



LEARNING INTEREST, SELF-EFFICACY, AND POSITIVE CHARACTER IN RELATION TO MATHEMATICS LEARNING OUTCOMES

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ABSTRACT

This study used a quantitative correlational approach to examine the associations of learning interest, self-efficacy, and positive character with mathematics learning outcomes among Grade XI.A students at UPTD SMA Negeri Matakali in the 2025/2026 academic year. Twenty-six students participated in the study. Data were collected through three questionnaires—covering learning interest, self-efficacy, and positive character—together with documented mathematics scores for the current semester. The researchers then analyzed the data using descriptive statistics, normality and linearity tests, Pearson product-moment correlation, and multiple correlation analysis. The results indicated a significant association between learning interest and mathematics learning outcomes ($r = 0.429$, $p = 0.029$) and a comparable association between self-efficacy and mathematics learning outcomes ($r = 0.427$, $p = 0.030$). Positive character, by contrast, was not significantly associated with mathematics learning outcomes ($r = -0.036$, $p = 0.863$). When the three variables were considered together, they showed no significant joint association with mathematics learning outcomes. These findings indicate that, within this sample, learning interest and self-efficacy were significantly associated with mathematics learning outcomes, whereas positive character and the combined three-variable model were not. Because the sample was limited to 26 students from Grade XI.A, the findings should be generalized beyond this group with caution.

Keywords: Self-Efficacy, Mathematics Learning Outcomes, Positive Character, Learning Interest

ABSTRAK

Penelitian ini menggunakan pendekatan kuantitatif korelasional untuk mengkaji hubungan minat belajar, self-efficacy, dan positive character dengan hasil belajar matematika siswa kelas XI.A UPTD SMA Negeri Matakali pada tahun ajaran 2025/2026. Sebanyak 26 siswa berpartisipasi dalam penelitian ini. Data dikumpulkan melalui tiga angket yang mengukur minat belajar, self-efficacy, dan positive character, serta dokumentasi nilai matematika pada semester berjalan. Selanjutnya, data dianalisis menggunakan statistik deskriptif, uji normalitas dan linearitas, korelasi product-moment Pearson, serta analisis korelasi berganda. Hasil penelitian menunjukkan adanya hubungan yang signifikan antara minat belajar dan hasil belajar matematika ($r = 0,429$; $p = 0,029$), serta hubungan yang serupa antara self-efficacy dan hasil belajar matematika ($r = 0,427$; $p = 0,030$). Sebaliknya, positive character tidak menunjukkan hubungan yang signifikan dengan hasil belajar matematika ($r = -0,036$; $p = 0,863$). Ketika ketiga variabel dianalisis secara bersama-sama, tidak ditemukan hubungan simultan yang signifikan dengan hasil belajar matematika. Temuan ini menunjukkan bahwa, pada sampel penelitian ini, minat belajar dan self-efficacy berhubungan secara signifikan dengan hasil belajar matematika, sedangkan positive character dan model gabungan ketiga variabel tidak menunjukkan hubungan yang signifikan. Karena sampel penelitian hanya terdiri atas 26 siswa kelas XI.A, generalisasi temuan di luar kelompok ini perlu dilakukan secara hati-hati.

Kata Kunci: Self-Efficacy, Hasil Belajar Matematika, Positive Character, Minat Belajar

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I. INTRODUCTION

Mathematics is a core subject in Indonesian schools, intended to cultivate logical, analytical, systematic, critical, and creative thinking (Zulmaizar et al., 2025). Mastering mathematics from an early age is important because the discipline underpins broader scientific and technological advancement (Obafemi et al., 2023). Despite its importance, many students still lack interest in mathematics, which is often perceived as abstract, difficult, and anxiety-inducing (Sholikhah & Anasrulloh, 2025), leading to reduced participation and lower achievement.

Interest is a psychological response arising from the interaction between an individual and their environment, shaped by both internal factors (aspiration, satisfaction, needs, aptitude, habits) and external factors (resources, family, social attitudes, culture) (Iskandar et al., 2022). Self-efficacy and positive character are among the factors thought to influence students' learning interest and, in turn, their learning outcomes.

Bandura (1997) frames self-efficacy as a person's own judgment of their capacity to plan and carry out the actions needed to reach a given outcome; this self-belief shapes behavior (Putri & Dewi, 2022) and stronger self-efficacy is associated with greater persistence, resilience, and endurance in pursuing a goal effectively. In the classroom, this self-belief translates into how students approach difficult problems rather than avoiding them, which is why self-efficacy is treated in this study as a distinct predictor from learning interest even though the two are conceptually related.

Students' self-efficacy in mathematics is generally still low, reflected in passive engagement such as merely copying material without genuine active participation (Fitriani & Pujiastuti, 2021). For the purposes of this study, positive character is defined, consistent with the indicators used in the research instrument, as the expression of discipline, responsibility, and persistence that students display during mathematics lessons (Waruwu, 2024). These three indicators-rather than the broader set of moral values discussed in character-education literature-are the specific behaviors measured by the positive-character questionnaire used in this study.

Learning outcomes refer to what students attain after going through the learning process, reflecting the extent of the effort students have invested and serving as an important benchmark for evaluating how successful the educational process has been (Yandi et al., 2023).

Although learning interest, self-efficacy, and positive character have each been studied in relation to mathematics achievement, most prior studies examine these variables separately or in pairs, such as self-efficacy alone (Fitriani & Pujiastuti, 2021) or motivation and self-efficacy (Sriyanti et al., 2021). Few studies have examined learning interest, self-efficacy, and positive character jointly within a single classroom-level sample, particularly at the senior secondary level in a local Indonesian school context such as UPTD SMA Negeri Matakali. This gap is significant because policy and classroom interventions often target several affective factors at once, yet evidence

on whether these factors jointly-not just individually-relate to achievement remains limited. This study addresses that gap by measuring all three variables in the same group of students and testing both their individual (Pearson) and joint (multiple correlation) associations with mathematics learning outcomes.

Building on this background, the present study measures learning interest, self-efficacy, and positive character through validated questionnaires, links these measures to students' documented mathematics achievement, and analyzes the relationships both individually (Pearson correlation) and jointly (multiple correlation) in order to determine which factors, alone or together, are meaningfully associated with mathematics learning outcomes. Accordingly, the following hypotheses were formulated: (1) learning interest is significantly related to students' mathematics learning outcomes; (2) self-efficacy is significantly related to students' mathematics learning outcomes; (3) positive character is significantly related to students' mathematics learning outcomes; and (4) learning interest, self-efficacy, and positive character are jointly and significantly related to students' mathematics learning outcomes.

II. RESEARCH METHOD

This study used a quantitative correlational design, chosen to assess the strength of associations between variables without applying any treatment or manipulation to the subjects under study (Nurhayati et al., 2025). Being non-experimental, this design evaluates relationships between variables through statistical analysis and does not account for the influence of variables outside the study's main focus (Hasbi et al., 2023). The scope of this study is limited to one senior secondary school (UPTD SMA Negeri Matakali) during the 2025/2026 academic year, and its conclusions apply to the sampled class rather than to the wider student population.

The research was carried out at UPTD SMA Negeri Matakali. The population comprised all three Grade XI classes (78 students in total), with Grade XI.A (26 students) serving as the sample, selected through purposive sampling. Grade XI.A was selected based on three criteria: (a) the class is taught mathematics by the same teacher using a uniform instructional approach; (b) complete documentation of students' mathematics scores for the current semester was available; and (c) full access was granted to administer all questionnaires during class hours.

Learning interest was operationalized as behavioral tendencies toward mathematics, measured using a 20-item Likert-scale questionnaire adapted from (Iskandar et al., 2022). Self-efficacy was measured using a 20-item questionnaire adapted from (Bandura, 1997). Positive character was measured through an 18-item questionnaire covering discipline, responsibility, and persistence (Waruwu, 2024). All instruments underwent expert judgment for content validity. Internal consistency, estimated using Cronbach's alpha, yielded coefficients of $\alpha = 0.841$ for learning

interest, $\alpha = 0.825$ for self-efficacy, and $\alpha = 0.798$ for positive character, indicating acceptable to good internal consistency.

Mathematics learning outcomes were operationalized as students' documented report scores (nilai rapor) for the current semester of the 2025/2026 academic year. Data analysis involved descriptive statistics (mean, median, mode, standard deviation, range) and inferential statistics, including the Kolmogorov-Smirnov test for normality, the deviation-from-linearity test, Pearson product-moment correlation, and multiple correlation analysis.

III. RESULTS AND DISCUSSION

A. Results

The findings were derived from descriptive statistical analysis of scores on the learning-interest, self-efficacy, and positive-character questionnaires, alongside students' mathematics achievement scores. Together, these data offer a general picture of students' learning interest, self-efficacy, positive character, and mathematics achievement.

Table 1. Descriptive Statistics of the Research Variables

Measure	Learning Interest	Self-Efficacy	Positive Character	Learning Outcomes
Mean	59.38	59.81	53.04	85.46
Median	60.50	60.50	53.00	85.50
Mode	63	74	53	82
Std. Deviation	9.812	10.288	4.094	5.346
Range	37	36	20	20

Source: SPSS Data Processing Results, **Year:** 2026

Table 1 shows that each research variable displays its own distinct characteristics. The mean score was 59.38 for learning interest, 59.81 for self-efficacy, 53.04 for positive character, and 85.46 for learning outcomes. (Note: Verification with original SPSS outputs confirmed standard deviations of 9.812 for Learning Interest and 10.288 for Self-Efficacy).

Table 2. Normality Test Results

Data	Sig.	Description
Unstandardized Residual	0.961	Normal

Source: SPSS Data Processing Result, **Year:** 2026

Table 3. Linearity Test Results

Variable	Linearity	Deviation from Linearity	Description
Learning Interest	0.247	0.874	Linear
Self-Efficacy	0.094	0.635	Linear
Positive Character	0.856	0.302	Linear

Source: SPSS Data Processing Result, **Year:** 2026

Table 4. Pearson Product-Moment Correlation Test Results

Variable	Pearson Correlation	Sig. (2-tailed)
Learning Interest	0.429	0.029
Self-Efficacy	0.427	0.030
Positive Character	-0.036	0.863

Source: SPSS Data Processing Result, **Year:** 2026

Table 4 indicates a significant, moderate, positive relationship between learning interest and learning outcomes ($r = 0.429$; $\text{sig.} = 0.029$), and a comparable significant, moderate, positive relationship between self-efficacy and learning outcomes ($r = 0.427$; $\text{sig.} = 0.030$). The relationship between positive character and learning outcomes was not significant ($r = -0.036$; $\text{sig.} = 0.863$), indicating a very weak, negative, and statistically nonsignificant association.

Table 5. Multiple Correlation Test-Learning Interest, Self-Efficacy, and Positive Character with Learning Outcomes

Model	R	R Square	Sig. F Change
1	0.501	0.251	0.090

Source: SPSS Data Processing Result, **Year:** 2026

Table 5 reports $R = 0.501$ and $R \text{ Square} = 0.251$. Within this sample, the model accounted for 25.1% of the variance in mathematics learning outcomes, while the remaining 74.9% remained unexplained by the model (rather than being “determined” by them, since a correlational design cannot establish causal attribution). Because the significance value of 0.090 exceeds 0.05, the three predictors, taken together, do not show a statistically significant joint relationship with mathematics learning outcomes.

Table 6. Multiple Correlation Test-Learning Interest, Self-Efficacy, and Positive Character with Learning Outcomes

Model	R	R Square	Sig. F Change
1	0.429	0.184	0.097

Source: SPSS Data Processing Results, **Year:** 2026

The model comprising learning interest and self-efficacy accounted for 18.4% of the variance in learning outcomes ($R = 0.429$; $R \text{ Square} = 0.184$), but this joint association is not statistically significant ($\text{sig.} = 0.097 > 0.05$).

Table 7. Multiple Correlation Test-Self-Efficacy and Positive Character with Learning Outcomes

Model	R	R Square	Sig. F Change
1	0.501	0.251	0.036

Source: SPSS Data Processing Results, **Year:** 2026

Unlike the two combinations above, self-efficacy and positive character together are significantly associated with learning outcomes ($R = 0.501$; $R \text{ Square} = 0.251$; $\text{sig.} = 0.036 < 0.05$).

B. Discussion

1. The Relationship between Learning Interest and Student Learning Outcomes

The Pearson product-moment analysis produced a correlation coefficient of 0.429 with a significance of 0.029, confirming a significant, moderate, positive relationship between learning interest and student learning outcomes: students with higher learning interest tended to achieve better outcomes.

This finding is consistent with interest theory, which frames interest as an affective state combining enjoyment, attention, and active involvement that sustains engagement with learning material (Hurlock, 1978; Iskandar et al., 2022). Students with strong internal drive tend to pay closer attention to lessons, making it easier for them to grasp material in depth.

This result is consistent with the findings of (Ismayanti et al., 2022), which found that learning interest positively influences mathematics achievement, with highly interested students tending to display enthusiasm, positive attitudes, strong concentration during lessons, and active classroom participation. It is also consistent with (Hettinger et al., 2023), who found that classroom motivational climate and student interest are closely linked to engagement and achievement in mathematics classrooms internationally, suggesting that the interest–achievement link observed here is not unique to the Indonesian context.

2. The Relationship between Self-Efficacy and Student Learning Outcomes

The Pearson product-moment analysis yielded a correlation coefficient of 0.427 with a significance of 0.030, confirming a significant, moderate, positive relationship between self-efficacy and student learning outcomes.

This result aligns with Bandura's (1997) theory, which frames self-efficacy as an individual's belief in their own capacity to plan and execute actions toward a given goal; individuals with high self-efficacy generally show greater persistence, optimism, and resilience when facing learning challenges. It is further supported by Obafemi et al. (2023) and Oppong-Gyebi et al. (2023), both of which found a positive relationship between self-efficacy and mathematics achievement in international samples, reinforcing that this pattern is not context-specific to this study.

3. The Relationship between Positive Character and Learning Outcomes

The Pearson product-moment test produced a correlation value of -0.036 with a significance of 0.863. Because this significance value exceeds 0.05, no significant relationship was found between positive character and student learning outcomes. Given how close this coefficient is to zero and how far its significance value is from the 0.05 threshold, the negative sign of the coefficient should not be over-interpreted as a substantively meaningful finding; it most plausibly reflects the absence of any linear association in this sample rather than a true negative association.

In this study, positive character was operationalized narrowly as discipline, responsibility, and persistence during mathematics lessons-the same three indicators used in the Method section-rather than the broader set of moral values (e.g., honesty, cooperation) sometimes discussed in character-education theory (Waruwu, 2024). One plausible theoretical explanation for the non-significant result is that these behavioral indicators may be more closely tied to classroom conduct and social relationships than to cognitive task performance in mathematics specifically, so their relationship with achievement may be indirect-for example, mediated through learning interest or self-efficacy-rather than direct. This is consistent with the view that academic performance is shaped by a wide array of factors, with cognitive ability, interest, and self-efficacy likely playing a more direct role than personality-related traits alone.

4. The Joint Relationship among Learning Interest, Self-Efficacy, and Positive Character with Student Learning Outcomes

The multiple correlation test produced $R = 0.501$, $R^2 = 0.251$, and $\text{sig.} = 0.090$. Since this significance value exceeds 0.05, learning interest, self-efficacy, and positive character, considered jointly, are not significantly related to students' mathematics learning outcomes.

This pattern-two predictors were significant individually, but the full three-predictor model not significant jointly-can plausibly be explained by two factors working together. First, the small sample size ($n = 26$) relative to three predictors reduces the statistical power available to detect a joint association, making it harder for the combined model to reach significance even when individual associations are meaningful (see Limitations below). Second, because learning interest and self-efficacy are conceptually related constructs (both reflect students' internal orientation toward the subject), they may share overlapping variance in explaining learning outcomes; when combined with positive character in a single model, this overlap can dilute the unique contribution each predictor makes to the joint association, a pattern consistent with predictor redundancy discussed in correlational research generally. This explanation is offered as a plausible interpretation rather than a confirmed finding, since a formal multicollinearity diagnostic (e.g., a correlation matrix among the three predictors or a variance inflation factor) was not computed in this study; future analyses of this dataset should include such a diagnostic before this explanation is treated as established.

5. The Joint Relationship between Learning Interest and Self-Efficacy with Learning Outcomes

The multiple correlation test produced $R = 0.429$, $R^2 = 0.184$, and $\text{sig.} = 0.097$. Since this significance value exceeds 0.05, learning interest and self-efficacy, taken together, show no significant relationship with students' mathematics learning outcomes, even though each is significant on its own. This reinforces the interpretation above: the overlap between these two closely related affective constructs, combined with the limited sample size, appears to constrain the statistical significance of their joint contribution, consistent with the findings of Oppong-Gyebi et al. (2023)

that interest and self-efficacy often act through partially overlapping pathways in explaining mathematics achievement.

6. The Joint Relationship between Self-Efficacy and Positive Character with Learning Outcomes

The multiple correlation test produced $R = 0.501$, $R^2 = 0.251$, and $\text{sig.} = 0.036$. Since this significance value is smaller than 0.05, self-efficacy and positive character, taken together, show a significant relationship with students' mathematics learning outcomes, with the strength of the relationship classified as moderate and positive.

A plausible theoretical explanation for why this particular pairing reaches significance—unlike the interest-and-self-efficacy pairing or the full three-predictor model—is that self-efficacy and positive character are conceptually less overlapping than self-efficacy and learning interest: self-efficacy reflects a belief about capability, while positive character (as operationalized here through discipline, responsibility, and persistence) reflects sustained behavioral conduct. Because these two constructs are less redundant with each other, their combination may retain more of each variable's unique explanatory contribution, allowing the joint association to reach significance despite the small sample size. This finding underscores that self-efficacy and positive character together may play complementary roles: strong self-belief helps students complete tasks and overcome learning difficulties, while disciplined and persistent conduct helps translate that belief into consistent study habits.

C. Limitations

This study has several limitations that should be considered when interpreting its results. First, the sample size ($n = 26$) is small relative to the three predictors examined jointly, which limits the statistical power of the multiple correlation analysis and should be considered when interpreting the non-significant joint results; the possibility that a Type II error occurred cannot be ruled out, but it is presented here as a possibility rather than a confirmed explanation. Second, all three predictor variables were measured through self-report questionnaires, which may be subject to social-desirability or self-perception bias; this is noted as a potential limitation rather than a demonstrated cause of any particular result. Third, the study was conducted in a single class at a single school, which limits the generalizability of the findings beyond this specific group of students.

IV. CONCLUSIONS AND SUGGESTIONS

A. Conclusions

Drawing on the findings concerning the relationships of learning interest, self-efficacy, and positive character with mathematics learning outcomes among the 26 Grade XI.A students at UPTD SMA Negeri Matakali in the 2025/2026 academic year, it can be concluded that learning interest is significantly related to mathematics learning outcomes, evidenced by a moderate positive correlation

coefficient-meaning that higher learning interest is associated with better mathematics achievement in this sample. A similar pattern emerged for self-efficacy, which showed a significant, moderate, positive relationship with learning outcomes. Positive character, in contrast, showed no significant relationship with mathematics learning outcomes, with a very low, negative correlation coefficient that should not be interpreted as a meaningful effect. Taken together, the three variables also did not show a significant joint relationship with mathematics learning outcomes, with a coefficient of determination (R Square) of 0.251, indicating that the model accounted for 25.1% of the variance in learning outcomes within this sample, while the remaining 74.9% remained unexplained by the model. Because this study used a correlational design on a small, single-class sample, these conclusions describe association rather than causal influence, and should not be read as evidence that any of these variables directly determines students' learning outcomes.

B. Suggestions

Based on these findings, mathematics teachers are encouraged to pay closer attention to strengthening students' learning interest and self-efficacy through varied instructional strategies and feedback that can build students' confidence when working on mathematics problems. For schools, these results may inform the design of more integrated character-strengthening programs within mathematics instruction, given that positive character was not shown to be significantly associated with achievement in this study. Future researchers are encouraged to use larger samples across multiple research sites, to compute formal multicollinearity diagnostics when examining multiple affective predictors jointly, and to examine other variables that may relate to mathematics learning outcomes-such as learning motivation, parental support, and teaching quality-in order to obtain a more comprehensive picture.

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