influence of self-concept and motivation on students' mathematics learning outcomes.

Copyright © 2022 IKIP Siliwangi.

All rights reserved.

Corresponding Author:

A Rasul,
Mathematics Education Program,
STKIP Hermon Timika,
JL. Budi Utomo Ujung, Mimika.
Email: arasulmtka.unm@gmail.com

How to Cite:

Rasul, A., Cakranegara, P. A. (2022). The Effect of Motivation and Self-Concept on Mathematics Learning Outcomes Senior High School Students. *JIML*, 5(2), 97-105.

INTRODUCTION

Education plays a very important role and has become a human need. The education process has actually been going on since humans were born. With education, a person is expected to

be able to improve his standard of living. Education is one of the government's programs for the welfare of society.

The progress of a nation is determined by the level of success of education. The success of education will be achieved if there is an effort to improve the quality of education of the nation itself. Education is a conscious effort made to develop individual abilities and personalities through certain processes or activities (teaching, guidance or training) as well as individual interactions with their environment to achieve a complete human being (Arifin, 2011). Meanwhile, the functions and objectives of national education according to Article 3 of Law no. 20 of 2003 (Hartuti et al., 2012) states that: "National education functions to develop capabilities and shape the character and civilization of a dignified nation in the context of educating the nation's life, aiming at developing the potential of students to become human beings who believe and fear God Almighty. Almighty, noble, healthy, knowledgeable, capable, creative, independent and become a democratic and responsible citizen."

Mathematics is one of the subjects that must be taught by teachers at all levels of education from elementary school to college. In learning mathematics, it is expected to form students' ability to think creatively and critically, and to practice rational thinking. (A. Apostle, 2022). According to (Susilo et al., 2015) as part of the 2013 curriculum which emphasizes the importance of a balance of competence attitudes, knowledge and skills, mathematical abilities are required to be formed through continuous learning starting with increasing knowledge of mathematical methods, followed by skills in presenting a problem in a systematic way. mathematics and solve them, and lead to the formation of honest, critical, creative, conscientious and rule-abiding attitudes. According to (Suheman et al., 2013) the function of mathematics is as a tool to understand or convey information, for example through an equation or tables in mathematical models, mindset (honing ways of thinking or reasoning power in understanding a concept or relationship between various concepts), and science (mathematics is always looking for truth and is willing to rectify temporarily accepted truths if there is an opportunity to try to develop discoveries as long as they follow a legitimate mindset).

But in reality, there are still many people who think that mathematics is very difficult. This is caused by many factors, such as the monotonous and unpleasant way of teaching teachers, the behavior of students who give up quickly when faced with difficult questions and very low student motivation to learn.

Motivation is the driving force of a person to carry out an activity to meet his needs (Rabideu, 2015). Motivation makes someone try to improve the work they want to achieve. This effort will continue to be done until you get what you want. The emergence of motivation according to (Suardiman, 2017) is due to a need. The needs that drive the emergence of motivation are psychological needs to meet physical satisfaction such as eating, drinking, oxygen and so on as well as psychological social needs to meet social satisfaction such as; appreciation, praise, security and so on. In addition, the emergence of motivation is also influenced by the environment in which the individual is located. Motivation gives direction and purpose to individual behavior. According to (Ardhana, 2013) motivation is an important factor in achieving achievement, both academic achievement and in other fields. Motivation is closer to the willingness to carry out tasks to achieve goals. One type of motivation that is seen as having a role in individual work behavior is achievement motivation.

Achievement motivation is a person's tendency to strive for success and has a goal orientation, success or failure activity (Atkinson, 2015). Achieving success requires hard work and trying as much as possible to avoid failure. (McClelland, 2017) defines achievement motivation as motivation that drives individuals to achieve success, and aims to succeed in

competition or competition with some standard of excellence. The measure of excellence can be in the form of previous own achievements or other people's achievements. Achievement motivation is a desire to achieve achievements in accordance with predetermined standards (A. Rasul, 2020).

In addition to the motivation needed by a student to achieve success, a self-concept is also needed which greatly influences individual behavior. A person's self-concept will also determine how he receives, feels, and responds to his environment. If he judges himself to be unfavorable, then he will underestimate and imagine the failure of his business, while individuals who judge themselves as good or positive will be optimistic about their efforts and try to overcome their difficulties, thereby increasing their chances of success.

METHOD

The type of research used is ex post facto research or often called after the fact research. Ex post facto research is research in which independent variables have occurred when the researcher begins by observing the dependent variable in a study (Cresli, Ersi, 2019)

Ex post facto research is research in which independent variables have occurred when the researcher begins by observing the dependent variable in a study. In this study, the relationship between the independent variable and the independent variable as well as between the independent variable and the dependent variable has occurred naturally. The characteristic of ex post facto research is the absence of control and manipulation. The variables investigated in this study were divided into two types, namely independent variables and dependent variables. The independent variables are motivation (X_1) and self-concept (X_2). While the dependent variable is the result of learning mathematics (Y).

The population in this study were all students of senior high school students grade X, totaling 355 students. The instruments used in this study were motivation questionnaires, self-concept questionnaires and mathematics learning outcomes tests. Before use, the instrument was validated with content validity and construct validity. The validity of the content is done by asking for responses from two experts. Meanwhile, the validity of the constructs was carried out using item validity after the implementation of the instrument trial according to (Tiro et al., 2012), namely, internal consistency test, construct validity test, and calculating the reliability coefficient. The data analysis technique used is descriptive and inferential data analysis. The data was processed using SPSS 16.

RESULTS AND DISCUSSION

1. Descriptive Data Analysis Results

1.1 Motivation Variables

The results of descriptive analysis related to students' mathematics motivation scores were obtained through the provision of a motivational questionnaire of 40 questions. The quantitative description of student motivation scores can be seen in Table 1 below:

Table 1. Descriptive Statistics of Mathematics Motivation Score (X_1)

Statistics	Statistical value
Sample size	49
Highest score	192
Lowest score	110
Score range	82
Average score	161,286
Median	164

Modus	179
Standard deviation	18,137
Variance	328,958

Table 1 shows that the score of mathematics motivation of students whose median is 164 means that 50% of students score below 164 and 50% of students score above 164. The median is greater than the average score and smaller than the mode. This means that the average score is on the left, the median is in the middle and the mode is on the right which describes the curve or the data is not symmetrical and skewed to the left, in other words the distribution of the data is to a low value.

Furthermore, if the data in Table 1 is categorized on a scale of five, then the data is obtained as in Table 2 below:

Table 2. Distribution and Presentation of Student Motivation Score (X_1)

Score interval	Category	F	%
159-200	Very high	30	61,224
131-158	High	17	34,694
111-130	Moderate	1	2,041
79-110	Poor	1	2,041
< 78	Very poor	-	-

The distribution of the motivation scores of students shows that 30 respondents (61.224%) scored in the very high category, there were 17 respondents (34.694%) who scored in the high category, there was one (1) respondent (2.041%) who scored in the high category. moderate, and one (1) respondent (2.041%) scored in the low category, and none of the respondents scored very low. Based on the values obtained, it can be concluded that the achievement motivation of students is in the very high category, and the diagram can be seen in Figure 1 below:



Figure 1. Histogram of Student Motivation Score

1.2 Self-Concept Variable

The results of the descriptive analysis related to the students' mathematical self-concept scores were obtained through the provision of a self-concept questionnaire of 30 questions. The quantitative description of students' self-concept scores can be seen in Table 3 below:

Table 3. Descriptive Statistics Mathematics Self-Concept Score (X_2)

Statistics	Statistical value
Sample size	49
Highest score	142
Lowest score	66

Score range	77
Average score	118,327
Median	21
Modus	109
Standard deviation	14,070
Variance	197,974

Table 3 shows that the score for the mathematics self-concept of students whose median is 121 means that 50% of students score below 121 and 50% of students score above 121. The median is greater than the average score and greater than the mode. This means that the median on the right, the average score in the middle and the mode on the left which describes the curve or data are not symmetrical and skewed to the right in other words the distribution of the data to a high value.

Furthermore, if the data in Table 3 is categorized on a scale of five, then the data is obtained as in Table 4 below:

Table 4. Distribution and Presentation of Students' Self-Concept Score (X_2)

Score interval	Category	F	%
120-150	Very high	26	53,061
99-119	High	19	38,776
84-98	Moderate	3	6,122
60-83	Poor	1	2,041
< 59	Very poor	-	-

The distribution of self-concept scores of students shows 26 respondents (53.061%) scored in the very high category, there were 19 respondents (38.776%) scored in the high category, there were three (3) respondents (6.122%) scored in the high category. medium category, there is one (1) respondent (2.041%) who got a low score, and no respondent got a very low score. Based on the values obtained, it can be concluded that the self-concept of students is in the very high category, and the diagram can be seen in Figure 2 below:

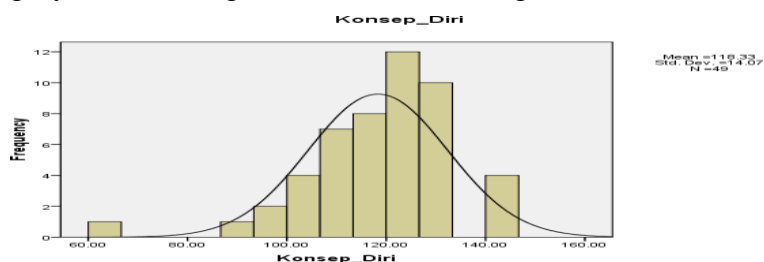


Figure 2. Histogram of Student Self-Concept Score

1.3 Variables of Mathematics Learning Outcomes

The results of the descriptive analysis related to the scores of students mathematics learning outcomes were obtained through the provision of 5 test questions. The quantitative description of students achievement motivation scores can be seen in Table 5 below:

Table 5. Descriptive Statistics of Mathematics Learning Outcomes Score (Y)

Statistics	Statistical value
Sample size	49
Highest score	100
Lowest score	33

Score range	67
Average score	81,020
Median	86
Modus	86
Standard deviation	14,641
Variance	214,354

Table 5 shows that the score of mathematics learning outcomes for students whose median is 86 means that 50% of students score below 86 and 50% of students score above 86. The median is the same as the mode and is greater than the average score. This means that the median and mode are in the middle, while the average score on the left which describes the curve or the data is close to symmetrical or the data distribution describes learning outcomes with moderate questions.

Furthermore, if the data in Table 5 is categorized on a scale of five, the data is obtained as in Table 6 below:

Table 6. Distribution and Presentation of Mathematics Learning Outcomes Scores (Y)

Score interval	Category	F	%
80-100	Very high	30	61,224
66-79	High	13	26,531
56-65	Moderate	2	4,082
40-55	Poor	3	6,122
< 39	Very poor	1	2,041

The distribution of scores on mathematics learning outcomes at that senior high school shows 30 respondents (61.224%) scored in the very high category, there were 13 respondents (26.531%) scored in the high category, there were two (2) respondents (4.082%) scored in the high category. in the medium category, there are three (3) respondents (6.122%) who get a low score, and there is one (1) respondent (2.041%) who gets a very low score. Based on the values obtained, it can be concluded that the mathematics results of students are in the very high category, and the diagram can be seen in Figure 3 below:

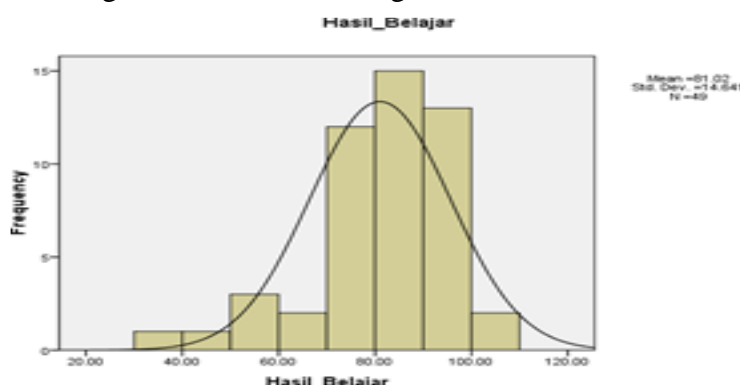


Figure 3. Histogram of Mathematics Learning Outcomes

2. Results of Inferential Data Analysis

2.1 The Effect of Motivation on Mathematics Learning Outcomes

In this study, H_1 was accepted at a significant level of 0.05 ($0.026 < 0.05$) meaning that there was a positive influence of motivation on mathematics learning outcomes for students.

The value of R-Square (R^2) = 0.101. This indicates that 10.1% of students mathematics learning outcomes are determined by motivation. The remaining 89.9% of students mathematics learning outcomes are determined by other variables. With the regression equation = $39.624 + 0.257 X_1$.

Based on the analysis study, achievement motivation has a positive effect on mathematics learning outcomes for students grade X of students. The results of this study are also supported by (Uno, 2012), namely the motive to succeed in doing a task or job, the motive to obtain perfection. Motivation is an effective aspect that affects student success in learning.

2.2 The Effect of Self-Concept on Mathematics Learning Outcomes

In this study, H_1 was accepted at a significant level of 0.05 ($0.008 < 0.05$) meaning that there was a positive influence of self-concept on mathematics learning outcomes for students.

The value of R-Square (R^2) = 0.142. This indicates that 14.2% of students mathematics learning outcomes are determined by self-concept. The remaining 85.8% of students mathematics learning outcomes are determined by other variables. With the regression equation = $34.666 + 0.392 X_2$.

Based on the analysis study, self-concept has a positive effect on mathematics learning outcomes for students. The results of this study are also supported by (Djaali, 2012), students with high achievement motivation will only achieve high academic achievement if: 1) their fear of failure is lower than their desire to succeed, 2) the assignments in class are quite challenging, not too easy but also not too difficult, thus providing an opportunity to succeed (Djaali, 2012).

2.3 The Influence of Motivation and Self-Concept on Mathematics Learning Outcomes

In this study, H_1 was accepted at a significant level of 0.05 ($0.028 < 0.05$) meaning that there was a positive influence of achievement motivation and self-concept on mathematics learning outcomes for students.

The value of R-Square (R^2) = 0.144. This indicates that 14.4% of students' mathematics learning outcomes are determined jointly by motivation and self-concept. The remaining 85.6% of students' mathematics learning outcomes are determined by other variables. With the regression equation = $36.626 + 0.080 X_1 + 0.484 X_2$.

Mathematics learning outcomes can be influenced by cognitive and affective factors, in this case achievement motivation and self-concept. The higher the achievement motivation and self-concept of a student, the higher his mathematics learning outcomes will be. Vice versa, so that it can be said that motivation and self-concept are very supportive and very important for a student in accepting, absorbing and understanding the mathematics lessons learned.

Learning outcomes are something that students get after participating in the learning process. According to (Mujiati, 2017) learning outcomes are influenced by the ability of students and the high or low or the effectiveness of the learning process. The expected learning outcomes are the results of students' mathematics learning mastery. Students are said to be complete if the score of students' mathematics learning outcomes reaches the predetermined minimum completeness criteria. Where the learning outcomes will be useful for yourself or many people both now and in the future.

CONCLUSION

The following conclusions from the research that have been carried out, the conclusions are as follows: that there is a positive influence of motivation and self-concept on mathematics learning outcomes for students are as follows:

1. The Effect of Motivation on Mathematics Learning Outcomes of students. In this study, H_1 was accepted at a significant level of 0.05 ($0.026 < 0.05$) meaning that there was a positive influence of motivation on mathematics learning outcomes for students. The value of R-Square (R^2) = 0.101. This indicates that 10.1% of students' mathematics learning outcomes are determined by motivation. The remaining 89.9% of students' mathematics learning outcomes are determined by other variables. With the regression equation = $39.624 + 0.257 X_1$.
2. The Effect of Self-Concept on Mathematics Learning Outcomes of students. In this study, H_1 was accepted at a significant level of 0.05 ($0.008 < 0.05$), meaning that there was a positive influence of self-concept on mathematics learning outcomes for students. The value of R-Square (R^2) = 0.142. This indicates that 14.2% of students' mathematics learning outcomes are determined by self-concept. The remaining 85.8% of students' mathematics learning outcomes are determined by other variables. With the regression equation = $34.666 + 0.392 X_2$.
3. The Effect of Motivation and Self-Concept on Mathematics Learning Outcomes of students. In this study, H_1 was accepted at a significant level of 0.05 ($0.028 < 0.05$) meaning that there was a positive influence of achievement motivation and self-concept on mathematics learning outcomes of students. The value of R-Square (R^2) = 0.144. This indicates that 14.4% of students' mathematics learning outcomes are determined jointly by motivation and self-concept. The remaining 85.6% of students' mathematics learning outcomes are determined by other variables. With the regression equation = $36.626 + 0.080 X_1 + 0.484 X_2$.

REFERENCES

- A. Rasul. (2020). Pengaruh Model Pembelajaran Kooperatif Tipe Make A Match Terhadap Motivasi dan Hasil Belajar Matematika pada Siswa Kelas VII SMP Yapris Timika. *Mandalika Mathematics and Education Journal*, 11.
- A. Rasul. (2022). Efektivitas Penerapan Model Contextual Teaching and Learning (CTL) Terhadap Hasil Belajar Sistem Persamaan Linear Tiga Variabel Siswa Kelas X SMK YAPIS TIMIKA. *Jurnal Pendidikan dan Kebudayaan*, 11.
- Ariin, Zainal. (2011). *Evaluasi Pembelajaran: Prinsip, Teknik, Prosedur*, Cetakan Ke-3. Bandung: PT.Remaja Rosdakarya.
- Ardana. (2013). Penerapan Model Pembelajaran Kooperatif Student Teams Achievement Divisions Untuk Meningkatkan Motivasi dan Hasil Belajar IPA Siswa Kelas IV SDN 3 DALUNG. *Mimbar PGSD Undiksha*, 1(1).
- Atkinson, J. (2015). *Motivation and Achievement*. Washington, D.C: V.H. Winston and Sons.
- Cresli, Ersi. (2019). Pengaruh Motivasi Berprestasi Dan Konsep Diri Terhadap Hasil Belajar Matematika Siswa Kelas VII SMP Frater Makassar. *DINAMIS* 16(2), 49-54.
- Degeng, I.N.S. (2017). *Strategi Pembelajaran, Mengorganisasi Isi dengan Model Elaborasi*. Malang: IKIP Malang bekerja sama dengan Biro Penerbitan Ikatan Profesi Teknologi Pendidikan.
- Djaali. 2012. *Psikologi Pendidikan*. Jakarta: Bumi Aksara.
- Hartuti, (2008). Kontribusi Ektrakurikuler Bola Basket Terhadap Pembibitan Atlet dan Peningkatan Kesegaran Jasmani. *Jurnal Pendidikan Jasmani Indonesia*, 5(1), 63.
- McClelland, (2017). Mengurai Problematika Pendidikan Nasional Berbasis Teori Motivasi Abraham Maslow dan David Mcclelland. *Lembaran Ilmu Kependidikan*, 47(1), 30-39.

- Rabideau, S.T. (2015). Effects of achievement motivation on behavior (On-line). *Personality Research*. <http://www.personalityresearch.org/papers/rabideau>. Html Diakses pada Kamis, 25 Juli 2019.
- Setyarini (2018). Student's Mathematical Understanding Ability Based on Self-efficacy. *Journal of Physics: Conference Series*. Surakarta: UNS.
- Susilo, Tri Achmad. B. (2015). Pengaruh Sikap Siswa Pada Matematika Terhadap Hasil Belajar Matematika Di SMP. *Jurnal Pendidikan Matematika*, 3(1).
- Suherman, S., & Fauziyyah, I. (2013). Analisis Pemahaman Konsep Matematis Peserta Didik Sekolah Dasar: Dampak Model Project Based Learning Model. *DIDAKTIKA TAUHIDI: Jurnal Pendidikan Guru Sekolah Dasar*, 7(1), 43–53.
- Suardiman. (2017). Pengembangan Bahan Ajar Tematik-Integratif Berbasis Kearifan Lokal Untuk Meningkatkan Karakter Peduli dan Tanggung Jawab. *Jurnal Pendidikan Karakter*, 7(1).
- Tiro, Muhammad Arif, and Wahidah Sanusi. (2018). Pengaruh Kemampuan Berpikir Divergen dan Efikasi Diri Terhadap Prestasi belajar Matematika Melalui Kemandirian Belajar Siswa Kelas VIII SMP Negeri di Galesong Utara, Kabupaten Takalar. *Prosiding Seminar Nasional Venue Artikulasi-Riset, Inovasi, Resonansi-Teori, dan Aplikasi Statistika (VARIANSI)*, 1(1).
- Uno, Hamzah. (2012). *Teori Motivasi dan Pengukurannya*. Jakarta: Bumi Aksara.