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Time Management, Learning Style, Motivation, and Environment Effects on Academic Achievement

Ardiansyah[1], Zul Fadli Kamal[2], Winarti[3], Nurul Fajriani[4], Muallim[5]
[1,2,3,4,5]Universitas Negeri Makassar
Corresponding author's email: muallim@unm.ac.id

ABSTRACT

Academic achievement among university students is shaped by a combination of self-regulatory skills and contextual conditions, yet studies that test time management, learning style, achievement motivation, and learning environment together in a single model remain comparatively uncommon in Indonesian teacher-education programs. This study examined the effect of these four factors on the academic achievement of Office Administration Education students (2023 cohort) at Universitas Negeri Makassar. A quantitative correlational design was used, with data collected from 36 respondents through a Likert-scale questionnaire (10 items per variable). Validity, reliability, and classical assumption tests (normality, multicollinearity, linearity) were computed in SPSS, followed by Pearson correlation and multiple linear regression. Time management ($r = 0.436$, $p = 0.008$), achievement motivation ($r = 0.448$, $p = 0.006$), and learning environment ($r = 0.352$, $p = 0.035$) were each significantly, moderately correlated with academic achievement, while learning style showed a weak, non-significant correlation ($r = 0.202$, $p = 0.237$) and did not satisfy the linearity assumption. The combined regression model was significant, $F(4, 31) = 3.476$, $p = 0.019$, explaining 31% of the variance in academic achievement ($R^2 = 0.31$). Individually, achievement motivation contributed the largest share of explained variance (15.0%), followed by time management (11.3%) and learning environment (8.9%), while learning style contributed negatively and negligibly (-4.2%). These findings suggest that, among the four factors tested, achievement motivation and time management are the most substantively important levers for improving academic achievement in this cohort, while the learning-style measure used here requires methodological refinement before its role can be more confidently assessed.

Keywords: time management; learning style; achievement motivation; learning environment; academic achievement

INTRODUCTION

Academic achievement is widely used as the primary indicator of a student's success in higher education, yet it is rarely explained by a single cause. Research consistently frames academic achievement as multifactorial, shaped jointly by internal factors such as intelligence, motivation, self-efficacy, and study habits, and external factors such as family background, institutional environment, and socioeconomic status; motivation and self-efficacy in particular are repeatedly identified as strong, consistent predictors of academic success across educational levels (Acosta-Gonzaga, 2023; Carrión-Barco et al., 2024).

Among internal, self-regulatory factors, time management has accumulated especially strong and consistent evidence as a predictor of academic performance. Effective time management, encompassing planning, prioritizing, and efficient allocation of study time, is associated with higher grades, reduced procrastination, and greater academic confidence, and time-management training interventions have been shown to directly improve academic achievement, particularly in the flexible scheduling environments typical of universities (Razali et al., 2018; Baniaghil et al., 2021; Liu et al., 2026). A related strand of research has examined learning style, though evidence here is markedly more mixed: some studies report a meaningful relationship between learning style (or style-instruction alignment) and achievement, while others find no significant association once other factors are controlled, suggesting that learning style alone is a comparatively weak and inconsistent predictor of academic success (Mozaffari et al., 2020; Tan & Laswad, 2015; Shala et al., 2024).

Achievement motivation, the drive to accomplish goals and attain competence, is consistently identified as a central, high-confidence predictor of academic performance, often mediating the effects of other factors such as teacher support and classroom environment on achievement (Lavrijsen et al., 2022; Dang et al., 2025). Motivation is also closely tied to engagement: motivated students are more likely to participate actively, invest time, and persist in learning activities, with academic engagement frequently identified as a mechanism through which motivation translates into achievement (Bayoumy & Alsayed, 2021; Zhong et al., 2023). Learning environment, encompassing classroom management, teacher support, and institutional resources, has been shown to affect achievement both directly and indirectly, including through its influence on academic procrastination and motivation (Cayubit, 2022; Sun et al., 2023; Hong, 2025).

Although each of these four factors, time management, learning style, achievement motivation, and learning environment, has substantial individual support in the literature, studies rarely test their relative and joint contribution within a single statistical model, particularly among Indonesian pre-service teacher-education students, whose future professional competence depends in part on the study and self-regulation habits they develop during their own higher education. This study addresses that gap by examining the combined and partial effects of time management, learning style, achievement motivation, and learning environment on the academic achievement of Office Administration Education students (2023 cohort) at Universitas Negeri Makassar.

METHODS

This study used a quantitative correlational design to examine the relationship between time management (X1), learning style (X2), achievement motivation (X3), and learning environment (X4) as independent variables, and academic achievement (Y) as the dependent variable. The population and sample were Office Administration Education students of the 2023 cohort at Universitas Negeri Makassar, with data collected from 36 respondents through a self-administered questionnaire.

Each variable was measured using 10 Likert-scale items. Item validity was assessed using Pearson product-moment correlation, comparing each item's calculated r-value against the critical r-table value (0.329 for n = 36, df = 34, $\alpha = 0.05$); items with r-count below r-table were treated as invalid and excluded from further analysis. Reliability was assessed using Cronbach's alpha, with a value above 0.60-0.70 considered acceptable, consistent with commonly applied thresholds in social science survey research.

Classical assumption tests were performed prior to hypothesis testing: a linearity test using Deviation from Linearity in the ANOVA table for each predictor against academic achievement, a normality test using the one-sample Kolmogorov-Smirnov test applied to each variable, and a multicollinearity test using the Variance Inflation Factor (VIF), with VIF < 10 indicating no multicollinearity. Because normality was assessed for each variable individually rather than for the residuals of the fitted regression model, the more conventional approach for verifying the assumptions underlying multiple linear regression, the normality results below should be interpreted with this scope in mind. Hypotheses were tested using Pearson correlation analysis and multiple linear regression analysis, comparing calculated r and F values against their respective critical table values at $\alpha = 0.05$ (r-table = 0.320 for the correlation analysis, computed for n = 36). All statistical procedures were carried out using IBM SPSS Statistics.

RESULT AND DISCUSSION

This section reports the validity and reliability testing, descriptive statistics, classical assumption tests, and correlation and regression analyses for the four predictors examined in this study.

1. Validity and Reliability

Validity testing on 36 respondents (r-table = 0.329, df = 34, $\alpha = 0.05$) found one invalid item in the time management (X1) instrument (item 4), two invalid items in the learning style (X2) instrument

(items 7 and 8), no invalid items in the achievement motivation (X3) instrument, one invalid item in the learning environment (X4) instrument (item 9), and one invalid item in the academic achievement (Y) instrument (item 7). All other items were retained as valid. Reliability testing (Table 1) found Cronbach's alpha values of 0.744 (X1), 0.726 (X2), 0.757 (X3), 0.695 (X4), and 0.728 (Y); all were treated as reliable using a 0.60-0.70 threshold common in social science research, though X4's value (0.695) falls just below the stricter 0.70 benchmark and should be read as marginally, rather than comfortably, reliable.

Table 1: Validity and Reliability Summary

Variable	Invalid Items	Cronbach's Alpha	Decision
Time Management (X1)	1 (item 4)	0.744	Reliable
Learning Style (X2)	2 (items 7, 8)	0.726	Reliable
Achievement Motivation (X3)	0	0.757	Reliable
Learning Environment (X4)	1 (item 9)	0.695	Marginally reliable
Academic Achievement (Y)	1 (item 7)	0.728	Reliable

Source: SPSS output

1. Descriptive Statistics

Descriptive statistics indicated that time management, learning style, achievement motivation, and learning environment (X1-X4) all fell predominantly in the "good" category, while academic achievement (Y) fell predominantly in the "fair" category, based on each variable's dominant frequency interval (interval width of 8, computed from a possible range of 10-50 across 10 five-point items).

2. Classical Assumption Tests

The normality test found Asymp. Sig. (2-tailed) values above 0.05 for time management (0.157), achievement motivation, learning environment, and academic achievement, indicating normally distributed data for these variables. Learning style was the exception, with Asymp. Sig. = 0.016 (< 0.05), indicating that this variable was not normally distributed.

The multicollinearity test found VIF values of 1.990 (X1), 1.684 (X2), 1.965 (X3), and 1.125 (X4), all below the threshold of 10, indicating that the four predictors are free from multicollinearity and can be used together in the regression model.

Table 2: Linearity Test (Deviation from Linearity)

Relationship	Sig.	F (count vs. table)	Conclusion
Y * X1 (Time Management)	0.475	1.016 < 2.22	Linear
Y * X2 (Learning Style)	0.010	3.123 > 2.24	Not linear
Y * X3 (Achievement Motivation)	0.700	0.768 < 2.25	Linear
Y * X4 (Learning Environment)	0.449	1.030 < 2.25	Linear

As shown in Table 2, three of the four predictors (time management, achievement motivation, learning environment) satisfied the linearity assumption, with Deviation from Linearity significance values above 0.05 and F-count values below their respective F-table critical values. Learning style (X2) did not satisfy this assumption: its Deviation from Linearity significance was 0.010 (below 0.05), and its F-count (3.123) exceeded the F-table critical value (2.24 for df = 11, 23), together indicating a statistically significant deviation from linearity.

3. Correlation Analysis

Pearson correlation analysis (Table 3) shows that time management, achievement motivation, and learning environment were each significantly, moderately correlated with academic achievement, while learning style showed only a weak, non-significant correlation ($r = 0.202$, $p = 0.237$).

Table 3: Pearson Correlation between Predictors and Academic Achievement

Variable	r	Sig. (2-tailed)	Strength	Conclusion
Time Management (X1)	0.436	0.008	Moderate	Significant
Learning Style (X2)	0.202	0.237	Weak	Not significant
Achievement Motivation (X3)	0.448	0.006	Moderate	Significant
Learning Environment (X4)	0.352	0.035	Weak-moderate	Significant

Source: SPSS output

4. Multiple Linear Regression Analysis

The multiple regression model (Table 4) produced $R^2 = 0.31$, indicating that time management, learning style, achievement motivation, and learning environment together explain 31% of the variance in academic achievement, with the remaining 69% explained by other variables outside this model. The ANOVA test produced $F(4, 31) = 3.476$ with a significance value of 0.019 ($p < 0.05$). Because the F-count (3.476) exceeds the F-table (df1 = 4, df2 = 31, F-table = 2.68), the regression model is statistically significant, meaning that the four predictors jointly influence academic achievement.

Table 4: Model Summary and ANOVA for the Regression Model

R Square	F	df1, df2	F-table	Sig.
0.31	3.476	4, 31	2.68	0.019

Source: SPSS output

At the partial level, achievement motivation contributed the largest share of the explained variance (15.0%, from standardized $\beta = 0.336 \times r = 0.448$), followed by time management (11.3%, $\beta = 0.260 \times r = 0.436$) and learning environment (8.9%, $\beta = 0.253 \times r = 0.352$). Learning style contributed negatively (-4.2%, $\beta = -0.212 \times r = 0.202$), consistent with its weak, non-significant bivariate correlation and its failure to satisfy the linearity assumption. These four contributions sum to approximately 31%, matching the model's R^2 (0.113 - 0.042 + 0.150 + 0.089 = 0.310).

Table 5: Effective Contribution of Each Predictor to R^2

Variable	Standardized Beta	r	Contribution (β × r)
Time Management (X1)	0.260	0.436	11.3%
Learning Style (X2)	-0.212	0.202	-4.2%
Achievement Motivation (X3)	0.336	0.448	15.0%
Learning Environment (X4)	0.253	0.352	8.9%

Source: computed by the authors from the standardized coefficients and correlations

The regression model can be expressed as follows:

$$\hat{Y} = 40.899 + 0.219X_1 - 0.202X_2 + 0.268X_3 + 0.289X_4 + \varepsilon$$

The constant value of 40.899 represents the predicted value of the dependent variable when all independent variables (X_1, X_2, X_3, and X_4) are equal to zero. The regression coefficients indicate the direction and magnitude of the relationship between each independent variable and the dependent variable, while holding the other variables constant. Specifically, a one unit increase in X_1 is associated with a 0.219 unit increase in the predicted dependent variable. In contrast, a one unit increase in X_2 is

associated with a 0.202 unit decrease in the predicted dependent variable. Meanwhile, a one unit increase in X_3 and X_4 is associated with increases of 0.268 and 0.289 units, respectively, in the predicted dependent variable.

The coefficient of determination ($R^2 = 0.31$) indicates that the four independent variables collectively account for 31% of the variance in the dependent variable. The remaining 69% of the variance is attributable to factors not included in the model and other sources of unexplained variation. This unexplained component is represented by the error term (ε). Based on the coefficient of determination, the residual path coefficient can be calculated as $\sqrt{(1 - R^2)} = \sqrt{(1 - 0.31)} = 0.831$. Thus, the residual coefficient of 0.831 reflects the contribution of factors outside the specified model to variation in the dependent variable.The significant, positive relationship found between achievement motivation and academic achievement, and its status as the single largest contributor to explained variance in this model, is well aligned with the literature identifying achievement motivation as a central, high-confidence predictor of academic performance, one that frequently mediates the effects of other classroom and institutional factors on achievement (Lavrijsen et al., 2022; Dang et al., 2025). This is consistent with the broader view that motivation functions as a foundational driver of the engagement, persistence, and goal-directed effort that translate ability and opportunity into actual academic outcomes (Bayoumy & Alsayed, 2021; Zhong et al., 2023).

Time management's significant, moderate correlation and its second-largest contribution to the model (11.3%) is similarly consistent with a substantial body of evidence linking effective time management, planning, prioritizing, and efficient study-time allocation, to higher academic achievement across educational levels, with time-management interventions shown to directly improve outcomes, particularly in the flexible, self-directed scheduling environment typical of university study (Razali et al., 2018; Baniaghil et al., 2021; Liu et al., 2026). Learning environment's smaller but still significant contribution (8.9%) is consistent with evidence that a supportive environment, encompassing institutional resources, teacher support, and classroom management, affects achievement both directly and indirectly, including through its influence on procrastination and motivation (Cayubit, 2022; Sun et al., 2023).

Learning style's weak, negative, and non-significant relationship with academic achievement, together with its failure to satisfy the linearity assumption, is broadly consistent with the more mixed and inconsistent evidence base for learning style as a predictor of achievement relative to the other three factors tested. Several studies similarly report no significant, or even a slightly negative, association between learning-style measures and academic performance once other factors are controlled, suggesting that learning style alone, without deliberate alignment between instructional method and individual preference, is a comparatively weak lever for improving achievement (Tan & Laswad, 2015; Shala et al., 2024). The negative sign of learning style's standardized coefficient in this study should be interpreted cautiously, however, given both its statistical non-significance and its documented violation of the linearity assumption, which together suggest the relationship, if any, may not be well captured by a simple linear model.

Overall, this model's combined explanatory power (31% of variance) is consistent with the broader finding that academic achievement is multifactorial and only partially explained by any single set of psychosocial predictors, with a substantial share of variance attributable to factors not captured here, such as prior academic performance, socioeconomic background, or cognitive ability, all of which have been identified elsewhere as substantial independent contributors to achievement (Erdriani et al., 2026; Cui et al., 2023; Carrión-Barco et al., 2024). This reinforces that time management and achievement motivation, while clearly the most actionable levers identified in this study, should be understood as part of a wider constellation of influences on student achievement rather than a complete explanatory account on their own.

CONCLUSION

This study examined the effects of time management, learning style, achievement motivation, and learning environment on the academic achievement of 36 Office Administration Education students

(2023 cohort) at Universitas Negeri Makassar. Time management, achievement motivation, and learning environment were each significantly correlated with academic achievement, while learning style was not and also failed to satisfy the linearity assumption.

The combined regression model was statistically significant and explained 31% of the variance in academic achievement. Achievement motivation was the largest individual contributor (15.0%), followed by time management (11.3%) and learning environment (8.9%), while learning style contributed negatively and negligibly (-4.2%). These findings suggest that efforts to improve academic achievement in this student population should prioritize strengthening achievement motivation and time-management skills specifically, while treating the learning-style measure used here as requiring further methodological refinement, for example by testing non-linear specifications or a validated learning-style instrument, before drawing firm conclusions about its role. Future research is recommended to test the regression's normality assumption on model residuals rather than on each raw variable individually, to replicate this study with a larger sample, and to incorporate additional predictors, such as prior academic performance or socioeconomic background, to account for the substantial share of variance left unexplained by the present model.

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