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Numerical Skill on Students' Achievement at STIKOM Tunas Bangsa

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Abstract

This research aimed to analyze the effect of numerical skills on learning achievement in terms of students' academic achievement index at STIKOM Tunas Bangsa Pematang Siantar. The research data were collected from the second-semester students' numerical skills test results and academic achievement index in the 2022/2023 Academic Year. The sampling technique used was purposive sampling with a total sample of 80 students. The research instruments used were documentation of learning achievement and numerical skill tests. Data processing was assisted by SPSS version 25. Simple linear regression analysis was used to analyze the effect of the independent variable on the dependent variable. Based on the data processing linear regression analysis results, a significance value of <0.05 was obtained, namely a value of $0.000 < 0.05$. This indicated that there was a significant effect of numerical skill on students' achievement. Moreover, the regression function obtained was $Y = 3.061 + 0.0008X$ with a correlation coefficient of 0.465, which means that the strength of the relationship between the numerical skill variable affects learning achievement by 46.5%, and it can be categorized as a fairly strong relationship between the variables.

Keyword: Academic Achievement; Numerical Ability; Student

Abstrak

Penelitian ini bertujuan untuk menganalisis pengaruh kemampuan numerasi terhadap prestasi belajar ditinjau dari indeks prestasi akademik mahasiswa di STIKOM Tunas Bangsa Pematangsiantar. Data penelitian ini berasal dari hasil tes kemampuan numerasi dan indeks prestasi akademik mahasiswa STIKOM Tunas Bangsa Semester dua Tahun Akademik 2022/2023. Teknik pengambilan sampel yang digunakan adalah Purposive Sampling dengan jumlah sampel yang digunakan sebanyak 80 mahasiswa. Instrumen penelitian yang digunakan yaitu dokumentasi prestasi belajar dan tes kemampuan numerasi. Olah data dibantu dengan SPSS versi 25. Analisis regresi linier sederhana digunakan untuk melihat adanya pengaruh variable bebas terhadap variable terikat. Berdasarkan hasil olah data analisis regresi linier diperoleh nilai signifikansi $<0,05$ yaitu diperoleh nilai $0,000 < 0,05$ ini berarti terdapat pengaruh yang signifikan kemampuan numerasi terhadap prestasi belajar mahasiswa. Dan persamaan regresi yang diperoleh yaitu $Y = 3,061 + 0,0008X$ dengan koefisien korelasi bernilai 0,465 berarti kekuatan hubungan variabel kemampuan numerasi mempengaruhi prestasi belajar sebesar 46,5% dan dapat dikategorikan hubungan antar variabelnya cukup kuat.

Keyword: Kemampuan Numerasi; Prestasi Akademik; Siswa

A. Introduction

In mathematics, mathematical ability is related to counting skills and the ability to reason or critical thinking patterns of students in answering any problems presented. Based on this, numeracy literacy is one of the skills that is needed. By acquiring numeracy literacy skills, learners can represent problems, use symbols, translate story problems, and choose the right strategy for solving math problems. Because of the importance of numeracy literacy skills, every learner must master them as a significant knowledge base for learning mathematics.

Nowadays, people, especially the current generation, need to acquire good numeracy skills to improve their potential and also generate a beneficial contribution to society. Good numeracy skills encourage one to skillfully apply mathematical knowledge in everyday life and for the benefit of others. In contrast, poor numeracy skills are a barrier to employment, as numeracy tests are increasingly becoming a routine component recruitment process.

Numeracy literacy is the ability to use numbers, data, and mathematical symbols, as well as knowledge and skills in making decisions related to real problems in everyday life (Gerakan Literasi Nasional, 2017). Problem-solving abilities are not only basic mathematics-related problems; even complex problems can be found if each master the numeracy skills.

According to Cockroft (Goos et al., 2011), numerical skill is the ability to interpret the results of these analyses to predict and make decisions, called numeracy literacy. In line with the above statement, according to Perdana (Anwar et al., 2021), numeracy literacy includes the competencies of mathematical thinking and reasoning, mathematical argumentation, mathematical communication, modeling, proposing and solving problems, representation, symbols, tools, and technology. Literacy skills are understanding, evaluating, using, and engaging with written messages to participate in culture to achieve individual goals and aspirations and to create understanding and potential. Meanwhile, *numeracy* is defined as the ability to

access, use, interpret, and relate mathematical information and advice, to engage and handle the mathematical needs of various situations in the future (Agustin & Wiranata, 2022).

Good numeracy skills aim to achieve the quality of human resources that are qualified and competitive. In reality, the numeracy skills of students in Indonesia are poor. This is based on the statement reported by Sri Hartatik (2020) "Based on the *Programmed for International Student Assessment* (PISA) results for Indonesia in 2018, the mathematics score is below average. The average OECD (*The Organization for Economic Co-operation and Development*) PISA score for mathematics is 489, while the Indonesian's mathematics score is in the range of 375".

Regarding several PISA tests that Indonesia has participated in since 2000, mathematics literacy skills have decreased. Indonesia's score at the beginning of the PISA test reached 371 and increased to 382 in 2003. In 2006 Indonesia's score reached 393, and in 2009, it reached a score of 402, then continued to decline to 396 in 2012, 397 in 2015 (a decrease of 1 point from the previous year), and the lowest point in 2018 was at 371 points.

Numerical ability is a type of academic achievement. According to Djamarah (Riadi, 2021), academic achievement is the result obtained in the form of impressions that result in changes in individuals as the final result of learning activities. Meanwhile, according to Ahmad et al (Kusumastuti, 2020) Academic achievement is the criterion used to assess student success in their educational process, so it is important to understand the factors that influence, predict, mediate or cause variations in academic achievement.

Furthermore, according to Suryabrata cited by (Eryanto & Rika, 2013) Academic achievement is a term used to indicate an achievement obtained from a person's learning outcomes in a certain period in the form of understanding, application, analytical power, and evaluation expressed in the form of numbers or symbols through assessments carried out directly by the teacher or using standardized tests.

Students' readiness in the learning process, which eases the educators to monitor the process, progress, and continuous improvement of students' learning outcomes. According to Azwar (Riadi, 2021), the academic achievement index is one of the indicators to be able to see the results of students' academic achievement. The academic achievement index is a learning outcome expressed through numbers or symbols. The achievement index can be used as a measure of one's learning achievement after going through the learning process.

Research results suggest that students who have high numerical abilities will be able to develop new concepts by combining various basic concepts as support for solving problems and producing good learning achievements. Jelatu et al., (2019) said there is a significant positive relationship between numerical abilities and student learning achievement. High numeracy skills will also result in high learning achievement, and vice versa; the lower the numerical ability, the achievement obtained by the students is also low.

Based on the description of the problems above, the researchers are interested in analyzing the numeracy skills of STIKOM Tunas Bangsa students and identifying their effect on learning achievement in terms of the student academic achievement index. It aims at improving learning to generate intelligent human resources with problem-solving and reasoning skills. In addition, it is also important to equip competitive human resources as numeracy ability is widely used as a test or a component of recruitment carried out by many governments and private companies.

Thus, the research problem formulation is: "Does numerical ability effect on students' academic achievement Index at STIKOM Tunas Bangsa?". It aims to determine the significance of student numeracy ability and learning achievement variables in terms of the academic achievement index scores.

B. Method

The research method used was quantitative research. According to (Sari et al., 2022). Before carrying out the stages of research, the most important thing to know is to determine the population and research sample Swarjana & SKM (2022).

While the sample of this study was 80 students, or 21.22% of the population, (Damanik et al., 2022). Moreover, the sampling technique used in this study is *purposive sampling*. Based on (Unaradjan, 2019), *purposive sampling* is a sampling technique used by researchers with certain considerations in determining samples for certain purposes. Meanwhile, according to Arikunto (Noor, 2011), the documentation method is used to search for verbal matters in the form of transcript notes, books, newspapers, magazines, meeting minutes and others.

C. Results and Discussion

1. Result

The research data processing process used simple linear regression test analysis assisted by SPSS software version 25. According to (Darma, 2021), Regression Analysis is a data analysis tool that is most often used to evaluate the effect of an independent variable (X) on the dependent variable (Y). Thus, linear regression analysis is the appropriate data analysis for this study because the purpose of this study was to examine the effect of one independent variable (numerical ability) on the dependent variable (learning achievement). The following are the results of this research data processing.

Normality and Linearity Test

Before conducting a linear regression test, according to (Raharjo, 2017) the data must pass the basic assumption test; namely, the data must be normally distributed and have a linear relationship between variables. So, it is necessary to test the normality and linearity of the data.

According to (Hidayat, 2013) the normality test is used to assess the distribution of data on variables or data groups, whether the data is normally distributed. Data normality can be assessed in two ways: statistical and visual analysis. While processing the research data, the *Kolmogorov-Smirnov analysis* was used to test

the normality of the data statistically. In contrast, the visual analysis was seen through the *normal Probability Plot graph*.

The results of statistical calculations using Kolmogorov-Smirnov (K – S) analysis are shown in Table 1 below.

Tabel 1. One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		80
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	.18020068
Most Extreme Differences	Absolute	.080
	Positive	.056
	Negative	-.080
Test Statistic		.080
Asymp. Sig. (2-tailed)		.200

a. Test distribution is Normal.
b. Calculated from data.

Based on (Raharjo, 2014a), the basis for decision-making in the K-S normality test is if the significance value (sig.) > 0.05, then the research data is normally distributed and vice versa. As in Table 1, the normality test results have a significance value of 0.200 > 0.05, which means that the data is normally distributed. In addition, data normality can also be seen from the Probability Plot graph generated from data processing, as shown in Figure 1 below.

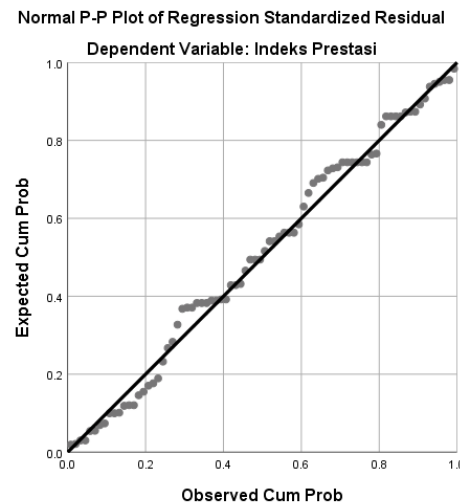


Figure 1. Regression graph normal probability plot

In line with the statement Raharjo (2014b) the data is said to be normally distributed if the data spread around the diagonal line and follows the direction of the diagonal line. Figure 1 above shows that the data points spread around the diagonal line and follow the direction of the diagonal line. Thus, the data is said to be normally distributed. Meanwhile, according to (Hidayat, 2017), there are two ways to do a linearity test using the SPSS application: the Scatter Plot Graph function and the Compare Means function. From this analysis, a significance value of $0.517 > 0.05$ was obtained as shown in table 2 below, this means a linear relationship exists between the numeracy ability and learning achievement.

Tabel 2. ANOVA for linearity test

		Sum of Squares	df	Mean Square	F	Sig.	
Indeks Prestasi * Kemampuan Numerasi	Between Groups	(Combined)	.817	5	.163	4.920	.001
		Linearity	.708	1	.708	21.323	.000
		Deviation from Linearity	.109	4	.027	.819	.517
		Within Groups	2.457	74	.033		
		Total	3.273	79			

Linear regression analysis in this study was used to investigate the effect of numeracy skills on learning achievement in terms of the academic achievement index of STIKOM Tunas Bangsa students. The following are some of the data results obtained from data processing using SPSS.

Tabel 3. Linear Regression Function

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.061	.114		26.860	.000
	Kemampuan Numerasi	.008	.002	.465	4.639	.000

a. Dependent Variable: Achievement Index

The first thing obtained from the processing results is the regression function produced by the independent and dependent variables. As seen in Table 3, the form of the regression function is $Y = 3.061 + 0.008 X$.

After the regression function is formed, the correlation coefficient (R) can also be obtained to describe the relationship between the numeracy ability variable and learning achievement. The resulting correlation coefficient value is 0.465 or 46.5%, shown in Table 4 below.

Tabel 4. Model Summary for Correlation Coefficient Values

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.465 ^a	.216	.206	.18135

- a. Predictors: (Constant), Numerical Ability
 b. Dependent Variable: Achievement Index

In addition, table 4 also displays a coefficient of determination of 0.216. This means that the numeracy ability variable contributes to learning achievement by 21.6%. In contrast, the rest is influenced by other factors not discussed in this study.

Finally, based on the statement (Firdaus, 2021), decision-making in a simple linear regression test can be done in 2 ways: based on the significant value and the t value. The basis for decision-making using the significance value is: if a significance value < 0.05 means that the independent variable influences the dependent variable, and vice versa. In this study, a comparison of the significance value with a probability value of 0.05 is used as a basis for decision-making on linear regression analysis. The following is the acquisition of significance values of the data processing, as shown in table 5 below.

Tabel 5. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.708	1	.708	21.522	.000 ^b
	Residual	2.565	78	.033		
	Total	3.273	79			

- a. Dependent Variable: Achievement Index
 b. Predictors: (Constant), Numerical Ability

Table 5 shows that the significance value is $0.000 < 0.05$, which means that numerical ability (X) influences learning achievement (Y).

2. Discussion

The data processing results with linear regression analysis showed that the independent variable (numerical ability) significantly influenced the dependent variable (learning achievement), which is reviewed based on the academic achievement index of STIKOM Tunas Bangsa students. This is supported by the data processing results, the data used must be normally distributed and have a linear relationship between the independent and dependent variables. The linear regression analysis can be continued after the data is proven to be normally distributed and linear. Analysis of the effect of numerical ability on learning achievement forms a regression equation $Y = 3.061 + 0.008X$. This equation means that if there is no effect of numeracy skills, student achievement is 3.061.

In addition, the regression coefficient in this equation is positive, meaning that if the numerical ability has an effect, learning achievement will increase by 0.008. Then the resulting correlation coefficient of 0.465 or 46.5% can be concluded that the form of relationship between the independent and dependent variables is in a fairly strong category. In addition, the magnitude of the contribution of the influence of numeracy skills on learning achievement is indicated by the coefficient of determination, which is 21.6%. In comparison, the remaining 78.4% is influenced by other factors not observed in this study.

E. Conclusion

Based on the results and data analysis discussion, it can be concluded that numerical ability significantly influences learning achievement in terms of the students' academic achievement index scores at STIKOM Tunas Bangsa students. In addition, the form of the resulting relationship is a positive relationship. This means that the better the numerical ability, the better the learning achievement of STIKOM Tunas Bangsa students will be followed. Therefore, improving learning to develop students' numerical achievement is necessary. Numeracy literacy is currently a common component used in the

job recruitment process. By improving students' numeracy skills, it is hoped that STIKOM Tunas Bangsa graduates will have good numeracy skills to create high quality human resources.

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