

THE INFLUENCE OF SCHOOL ENVIRONMENT AND TECHNOLOGY USE ON LEARNING DISCIPLINE AND MATHEMATICS ACHIEVEMENT AMONG HIGH SCHOOL STUDENTS

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Abstract

The low mathematics achievement of Indonesian students in both national and international assessments demands the identification of factors that schools can intervene upon, while the massive penetration of digital technology in classrooms following the pandemic has not been matched by empirical evidence regarding its impact on learning discipline and mathematics achievement. This study aims to analyze the influence of school environment and technology utilization on learning discipline and mathematics achievement, both partially and simultaneously. This quantitative research with an ex post facto approach involved the entire population of eleventh-grade students at SMA Negeri 20 Gowa in the 2025/2026 academic year (155 students), with a sample of 84 students selected using the convenience sampling technique. Data were collected through questionnaires and tests that met validity and reliability criteria, then analyzed descriptively and inferentially. The results indicate that school environment and technology utilization significantly predict on learning discipline (Sig. = 0.000; R^2 = 0.289) and mathematics achievement (Sig. = 0.009; R^2 = 0.109). Partially, school environment has no significant effect on either learning discipline (Sig. = 0.427) or mathematics achievement (Sig. = 0.281), while technology utilization has a significant effect on both (Sig. = 0.000 and Sig. = 0.002). These findings suggest that learning-oriented technology utilization maybe a more relevant predictor of students' learning discipline and mathematics achievement in the context studied. However, the relatively low R^2 for mathematics achievement indicates that other student, teacher, and instructional factors should also be considered.

Keywords: School Environment, Technology Utilization, Learning Discipline, Mathematics Achievement

A. Introduction

The mathematics achievement of Indonesian students remains an unresolved issue. PISA results place Indonesian students' mathematical literacy far below the OECD average, with a score of 366 in 2022 compared to the OECD average of 472 (OECD, 2023). A similar pattern appears at SMA Negeri 20 Gowa,

where the average mathematics score of eleventh-grade students reached the school's Minimum Mastery Criterion (KKM) of 78, yet individual scores ranged widely from 30 to 88. This gap indicates that mathematics achievement cannot be explained by cognitive ability alone, but is also shaped by contextual conditions that, unlike innate ability, remain within reach of school intervention.

Two such conditions stand out in contemporary mathematics learning: school environment and technology utilization. A conducive school environment covering physical, social, and academic conditions sustains motivation and shapes regular learning habits, whereas an unsupportive one hinders engagement and lowers achievement (Triwiyanto, 2014; Siswanto & Arbani, 2021). Although Rafliani & Aniswita (2022) found school environment to significantly influence mathematics achievement, Andarwati (2018) reported no significant effect, indicating that its role is not yet well established.

Technology, meanwhile, has transformed the learning process by shifting teachers from information sources to facilitators (Maritsa et al., 2021) and by easing access to information and improving learning efficiency (Bagaskoro, 2019). In mathematics specifically, technology-based media helps students grasp abstract concepts through visualization (Bito & Masaong, 2023) and has been linked to higher motivation and achievement (Nathaniela & Esfandiari, 2023). Yet its effects are not uniformly positive: the same devices that provide learning resources also invite distraction, and undirected use can reduce concentration and self-regulation (Junco, 2012). This suggests that technology's effect on achievement depends on students' capacity for self-control commonly known as learning discipline (Sobri, 2020) which reflects compliance with learning rules and consistency in study behavior, and functions both as a predictor of achievement and as an outcome of school and technology conditions.

Prior research, however, reveals three gaps. First, school environment (Rafliani & Aniswita, 2022) and technology utilization (Nathaniela & Esfandiari, 2023) have mostly been studied separately, leaving it unclear whether school environment still matters once technology use is statistically controlled. Second, technology's facilitative and distractive effects remain unreconciled in the literature

Third, learning discipline is usually treated only as a predictor of achievement, rarely as an outcome shaped by school and technology conditions.

This study addresses these gaps by examining school environment and technology utilization simultaneously against two tiered outcomes learning discipline and mathematics achievement allowing each predictor's unique contribution to be identified. Theoretically, it clarifies the position of learning discipline in the pathway linking contextual factors to mathematics achievement; practically, it helps schools decide where to direct limited resources, whether toward improving the school environment or toward guiding technology utilization.

Accordingly, this study aims to: (1) describe the conditions of school environment, technology utilization, learning discipline, and mathematics achievement; (2) analyze the influence of school environment and technology utilization on learning discipline; (3) analyze their simultaneous influence on mathematics achievement; (4) analyze the partial influence of school environment on learning discipline and mathematics achievement; (5) analyze the partial influence of technology utilization on learning discipline and mathematics achievement; and (6) analyze the relative contribution of school environment and technology utilization to learning discipline and mathematics achievement.

Theoretical Framework

School environment and technology utilization are two contextual factors presumed to play a role in shaping the quality of learning. A conducive school environment, in terms of its physical, social, and academic aspects, can create an orderly learning atmosphere that fosters the growth of students' learning discipline. On the other hand, appropriate technology utilization can enrich learning resources, facilitate access to information, and help students understand abstract mathematical concepts through various interactive learning media. However, undirected use of technology also has the potential to reduce concentration and learning discipline, meaning its benefits for learning outcomes are not always positive.

Various studies have shown that school environment and technology utilization play a role in both learning discipline and mathematics achievement. Nevertheless, previous research findings remain varied, particularly regarding the magnitude of the influence of school environment on learning achievement. This variation in results indicates that the relationship among school environment, technology utilization, learning discipline, and mathematics achievement still requires further testing across different contexts, student characteristics, and school environments. Therefore, further research is needed to obtain a more comprehensive understanding of the interrelationships among these variables.

Based on the analysis conducted to determine the basic assumptions, the next step needed is to formulate hypotheses.

1. There is an influence of school environment and technology utilization jointly on learning discipline
2. There is an influence of school environment and technology utilization jointly on mathematics achievement
3. There is a positive influence of school environment on learning discipline
4. There is a positive influence of technology utilization on learning discipline
5. There is a positive influence of school environment on mathematics achievement
6. There is a positive influence of technology utilization on mathematics achievement

B. Method

Type of Research

This study used a quantitative, ex-post facto causal design to examine the influence of school environment and technology utilization on learning discipline and mathematics achievement, without manipulating the variables (Figures 1–2).

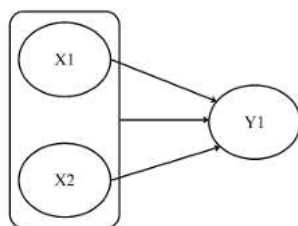


Figure 1. Research Design Y1

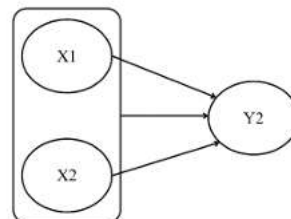


Figure 2. Research Design Y2

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Description:

X_1 : School environment

X_2 : Technology utilization

Y_1 : Learning discipline

Y_2 : Mathematics achievement

Participants

Participants were 84 eleventh-grade students at SMA Negeri 20 Gowa (2025/2026 academic year), selected through convenience sampling. This grade was chosen because students had completed the relevant mathematics curriculum and had experience using technology in learning. Characteristics by gender, age, and ethnicity are shown in Table 1.

Table 1. Characteristics of Research Participants

Characteristic	Category	n	Percentage (%)
Gender	Male	48	57.1
	Female	36	42.9
Age	16 Years	60	71.4
	17 Years	24	28.6
Ethnicity	Makassar	82	97.6
	Bugis	1	1.2
	Javanese	1	1.2

Instruments

Four instruments were used questionnaires for school environment, technology utilization, and learning discipline, plus a mathematics achievement test all validated before use. The final versions comprised 17, 10, 19, and 6 valid, reliable items, respectively; the three questionnaires used a four-point Likert scale (Strongly Agree to Strongly Disagree).

School Environment Questionnaire

This questionnaire measured students' perceptions of the school environment across nine indicators (Table 2).

Table 2. Blueprint of the School Environment Questionnaire

Indicator	Sample Statement
Completeness of facilities and infrastructure	The classroom does not have enough desks and chairs for all students
Availability of tools, media/learning resources	The library lacks the reference books needed by students
Student-teacher interaction	The teacher uses polite language when speaking with students
Student-student interaction	I am able to interact smoothly with my group members
Student interaction with school employees/staff	School employees and staff are always friendly when serving students
Two-way communication during learning	The teacher gives students the opportunity to ask and answer questions
School atmosphere	Every student is active in the learning process
Implementation of teaching and learning activities	Learning activities at school are often not well implemented
Extracurricular activities	Extracurricular activities often do not follow the schedule set by the school

Technology Utilization Questionnaire

This questionnaire measured the level of technology use in mathematics learning across six indicators (Table 3).

Table 3. Blueprint of the Technology Utilization Questionnaire

Indicator	Sample Statement
Ability to provide information	I can easily obtain information about mathematics learning materials through formal media
User friendly	I can search for additional references on various educational websites available on the internet
System reliability	I have difficulty obtaining more accurate and trustworthy information through the use of information technology
Rapid innovation cycle	I find it difficult to search for information through available websites or applications
Diverse and stable technology	I am unable to adapt to various innovations in the development of information technology across different fields of expertise
Decentralization/individualism	I find it easier to recognize my own abilities and skills

Learning Discipline Questionnaire

This questionnaire measured students' discipline in the learning process across six indicators (Table 4).

Table 4. Blueprint of the Learning Discipline Questionnaire

Indicator	Sample Statement
Orderliness	I follow mathematics lessons in class in an orderly manner, without disturbing the classmate beside me
Self-control	I try to study diligently so that I can complete mathematics problems at home
Concentration	I often feel sleepy in class during mathematics lessons

Mathematics Achievement Test

This test measured students' success in mathematics learning through six essay questions spanning three cognitive levels (C2, C3, C4), covering six question indicators (Table 5).

Table 5. Blueprint of the Mathematics Achievement Test

Material	Question Indicator	Cognitive Level	Sample Question
Function Composition & Inverse Function	Students are able to explain the concept of a function and distinguish it from a relation	C2	Explain the concept of a function in your own words. Explain why not all relations can be called functions? Include one simple example!
Matrix	Students can correctly explain the concept of a matrix and matrix order	C2	Explain what is meant by a matrix and matrix order. Then, provide one example of a 2×2 matrix along with an explanation of its order!

Research Procedure

The study proceeded in three stages: formulating the problem and developing and validating the instruments (Pearson's Product Moment; Cronbach's

Alpha); administering the validated questionnaires and test to eleventh-grade students at SMA Negeri 20 Gowa; and analyzing the data descriptively, followed by classical assumption tests and multiple linear regression at a 5% significance level to answer the research problems.

Descriptive Analysis

Descriptive analysis was used to summarize the characteristics of each variable school environment, technology utilization, learning discipline, and mathematics achievement by calculating the minimum, maximum, mean, and standard deviation (Ghozali, 2018). Scores were then categorized into several levels following Sugiyono (2007), based on the highest score, lowest score, range, and class interval, to clarify the level of each variable.

Inferential Analysis

Inferential analysis tested the hypotheses using SPSS at a 5% significance level. Classical assumption tests were conducted first normality (Kolmogorov-Smirnov), linearity, multicollinearity (Tolerance/VIF), and heteroscedasticity (Glejser) followed by multiple linear regression: the F-test for simultaneous effects, the t-test for partial effects, and R^2 for each variable's contribution.

C. Results and Discussion

Descriptive Statistical Analysis Results

Descriptive analysis is applied as a method to provide a comprehensive overview of the characteristics of a dataset. This overview can be observed through several key statistical indicators, including the mean, standard deviation, maximum value, and minimum value, which reflect the degree of data dispersion. In more detail, the description of the descriptive analysis results for each variable that is the focus of this research is presented as follows.

Table 6. Descriptive Analysis Results

Variable	Mean	Standard Deviation	Maximum	Minimum
School Environment	52.62	4.82	66.00	41.00
Technology Utilization	28.44	3.33	38.00	17.00
Learning Discipline	57.40	6.83	76.00	44.00
Students' Mathematics Achievement	51.02	3.89	100.00	11.00

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Based on Table 6, it is known that the mean value of the school environment variable is 52.62, technology utilization is 28.44, learning discipline is 57.40, and students' mathematics achievement is 51.02. The learning discipline variable has the highest mean value, while technology utilization has the lowest mean value. In addition, students' mathematics achievement shows the largest standard deviation (33.89), indicating that students' mathematics achievement scores are more varied compared to other variables.

Table 7. Frequency of Descriptive Analysis Variables

Variable	Category	Frequency	Percentage (%)
School Environment	Moderate	37	44.0
Technology Utilization	Moderate	46	54.8
Learning Discipline	Moderate	30	35.7
Students' Mathematics Achievement	Very Low	34	40.5

Furthermore, in Table 7, the majority of respondents had a school environment in the moderate category, comprising 37 students (44.0%), technology utilization in the moderate category, comprising 46 students (54.8%), and learning discipline in the moderate category, comprising 30 students (35.7%). Meanwhile, students' mathematics achievement was dominated by the very low category, comprising 34 students (40.5%). These results indicate that most respondents had a moderate level of school environment, technology utilization, and learning discipline, whereas students' mathematics achievement remained in the very low category.

Classical Assumption Test Results

The normality test is the initial step in data analysis to determine whether the data are normally distributed or not. The normality test was conducted using Kolmogorov-Smirnov with a significance value > 0.05 .

Table 8. Normality Test Results

Kolmogorov-Smirnov	Sig.	Description
Unstandardized Residual	0.177	Normally distributed
Unstandardized Residual	0.001	Not normally distributed

Based on Table 8, the first residual is normally distributed (Sig. = 0.177 > 0.05), while the second residual is not normally distributed (Sig. = 0.001 < 0.05).

However, with a sample size of 84, the normality assumption for the second residual is still considered fulfilled based on the Central Limit Theorem. Next, a linearity test was conducted to determine whether the relationship between the independent and dependent variables is linear. The results of the linearity test are presented in Table 9.

Table 9. Linearity Test Results

Variable Pair	Sig.Deviation from Linearity	Description
X1 → Y1	0.174	Linear
X1 → Y2	0.066	Linear
X2 → Y1	0.980	Linear
X2 → Y2	0.448	Linear

In Table 9, it is found that all variable pairs have a Deviation from Linearity significance value > 0.05 , indicating that the relationships between the variables are linear. Next, a multicollinearity test was conducted to examine the correlation among the independent variables. The results are presented in Table 10.

Table 10. Multicollinearity Test Results

Variable	Tolerance	VIF	Description
X1	0.923	1.084	No multicollinearity
X2	0.923	1.084	No multicollinearity
*Tolerance and VIF values apply to both Y1 and Y2			

Based on Table 10, all variables have a Tolerance value > 0.10 and a VIF value < 10 , indicating that no multicollinearity occurs. Next, a heteroscedasticity test was conducted to determine whether there is inequality of residual variance. The results of the heteroscedasticity test are presented in Table 11.

Table 11. Heteroscedasticity Test Results

Variable	Sig. Model 1 (Y1)	Sig. Model 2 (Y2)
School Environment (X1)	0.859	0.847
Technology Utilization (X2)	0.022	0.595

In Table 11, in Model 1 the school environment variable has a significance value of 0.859 (> 0.05), while technology utilization has a significance value of 0.022 (< 0.05). Meanwhile, in Model 2, both variables have significance values of 0.847 and 0.595 (> 0.05). Thus, Model 1 still shows symptoms of heteroscedasticity in the technology utilization variable, while Model 2 does not experience heteroscedasticity.

Hypothesis Test Results

Hypothesis testing was carried out using multiple linear regression analysis to determine the influence of the independent variables on the dependent variable, both partially (t-test), simultaneously (F-test), and through the coefficient of determination (R^2). The results of the first model analysis are presented in the following table.

Table 12. F-Test Results for Y1 (Simultaneous)

Model	F	Sig.
Learning Discipline	16.467	0.000

Based on Table 12, an F value of 16.467 is obtained with a significance value of $0.000 < 0.05$. This indicates that school environment and technology utilization simultaneously have a significant effect on learning discipline.

Table 13. Result of the t-Test for Y1 (Partial)

Variable	B	t	Sig.
Constant	21.862	2.764	0.007
School Environment (X1)	0.110	0.799	0.427
Technology Utilization (X2)	1.046	5.691	0.000

In Table 13, school environment has no significant effect on learning discipline ($\text{Sig.} = 0.427 > 0.05$), while technology utilization has a significant effect on learning discipline ($\text{Sig.} = 0.000 < 0.05$).

Table 14. Results of the Coefficient of Determination for Model Y1

R	R Square	Adjusted R Square
0.538	0.289	0.272

Based on Table 14, the R Square value obtained is 0.289, meaning that school environment and technology utilization are able to explain 28.9% of the variation in learning discipline. The multiple linear regression equation obtained in Table 12 is as follows.

$$Y_1 = 21.862 + 0.110X_1 + 1.046X_2$$

This equation shows that school environment and technology utilization have positive regression coefficients, meaning that an increase in both variables tends to be followed by an increase in students' learning discipline.

After conducting the analysis on the first model, the next step is to perform regression analysis on the second model, which uses students' mathematics

achievement as the dependent variable. This analysis aims to determine the magnitude of the effect of school environment and technology utilization on students' mathematics achievement, both simultaneously and individually. Through this analysis, the significance of the effect of each independent variable and the model's ability to explain the variation in students' mathematics achievement can be determined. The results of the regression analysis for the second model are presented in the following table.

Table 15. Results of the F-Test for Y2 (Simultaneous)

Model	F	Sig.
Mathematics Achievement	4.957	0.009

Based on Table 15, the F value obtained is 4.957 with a significance value of $0.009 < 0.05$. This indicates that school environment and technology utilization simultaneously have a significant effect on students' mathematics achievement.

Table 16. Results of the t-Test for Y2 (Partial)

Variable	B	t	Sig.
Constant	-4.181	-0.095	0.924
School Environment (X1)	-0.832	-1.086	0.281
Technology Utilization (X2)	3.481	3.141	0.002

In Table 16, school environment has no significant effect on mathematics achievement ($\text{Sig.} = 0.281 > 0.05$), while technology utilization has a significant effect on mathematics achievement ($\text{Sig.} = 0.002 < 0.05$).

Table 17. Results of the Coefficient of Determination for Model Y2

R	R Square	Adjusted R Square
0.330	0.109	0.087

Based on Table 17, the R Square value obtained is 0.109, meaning that school environment and technology utilization are able to explain 10.9% of the variation in students' mathematics achievement. The multiple linear regression equation obtained in Table 15 is as follows.

$$Y_2 = -4.181 - 0.832X_1 + 3.481X_2$$

This equation shows that school environment has a negative regression coefficient, while technology utilization has a positive regression coefficient. This

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means that an increase in school environment tends to decrease mathematics achievement, while an increase in technology utilization tends to increase mathematics achievement.

Discussion

General Overview of the Conditions of School Environment, Technology Utilization, Learning Discipline, and Mathematics Achievement

The results of the descriptive analysis indicate a discrepancy among the conditions of the research variables. School environment, technology utilization, and learning discipline fall into the moderate category, whereas students' mathematics achievement falls into the very low category. This condition shows that relatively good environmental support, technology utilization, and learning discipline have not been fully followed by an improvement in students' mathematics achievement. In other words, although students learn in a fairly conducive environment, make use of technology in learning, and demonstrate fairly good learning discipline, the academic achievement obtained remains low. This finding indicates that there are other factors outside the variables studied that also influence students' mathematics achievement. Therefore, the subsequent discussion focuses on analyzing the effect of each research variable on learning discipline and mathematics achievement.

Simultaneous Effect of School Environment and Technology Utilization on Learning Discipline and Mathematics Achievement

The results of the analysis show that school environment and technology utilization simultaneously have a significant effect on both learning discipline and students' mathematics achievement. This finding indicates that the two variables together are able to explain the variation in learning discipline and mathematics achievement. However, the results of the partial test show that only technology utilization has a significant effect, while school environment does not have a significant effect on either dependent variable. This condition indicates that the significance of the regression model simultaneously is more influenced by the contribution of technology utilization than by school environment. Thus, technology utilization

was the only predictor that showed a statistically significant partial association with both learning discipline and mathematics achievement. This finding also shows that the results of the simultaneous test need to be interpreted together with the results of the partial test, so that the contribution of each independent variable in the regression model can be determined. Therefore, although the regression model is significant overall, not all independent variables have a significant individual effect on the dependent variable.

The Insignificant Effect of School Environment on Learning Discipline and Mathematics Achievement

The results of the study show that school environment does not have a significant effect on either learning discipline or students' mathematics achievement. This finding is consistent across both models and therefore requires an explanation that is related not only to the presence of other factors outside the study, but also to the characteristics of the data used. One of the most plausible explanations is related to the research design. All respondents came from the same school and therefore had relatively uniform facilities and infrastructure, teaching staff, rules and regulations, and academic climate. As a result, the variation in school environment obtained through the questionnaire reflects differences in students' perceptions more than actual differences in environmental conditions. The limited variation in the predictor caused the ability of school environment to explain differences in learning discipline and mathematics achievement to be low. Theoretically, school environment also functions as a contextual condition experienced relatively equally by all students, whereas learning discipline and mathematics achievement are more influenced by individual responses and characteristics in making use of that condition.

This finding is in line with the research of Priambodo and Setiawan (2024), Fristanto (2021), and Andrawati (2018), but differs from the results of research by Nababan (2021) and Supriadi et al. (2023). This difference is presumed to be caused by differences in the unit of analysis. Studies involving multiple schools are able to capture more diverse variation in school environment, making its effect easier to detect, whereas studies conducted at only one school have relatively homogeneous environmental variation. Therefore, the results of this study do not indicate that

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school environment is unimportant in the learning process, but rather that its effect could not be detected in the context of a study using respondents from a single school.

The Role of Technology Utilization in Improving Learning Discipline and Mathematics Achievement

Technology utilization has a positive and significant effect on both learning discipline and students' mathematics achievement. Unlike school environment, which is relatively uniform across all respondents, technology utilization is an individual characteristic that varies among students, allowing it to explain differences in learning discipline and mathematics achievement. With regard to learning discipline, technology utilization helps students manage their learning process through access to materials, completion of assignments, and more independent management of study time. This convenience encourages the formation of learning regularity that does not fully depend on teacher supervision. This finding is in line with Retnowati and Rahmawan (2016) and is supported by the Technology Acceptance Model (Davis, 1989), which explains that perceptions of technology utilization encourage the sustained use of technology in learning.

With regard to mathematics achievement, technology utilization helps students understand abstract concepts through visualization, interactive exercises, and direct feedback. These features support the mathematics learning process, which requires conceptual understanding and continuous practice. This finding is in line with the research of Bito and Masaong (2023), Nadeak et al. (2020), and Ridho et al. (2024), and is consistent with the Technological Pedagogical Content Knowledge (TPACK) framework, which emphasizes the importance of utilizing technology in accordance with the characteristics of the learning material (Mishra & Koehler, 2006).

This study measures technology utilization used to support learning activities, not merely the intensity of digital device use. Therefore, the positive effect found indicates that appropriate, learning-oriented use of technology can support the improvement of students' learning discipline and mathematics achievement.

Comparison of the Contributions of School Environment and Technology Utilization to the Dependent Variables

Among the two independent variables tested, only technology utilization made a significant contribution to both learning discipline and students' mathematics achievement, while school environment did not show a significant contribution. This finding indicates that technology utilization is a more dominant predictor in explaining the variation in learning discipline and mathematics achievement within the context of this study. Differences in achievement among students are influenced more by how each student makes use of technology in the learning process than by the school environment, which is relatively the same for all students. This result also reinforces the idea that variables with variation among students tend to have a greater ability to explain differences in learning outcomes compared to variables whose conditions are relatively homogeneous.

This finding implies that efforts to improve learning discipline and mathematics achievement are not sufficient through the provision of facilities or improvement of the school environment alone, but also need to be accompanied by strengthening the utilization of technology in learning. Teachers can guide students to make effective use of various learning media and applications, while schools can support the provision of facilities and digital literacy programs that support the learning process. Thus, technology utilization functions not only as a means of supporting learning but also as a factor that makes a real contribution to improving learning discipline and mathematics achievement.

Low Mathematics Achievement Amid Relatively Good Variable Conditions: Implications and Directions for Future Research

The research findings show that students' mathematics achievement remains in the very low category even though school environment, technology utilization, and learning discipline are in the moderate category. This condition indicates that the presence of these factors has not been fully able to improve students' academic achievement. In other words, good learning discipline does not automatically result in high mathematics achievement, because such achievement is also influenced by

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other factors, such as thinking ability, learning strategies, motivation, and the quality of the learning process. Therefore, future research needs to examine these variables in order to provide a more comprehensive explanation of students' low mathematics achievement.

D. Conclusion

This study found that technology utilization is the most dominant variable in influencing students' learning discipline and mathematics achievement, while school environment did not have a significant effect on either variable. In addition, students' mathematics achievement remained in the very low category even though school environment, technology utilization, and learning discipline were in the moderate category. This finding indicates that there are other factors outside the variables studied that also influence students' mathematics achievement. A limitation of this study lies in the fact that all respondents came from a single school, so that the variation in school environment conditions was relatively homogeneous. This condition caused the effect of school environment on learning discipline and mathematics achievement to not be optimally captured. In addition, this study only examined two independent variables, namely school environment and technology utilization, so there are still other factors that potentially influence students' learning discipline and mathematics achievement. Based on these limitations, future research is recommended to involve respondents from several schools with diverse characteristics so that the variation in school environment can be more representatively captured. Future research could also add other variables, such as learning motivation, learning strategies, metacognitive ability, parental support, teacher competence, or other relevant factors, in order to obtain a more comprehensive understanding of the factors that influence students' learning discipline and mathematics achievement.

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