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The Influence of Mathematical Ability on Learning Achievement in Financial Accounting

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ABSTRACT

This study aims to examine the effect of mathematical ability on students' learning achievement in financial accounting among twelfth-grade students of the accounting program at SMKN 2 Mataram in the 2021–2022 academic year. Mathematical ability is considered a crucial cognitive factor in supporting the mastery of accounting subjects, as both disciplines share similar characteristics, particularly in the use of logic, symbols, and numerical calculations. This research employed a quantitative approach with a correlational design. The research subjects were twelfth-grade accounting students at SMKN 2 Mataram. Data on students' mathematical ability and financial accounting achievement were collected through documentation of students' academic scores. Data analysis was conducted by applying prerequisite tests, including normality and linearity tests, followed by simple linear regression analysis to test the research hypothesis. The results indicated that the data for both mathematical ability and financial accounting achievement were normally distributed and exhibited a linear relationship. The regression analysis revealed a t value of 4.851 with a significance level of 0.000 ($p < 0.05$), indicating a statistically significant effect of mathematical ability on students' achievement in financial accounting. These findings confirm that mathematical ability plays a significant role in enhancing students' understanding and academic performance in financial accounting. Therefore, strengthening students' mathematical skills should be a key consideration in instructional practices and the management of accounting programs in vocational high schools.

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INTRODUCTION

Education is the main foundation in the sustainable development of human resources, because through education, individuals are not only equipped with knowledge but are also directed to improve their quality of life, independence, and socio-economic competitiveness. Education plays a strategic role in liberating people from backwardness, ignorance, and poverty, while also shaping critical thinking skills and responsibility in community life (Tilaar, 2012; Ali et al., 2025). Therefore, education becomes an important instrument in building a dignified national civilization.

Juridically, the goals of national education have been affirmed in Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, which states that education aims to enlighten the nation's life and develop the potential of students to become human beings who have faith and piety towards God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and responsible as citizens (Republic of Indonesia, 2003; Zaini et al., 2025; Ali et al., 2026). This formulation indicates that education not only emphasizes cognitive aspects, but also the development of students' character, skills, and life competencies.

In the context of vocational secondary education, accounting education is one of the fields of study that has a strategic role and is relevant to the needs of the world of work. Accounting is not only studied as a theoretical science, but also as a practical skill applied in various aspects of life, such as buying and selling transactions, banking, taxation, capital markets, to organizational financial planning and control. The complexity of this role makes accounting a financial information provision system that demands meticulousness, accuracy of analysis, and a strong mastery of concepts (Kieso et al., 2020).

The increasingly rapid development of the business and industrial world demands human resources with adequate accounting competencies. Good accounting learning achievements will provide long-term benefits for students, both for continuing their studies to higher education levels and for entering the world of work. For vocational high school (SMK) students, optimal accounting achievement is an indicator of professional competency readiness, especially in budget planning, financial statement preparation, and data-based financial decision-making (Weygandt et al., 2019).

However, the reality in the field shows that students' accounting learning achievements have not fully reached the expected results. Variations in basic academic abilities still influence differences in learning outcomes among students. Slameto (2015) asserts that both internal and external factors influence learning achievement. Internal factors include intelligence, interest, talent, motivation, and learning readiness, while external factors include teaching methods, family environment, school environment, and social interactions. Among these internal factors, intellectual ability or intelligence has a significant contribution to student learning success.

In accounting learning, mathematical ability is one of the very important basic abilities, considering the characteristics of accounting, which are closely related to numbers, calculations, and analysis of financial transactions. Good mathematical ability will help students understand concepts, prepare journals, manage ledgers, to compile financial reports systematically and accurately. Conversely, weaknesses in mathematical ability have the potential to cause chain errors in the accounting recording process. Based on these conditions, this research was conducted to empirically examine the influence of mathematical ability on the learning achievement of the accounting subject for class XII accounting students at SMKN 2 Mataram.

METHOD

A. Research Design and Approach

This study uses a quantitative approach with a correlational research design. The quantitative approach was chosen because this research aims to objectively test the relationships and influences between variables through statistical analysis. The research design functions as a systematic framework that directs the process of data collection, processing, and analysis to align with the research objectives and can be carried out efficiently (Nasution, 2016).

The quantitative approach allows researchers to test hypotheses, verify theories, and reveal causal relationships between variables based on numerical data analyzed statistically (Arikunto, 2019). In the context of this research, a correlational design is used to determine the influence of basic mathematical ability on students' financial accounting learning achievement.

B. Research Population

The population is the entire set of subjects that have specific characteristics and are the target for generalizing the research results (Sugiyono, 2022). Thus, the population reflects all individuals relevant to the research problem and potentially providing the needed information.

The population in this study is all grade XII students in the Accounting vocational program at SMK Negeri 2 Mataram, totaling 60 students. This population is spread across two classes, namely class XII Accounting 1 and class XII Accounting 2. Because the population size is relatively small, all population members are taken as research subjects, making this study a population study.

C. Research Variables

Research variables are attributes or characteristics determined by the researcher to be studied and analyzed to obtain research conclusions (Sugiyono, 2022). This study involves two types of variables: independent variables and dependent variables.

The independent variable (X) in this study is mathematical ability, defined as students' ability to understand concepts, perform calculations, and solve problems related to numbers and mathematical operations. The dependent variable (Y) is financial accounting learning achievement, which is the learning outcomes achieved by students after participating in the learning process, reflected in their ability to record, measure, and report financial transactions based on learning evaluation results.

D. Data Collection Technique

Data collection technique is a strategic step in research because data quality greatly determines the validity of the research results (Creswell, 2018). In this study, data is collected using the documentation method.

The documentation method is used to obtain secondary data relevant to the research variables, such as grade data and institutional information. The collected data includes: (1) students' grade XI odd semester mathematics scores as an indicator of mathematical ability, (2) grade XI even semester financial accounting learning achievement scores as an indicator of learning achievement, and (3) the profile data of SMK Negeri 2 Mataram as supporting research information.

E. Classical Assumption Tests

Before regression analysis is conducted, the research data is first tested through classical assumption tests to ensure that the regression model meets the required statistical prerequisites (Ghozali, 2021).

The normality test is performed to determine whether the data of the independent and dependent variables are normally distributed. The normality testing in this study uses the Kolmogorov–Smirnov test with the criterion that data is stated to be normally distributed if the significance value is greater than 0.05. Additionally, a linearity test is conducted to ensure that the relationship between mathematical ability and financial accounting learning achievement is linear. A linear relationship is one of the main prerequisites in simple linear regression analysis.

F. Data Analysis Technique

1. Descriptive Statistical Analysis

Data analysis in this study is conducted in two stages: descriptive statistical analysis and simple linear regression analysis. Descriptive statistics are used to describe the general characteristics of the data, such as minimum value, maximum value, mean, median, mode, and standard deviation, thus providing an initial overview of the condition of students' mathematical ability and learning achievement (Sugiyono, 2022).

2. Regression Analysis

Next, simple linear regression analysis is used to test the influence of mathematical ability on financial accounting learning achievement. This regression model aims to determine the direction and magnitude of the influence of the independent variable on the dependent variable. The regression equation used is $\hat{Y} = a + bX$, where $\hat{Y}$ is the predicted value of financial accounting learning achievement, a is the constant, b is the regression coefficient, and X is mathematical ability. The results of the regression analysis are used as the basis for decision-making in testing the research hypothesis.

3. t-Test Analysis

This analysis is used to determine the level of significance or the significance level of the influence given by the distribution pattern on the improvement of its testing procedure is

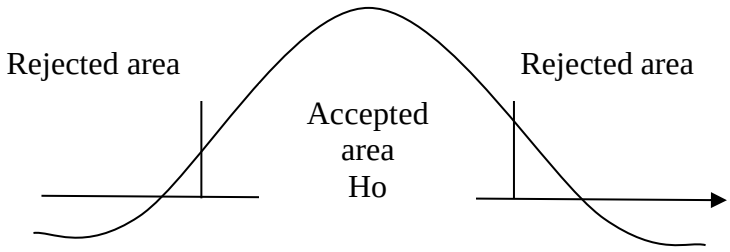

Figure 1. Hypothesis Description

a. Determining the null hypothesis and the alternative hypothesis

Ho: $\beta = 0$, meaning that the variable of mathematical ability does not have a significant influence on financial accounting learning achievement.

Ha: $\beta \neq 0$, meaning that the variable of mathematical ability has a significant influence on financial accounting learning achievement.

b. Determining the level of significance or confidence level of 95% and degrees of freedom n-2

c. Determining the t-value
d. Drawing a conclusion

If the calculated t is greater than or equal to –t table or the calculated t is less than or equal to t table, then Ho is accepted and Ha is rejected, meaning there is no significant influence between mathematical ability and learning achievement in the financial accounting subject. Whereas if the calculated t is greater than t table or if the calculated t is less than –t table, then Ho is rejected and Ha is accepted, meaning there is a significant influence between mathematical ability and learning achievement in the financial accounting subject.

RESULT AND DISCUSSION

A. Data Collection and Presentation

1. Data Collection

This research was conducted at SMKN 2 Mataram from August 11 to September 20, 2011, involving 60 students from two classes of the Accounting major in grade XII. Data collection was carried out through documentation, including data on students' accounting and mathematics grades, student conditions, teacher and staff conditions, facilities and infrastructure, school organizational structure, and the history of SMKN 2 Mataram's establishment.

2. Data Presentation

Based on the main problem, which is whether there is an influence of mathematical ability on the financial accounting learning achievement of grade XII students at SMKN 2 Mataram, the data collected in this study are the mathematics achievement of grade XII students when they were in grade XI semester 1 and the accounting achievement of grade XII students when they were in grade XI semester 2. This is to determine whether a student's mathematical ability influences their accounting grades, as both subjects are closely related to numbers.

3. Classical Assumption Test

a. Normality Test

Tabel 1. Tests of Normality

	Kolmogorov-Smirnov(a)			**Shapiro-Wilk**		
	Statistic	Df	Sig.	Statistic	df	Sig.
AKT	.075	60	.200(*)	.977	60	.327
MTK	.141	60	.005	.913	60	.000

Dari *output* di atas dilihat pada kolom *kolmogorov-Smirnov* dan dapat diketahui bahwa nilai signifikansi untuk MTK .000 dan AKT sebesar 0.200. Karena signifikasi untuk AKT lebih besar dari 0.05, maka dapat disimpulkan bahwa populasi data MTK dan AKT berdistribusi normal.

a. Uji Linieritsa

Tabel 2. Hasil ANOVA

			Sum of Squares	**Df**	**Mean Square**	**F**	**Sig.**
AKT * MTK	Between Groups	(Combined)	4.379	15	.292	2.017	.036

	Linearity	3.103	1	3.103	21.433	.000
	Deviation from Linearity	1.276	14	.091	.630	.826
Within Groups		6.370	44	.145		
Total		10.749	59			

From the output above, the results of the linearity test can be seen in the ANOVA Table output. It can be observed that the significance value for Linearity is 0.000. Since the significance is less than 0.05, it can be concluded that there is a linear relationship between the variables of mathematical ability and accounting ability.

4. Data Analysis

a. Descriptive Statistical Analysis

1. Mathematical Ability

Tabel 3. Descriptive Statistics (Kemampuan Matematika Semester I Kelas XI) MTK

N	60
Range	38
Minimum	60
Maximum	98
Sum	4411
Mean	73.52
Std. Error	1.462
Std. Stastistic	11.326
Variance	128.288
Skewnes stastistic	.356
Skewnes std. Error	.309
Kurtosis Stastistic	-1.134
Std. Error	.608

Analisis Output:

1) N: 60 indicates that the data collected consists of 58 samples.
2) Range: 38 is the span calculated using the formula for the difference between the largest data point (max: 98) and the smallest data point (min: 60).
3) Mean: 4411, shows that the mathematical ability has an average value of 73.52 with a standard error of 11.326.
4) Skewness statistic: .356 indicates the skewness value.
5) Kurtosis: -1.134 indicates the measure of peakedness of the data with a Kurtosis standard error of .608.

Tabel 4. Matematika Ability

Score	**Scale**
85-100	Sangat baik
73-84	baik
60-72	cukup

Table 5 Frequency distribution of mathematics scores

Score	Frequency
60-66	22
67-72	9
73-78	7
79-84	7
85-90	7
91-96	6
97-99	2
Jumlah	60

From the Frequency Distribution table of Mathematics scores, it can be seen that the total number of students is 58, with 22 students scoring between 60-66 and 2 students scoring between 97-99. This proves that the students' ability in mathematics is sufficient.

2. Financial Accounting Ability

Table 6. Descriptive Statistics (Financial Accounting Achievement Semester I, Class XI) AKT

N	60
Range	20
Minimum	70
Maximum	90
Sum	479
Mean	7.91
Std. Error	.055
Std. Stastistic	.427
Variance. Stastistic	.182
Skewnes stastistic	.527
Skewnes std. Error	.309
Kurtosis Stastistic	.309
Std. Error	.608

Analisis Output :

1) N: 60 indicates that the data collected consists of 60 samples.
2) Range: 20 is the range calculated using the formula for the difference between the largest data point (max: 90) and the smallest data point (min: 70).
3) Mean: 7.91 indicates that the mathematical ability has an average value of .055 with a standard error of .427.
4) Skewness statistic: .527 shows the skewness value.
5) Kurtosis: .309 indicates the measure of peakedness of the data with a Kurtosis standard error of .608.

Table 7. Financial Accounting Ability

Score	skala
8.31-9.20	Sangat baik
7.71-8.30	baik
7.07-7.70	cukup

Table 8. Frequency distribution of accounting values

Score	Frekuuensi
7.11-7.40	3
7.41-7.70	18
7.71-8.00	15
8.01-8.30	13
8.31-8.60	7
8.61-8.90	3
8.91-9.20	1
Jumlah	60

From the Frequency Distribution table of Accounting scores, it can be seen that out of 60 students, 18 students received an accounting score between 7.41 and 7.70. This proves that the performance in the accounting subject is good.

a. Simple Regression Analysis

1) The general simple linear regression equation used in this study is: Y = a + bX
2) From the equation above, it can be explained that the observed results of variable Y are influenced by the independent variable (X), which is mathematical ability.
3) The general simple regression equation used in this study is: Y = a + bx
4) From the equation above, it can be explained that the observed results of variable Y are influenced by the independent variable.

Tabel 9. Coefficients[a]

Model	Unstandardized Coefficients		Standardized		
	B	Std.Error	Beta	T	Sig
1. (Contant)	6.418	.310		20.679	.000
MTK	.020	.004	.337	4.851	.000

Dependent variable: AKT Semester 1. The simple regression equation is: Y = 6.418 + 0.020 X. The equation obtained from the simple regression analysis indicates a positive relationship between mathematical ability and learning financial accounting; the higher the mathematics score, the greater the improvement in financial accounting learning achievement. Based on the calculation results using the SPSS program in the Coefficients table, column Unstandardized Coefficients B, the values of each regression coefficient are obtained: = 6.418, = 0.020.

b. t-test analysis.

The t-test analysis is conducted to examine the significance of the influence of the independent variable individually on the dependent variable, with other variables held constant. 1) Mathematical

ability (X) on Y. From the calculation results (in the Coefficients table, column: t) below, the calculated t-value is 3.122 and is significant at the 0.003 level. Because the probability of the calculated t < 0.05, this regression model can be used to predict learning achievement in the financial accounting subject. In other words, mathematical ability (X) influences learning achievement in the financial accounting subject (Y). This means Ho is accepted.

B. Discussion

Educational psychology theory explains that student learning achievement is influenced by various internal factors, one of which is the intelligence and cognitive abilities possessed. The higher a student's cognitive ability, the greater their capacity to understand concepts, solve problems, and complete academic and non-academic tasks effectively (Santrock, 2020; Slameto, 2019). In the context of learning in vocational schools, basic cognitive abilities such as mathematical ability become an important foundation for mastering other subjects that are numerical and analytical in nature, including financial accounting.

This research aims to examine the influence of mathematical ability on the learning achievement in the financial accounting subject of Grade XII Accounting students at SMKN 2 Mataram for the 2011–2012 Academic Year. This study positions mathematical ability as the independent variable (X) and financial accounting learning achievement as the dependent variable (Y). Therefore, the main focus of the research is to determine whether or not there is an influence of mathematical ability on students' accounting learning achievement. This approach aligns with the view that mastery of numerical ability and mathematical logic heavily influences learning success in accounting subjects (Sugiyono, 2021).

Viewed from their scientific characteristics, mathematics and accounting have strong similarities, especially in the use of deductive logic, symbols, and standard formulas that demand precision and accuracy in calculation. Accounting not only requires the ability to understand concepts but also skills in calculating and analyzing financial data systematically. Therefore, students with good mathematical ability tend to find it easier to understand procedures and concepts in financial accounting (Weygandt et al., 2022). Basic mathematical abilities, such as arithmetic operations and formula application, are important prerequisites for producing valid and accurate accounting calculations.

Based on the results of data analysis, students' mathematical ability is classified as above average. This is supported by the normality test results, which show that the data for mathematical ability and accounting ability are normally distributed, with a significance value greater than 0.05. This finding indicates that the data is suitable for further statistical analysis and reflects a relatively homogeneous condition of students' academic abilities. Empirically, this condition strengthens the assumption that mathematical ability makes a significant contribution to mastering the financial accounting subject.

Accounting as a subject has specific characteristics, including the use of technical terms and specific symbols, such as balance sheets, income statements, debit, credit, journals, and ledgers, which require both conceptual understanding and numerical skills. The process of recording and processing financial data cannot be separated from mathematical calculation activities, whether done manually or with the aid of calculation tools. Therefore, mastery of mathematics becomes a primary

supporting factor in enhancing understanding and learning achievement in accounting (Horngren et al., 2021).

The linearity test results show that the relationship between mathematical ability and accounting ability is linear, indicated by a linearity significance value of 0.000 ($p < 0.05$). This finding demonstrates a direct and consistent relationship between the two variables. Furthermore, the regression test results show a calculated t-value of 4.851 with a significance level of 0.000, meaning that mathematical ability has a significant influence on financial accounting learning achievement. Thus, the regression model used is suitable for predicting accounting learning achievement based on students' mathematical ability.

Based on these results, the alternative hypothesis stating that there is an influence of mathematical ability on the learning achievement in the accounting subject of Grade XII Accounting students at SMKN 2 Mataram can be accepted. This finding confirms that mathematical ability plays an important role in supporting learning success in financial accounting. The better the mathematical ability a student possesses, the higher the learning achievement attained in the accounting subject. The results of this study are consistent with previous findings that emphasize the importance of numerical ability as a foundation for learning accounting and other calculation-based subjects.

CONCLUSION

Based on the results of the analysis and discussion that have been conducted, it can be concluded that the mathematical ability of grade X students at SMKN 2 Mataram is in the excellent category, as reflected by the students' achievement scores in each semester. In addition, the students' accounting ability also shows quite good results, as seen from the final scores in the accounting subject. The main finding of this study indicates a very significant influence of basic mathematical ability on students' accounting learning achievement. The statistical test results show a t-value of 4.851 with a significance level of 0.000 ($p < 0.05$), which indicates that mathematical ability is an important factor in determining the success of learning accounting. Thus, this study confirms that the better the basic mathematical ability possessed by students, the higher the learning achievement achieved in the financial accounting subject. This conclusion implies the importance of strengthening mathematical ability as a foundation in accounting learning, both through the student selection process and through learning strategies that emphasize mastery of concepts and calculation skills. Overall, the results of this study provide empirical evidence that mathematical ability plays a significant role in supporting the achievement of accounting learning outcomes at SMKN 2 Mataram.

REFERENCES

Ali, L. U., Suranto, S., & Indrowati, M. (2025). Model Problem Based Contextual Learning (PBCL) Bermuatan Etnosains untuk Meningkatkan Kemampuan Literasi Sains dan Keterampilan Berpikir Kreatif Siswa. In A. Malik (Ed.), CV Eureka Media Aksara (1st ed.). Eureka Media Aksara. https://repository.penerbiteureka.com/publications/620370/

Ali, L. U., Suranto, S., Indrowati, M., & Suhirman. (2026). A meta-analysis of the effectiveness of problem-based learning on science literacy. In Maila D.H. Rahiem (Ed.), Towards Resilient Societies: The Synergy of Religion, Education, Health, Science, and Technology (1st ed., Vol. 1, Issue 1). Taylor & Francis. https://doi.org/10.1201/9781003645542-44

Arikunto, S. (2019). Prosedur penelitian: Suatu pendekatan praktik. Rineka Cipta.

Creswell, J. W. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). SAGE Publications.

Ghozali, I. (2021). Aplikasi analisis multivariate dengan program IBM SPSS 26. Badan Penerbit Universitas Diponegoro.

Horngren, C. T., Datar, S. M., Rajan, M. V., & Wynder, M. (2021). Introduction to management accounting (16th ed.). Pearson Education.

Kieso, D. E., Weygandt, J. J., & Warfield, T. D. (2020). Intermediate accounting (17th ed.). Wiley.

Nasution, S. (2016). Metode penelitian naturalistik kualitatif. Tarsito.

Republik Indonesia. (2003). Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 tentang Sistem Pendidikan Nasional. Jakarta: Sekretariat Negara.

Santrock, J. W. (2020). Educational psychology (6th ed.). McGraw-Hill Education.

Slameto. (2015). Belajar dan faktor-faktor yang mempengaruhinya. Rineka Cipta.

Sugiyono. (2022). Metode penelitian kuantitatif. Alfabeta.

Tilaar, H. A. R. (2012). Kaleidoskop pendidikan nasional. Kompas.

Weygandt, J. J., Kimmel, P. D., & Kieso, D. E. (2019). Accounting principles (13th ed.). Wiley.

Weygandt, J. J., Kimmel, P. D., & Kieso, D. E. (2022). Financial accounting (12th ed.). Wiley.

Zaini, M., Ali, L. U., Handriani, L. S., & Fitriana, I. M. (2025). The influence of guided inquiry learning based on local wisdom and android applications on students' high-order thinking skills (HOTS). Compton: Jurnal Ilmiah Pendidikan Fisika, 12(1), 161–175. https://doi.org/10.30738/cjipf.v12i1.19905