The Influence of Learning Motivation and Numeracy on High School Students

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ABSTRACT

This research aims to analyze the influence of learning motivation on numeracy in trigonometry material. The method used is quantitative. The subjects in this research were 54 Pasundan 1 Cianjur High School students who were given four numeracy test questions and 20 learning motivation questionnaire statements. The instruments used are descriptive test questions and non-test questions in the form of questionnaires. Data analysis techniques use normality tests, homoscedasticity tests, linearity tests and simple linear regression tests. Based on the research results, a conclusion was obtained: The achievement of the highest percentage of learning motivation is interpreting the results of the analysis to predict and make decisions, including good criteria. The lowest percentage is that there is a conducive environment with sufficient criteria. The achievement of the highest percentage of student numeracy was interpreting the results of the analysis to predict and make decisions, including good criteria. The lowest percentage is being able to analyze information displayed in various forms (graphs, tables, charts, diagrams and so on), with sufficient criteria. There is an influence of learning motivation on high school students' numeracy.

Keywords: learning motivation; numeracy; mathematics

INTRODUCTION

The importance of education in educating the nation's life is included in the Preamble to the 1945 Constitution (Aprima & Sari, 2022). One lesson that has an important role in the world of education and in dealing with everyday life problems is mathematics (Sholihah & Mahmudi, 2015). Mathematics is a branch of science that has a very large role in the development of science and technology (Septian & Komala, 2019). Mathematics is a subject taught from primary to secondary education levels (Hasanah, 2016). However, currently, one of the subjects that students are less interested in is mathematics (Heriyati, 2017). Even though mathematics is an important subject in human life. Therefore, mathematics is very important for building quality human resources in almost all aspects, even in the technological and digital era (Septian & Rizkiandi, 2017).

When learning mathematics, students find it difficult to accept the material taught by the teacher, so they feel that mathematics is a difficult, uninteresting and boring subject (Munthe & Pasaribu, 2023). So, this can affect the development of mathematics learning and students' lack of motivation to learn mathematics. Low motivation to learn is a form of learning difficulty that often occurs among students (Hazarida et al., 2015). This motivation plays a very important role in the success of students' learning because motivation is an impulse that arises from within the student consciously or unconsciously, which can arise from within oneself or from outside oneself, to take action with the desired goal (Heriyati, 2017). In learning activities, motivation is the overall driving force within students, which

creates, ensures continuity, provides direction to learning activities and can hope that goals can be achieved (Winata & Friantini, 2019).

Since 2021, the National Assessment used in Indonesia is no longer a national exam but the Minimum Completeness Assessment (AKM), which is officially implemented by the Ministry of Education and Culture (Kemendikbud) (Zamsir et al., 2015). The AKM set by the government is one part of the government's target to prepare students to face the 21st century, namely having Critical thinking skills, Creativity, Communication skills and Collaboration (Zamsir et al., 2015). AKM consists of literacy and numeracy. Numeracy is very important knowledge for students because this ability is closely related to solving mathematical problems in everyday life (Tresnasih et al., 2022).

According to the Organization for Economic Cooperation and Development (OECD) (2022), the results of the 2022 International Program for Student Assessment (PISA) show that student numeracy in Indonesia is still relatively low. For students in Indonesia, the average score for numeracy ability fell 13 points to 366, from the score in the previous edition of 379. The low numeracy ability of students can cause them to make mistakes when solving mathematics problems, especially numeracy questions in trigonometry material, and they can experience difficulties. In applying their mathematical knowledge to problems related to everyday life (Nasoha et al., 2022).

Therefore, motivation is needed, and if you are motivated to learn, there will be changes in student numeracy (Cahyanovianty & Wahidin, 2021). This is reinforced by the results of previous research, such as research conducted by Hasibuan et al. (2022), showing that the higher the motivation to learn mathematics, the higher the numeracy. Furthermore, research by Syafriah & Sofian Hadi (2023) with the title "Analysis of Numeracy Ability in Solving Minimum Competency Assessment (AKM) Questions for Class VIII Students at SMPN 134 Jakarta" shows that the numeracy of eighth grade students at SMPN 134 Jakarta is still low with details of 55 students being at a low level of numeracy ability, 3 other students having high level numeracy ability. medium, and there are no students who are at a high level of numeracy ability. So, with the latest numeracy material in trigonometry and in terms of learning motivation, it is hoped that students will be able to solve mathematical problems in order to optimize learning which can influence students' learning motivation towards numeracy.

Based on this description, this article is concerned with whether there is a significant influence of learning motivation on numeracy. The objectives of this research are: 1) to determine the percentage of achievement of high school students learning motivation indicators; 2) to determine the percentage of achievement of numeracy indicators for high school students; 3) to determine the effect of learning motivation on high school students' numeracy.

RESEARCH METHODS

The method used in this research is quantitative with regression analysis techniques because the researcher determines the best set of independent variables so that they can provide the most accurate prediction results based on test measuring tools in the form of written tests and unwritten tests. The population in this study were class. The sample used was one class from four existing classes, namely class X-2, totaling 54 people the selection

was selected using the purposive sampling method, with the criteria being that students had sufficient academic performance in mathematics or numeracy subjects.

The instrument used consists of numeracy test questions on trigonometry material which consists of 4 description questions, which are adapted to numeracy indicators including: 1) being able to use various kinds of numbers or symbols related to basic mathematics in solving daily life problems; 2) able to analyze information displayed in various forms (graphs, tables, charts, diagrams and so on); 3) interpret the results of the analysis to predict and make decisions.

The student learning motivation questionnaire consists of 20 statements, namely 10 positive statements and ten negative statements, which are adjusted to indicators of learning motivation, including 1) the desire and desire to succeed; 2) there is encouragement and need for learning; 3) there are hopes and aspirations for the future; 4) there is an appreciation for learning; 5) there are interesting activities in learning; 6) the existence of a conducive environment. Data analysis used to determine the effect of learning motivation on numeracy uses the normality test, homoscedasticity test, linearity test, and simple linear regression test.

RESULTS AND DISCUSSION

Data from the analysis of the percentage of achievement of learning motivation indicators can be seen in Table 3.

Table 3. Percentage of Achievement of Learning Motivation Indicators

No.	Indicator	Percentage of Achievement	Interpretation
1.	There is passion and desire to succeed	79 %	Good
2.	There is encouragement and need to learn	71 %	Enough
3.	There is appreciation in learning	76 %	Good
4.	There is a conducive environment	66 %	Enough

Based on Table 2, the average score category for learning motivation in Table 3 shows that the indicator with the highest percentage is "the presence of passion and desire to succeed", which is 79%. The second highest percentage is "there is appreciation in learning", with a gain of 76%. The third highest percentage is "the presence of encouragement and need to learn", which is 71%. The indicator with the lowest percentage is "the existence of a conducive environment", with a score of 66%.

Furthermore, data from the analysis of the percentage of achievement of numeracy indicators can be seen in Table 4 below.

Table 4. Percentage of Achievement of Numeracy Indicators

No.	Indicator	Percentage of Achievement	Interpretation
1.	Able to use various kinds of numbers or symbols related to basic mathematics in solving daily life problems	87 %	Good
2.	Able to analyze information displayed in various forms (graphs, tables, charts, diagrams and so on)	53.9 %	Enough
3.	Interpret the results of the analysis to predict and make decisions	90 %	Good

Based on Table 1, the average numeracy score category in Table 4 shows that the indicator with the highest percentage is "interpreting the results of the analysis to predict and make decisions", namely 90%. The second highest percentage is "able to use various kinds of numbers or symbols related to basic mathematics in solving daily life problems", with a score of 87%. The indicator with the lowest percentage is "Able to analyze information displayed in various forms (graphs, tables, charts, diagrams and so on)", with a score of 53.9%.

The results of the research data analysis are intended to answer the research hypotheses that have been formulated. This analysis is carried out with a normality test stage first, namely to find out whether the distribution of data comes from a population with a normal distribution or not, then a homoscedasticity test to find out the conditions in a regression model where the error variance is constant, then a linearity test to find out whether the variables are independent. The dependent variable has a significant linear relationship or not. After the normality test, homoscedasticity test and linearity test, a hypothesis test was carried out using a simple regression test.

Normality test

The normality test aims to determine whether the data used in the regression model will be normally distributed. The analysis results can be said to be normally distributed if the significance value is $> \alpha$, with ($\alpha = 0.05$). The normality test can be seen in Table 5.

Table 5. Normality Test

	Mean	Std. Deviation	Shapiro-Wilk
Numerasi	17.759	6.567	0.981
Motivasi Belajar	58.185	5.439	0.970

Table 5 shows that the two research variables, namely numeracy and learning motivation, have a value of Sig. > 0.05. Thus, both variables are normally distributed. Based on Table 5, the significance values (numeracy and learning motivation) are 0.981 and 0.970. So, based on these results, the distribution data in the linear regression model used is normally distributed because $0.981 > 0.05$ and $0.970 > 0.05$.

Homoscedasticity Test

A homoscedasticity test is used to determine the conditions in a regression model where the error variance is constant. The results of the homoscedasticity test are obtained in Figure 1.
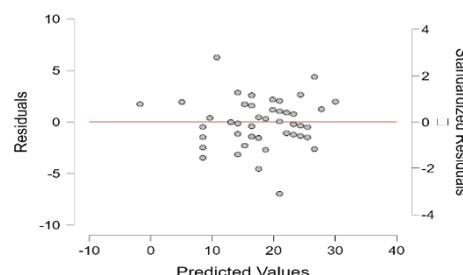

Figure 1. Homoscedasticity test

Based on Figure 1, it can be seen from residual vs predicated. It can be seen that the line is flat, and the points are random, meaning that other variables do not influence the residual here. So, the homoscedasticity test is met.

Linearity Test

The linearity test is used to determine whether the independent variable and dependent variable have a significant linear relationship or not. The results of the linearity test are obtained in Figure 2.
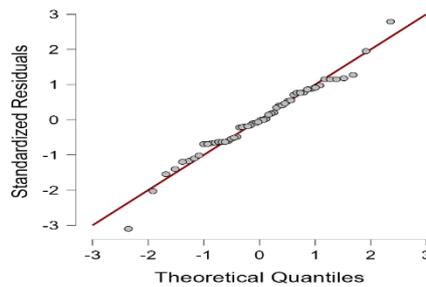

Figure 2. Linearity Test

Based on Figure 2, it is known whether the data shows linearity or not, which can be seen from the partial regression plots. Figure 2 looks linear because it forms a straight line, and the points in the image are random or do not form a pattern. Based on the results of the linearity test above, it was found that the relationship between the independent variable and the dependent variable is linear, so the linear regression model can be used to analyze the data.

Simple Regression Test

This analysis was carried out to determine whether there was an influence of learning motivation on numeracy.

Table 6. Correlation Coefficient

Model	R	R²
H_0	0.000	0.000
H_1	0.940	0.883

Based on Table 6, the correlation value for learning motivation and numeracy is 0.940, which means the influence of learning motivation on numeracy is relative. Meanwhile, the coefficient of determination obtained a value of 0.883; this shows that the learning motivation variable only contributes 88.3% to the formation of the numeracy variable. From these two things, H_1 is accepted, so it can be stated that learning motivation has an influence on numeracy.

Table 7. Significance Test Results

ANOVA						
Model		Sum of Squares	df	Mean Square	F	p
H_1	Regression	2019.127	1	2019.127	393.617	< .001
	Residual	266.743	52	5.130		
	Total	2285.870	53			

The significance test results in Table 7 show a p-value <0.001, meaning <0.05, so H_0 is rejected, and H_1 is accepted. This means that there is an influence between learning motivation and the numeracy of Pasundan 1 Cianjur High School students.

Table 8. Test Results of Simple Regression Analysis Results

Coefficients

Model		Unstandardized	Standard Error	Standardized	t	p
H_0	(Intercept)	17,759	0,894		19,872	< ,001
H_1	(Intercept)	-48,265	3,342		-14,441	< ,001
	Motivasi Belajar	1,135	0,057	0,940	19,840	< ,001

Based on the results of the linear regression analysis in Table 8. above, a simple linear regression equation can be expressed by using the formula $Y = \alpha + \beta X$ so that the regression equation can be written $Y = -48.265 + 1.135X$. The significance test aims to determine the significance of the influence of learning motivation on numeracy. Based on simple linear regression analysis, it was found that the significance value was 0.001, where 0.001 < 0.05, so it was known that learning motivation had a significant influence on numeracy.

Based on the results of the percentage achievement of the learning motivation indicator, the highest percentage is "the presence of passion and desire to succeed", which is 79%. Where the achievement motive is a motive to succeed in carrying out a task or job (Cahyono et al., 2022). Students who have the desire to succeed are students who always apply discipline in their lives. Discipline shapes a person's character to work systemically and comply with applicable regulations (Rahmadi & Pancarania, 2020). The indicator with the lowest percentage is "the existence of a conducive environment", with a score of 66%. Because students feel unappreciated and unrecognized for the results of their work or actions Because students feel appreciated and recognized for the results of their work or actions. Providing learning awards has an impact on the development of student's abilities because awards will help students understand their abilities (Adisucipto et al., 2021).

Meanwhile, the highest percentage of achievement of numeracy indicators is "interpreting the results of the analysis to predict and make decisions", which is 90%. This means that students are able to interpret the results of the analysis to predict and make decisions. This is in line with the opinion of Friantini et al. (2021) that if students are able to interpret analysis results to predict and make decisions, then these students also have high numeracy abilities. The indicator with the lowest percentage is "able to analyze information displayed in various forms graphs, tables, charts, diagrams and so on)" with a score of 53.9%. This data shows that students' numeracy appears lowest when reading question data in various forms (graphs, tables, charts, diagrams and so on). The reason is that students do not have a strong understanding of the basic concepts needed to interpret data in various forms. Students need help presenting information from data, so they cannot read the information in the table (Khoirunnisa & Adirakasiwi, 2023). The results of this research indicate that there is an influence between learning motivation and the numeracy of students at Pasundan 1 Cianjur High School. Thus, the results of this research can support the theory put forward

by Emda (2018) that the student learning process requires motivation to improve their learning outcomes to achieve learning goals, namely learning motivation. Moreover, in line with research conducted by Hasibuan et al. (2022) with research results, the higher the motivation to learn mathematics, the higher the student's numeracy.

CONCLUSION

Based on the research results obtained, it can be concluded that the highest percentage of achievement of learning motivation indicators is the desire to succeed. Meanwhile, the highest percentage of achievement of numeracy indicators is interpreting the results of the analysis to predict and make decisions regarding mathematical communication skills. Learning motivation influences high school students' numeracy.

Based on the research results, it is recommended to use various interesting and interactive learning methods to increase learning motivation, especially giving awards and recognition for student achievements in numeracy, both individually and in groups, to increase learning motivation. And provide individual guidance for students who need special assistance in understanding numeracy concepts.

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