

# Parenting Practices, Student Engagement, and Motivation as Influence of Academic Performance: A Mediation Analysis

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## ABSTRACT

This study investigated the extent to which parenting practices, student engagement, and motivation predict academic performance among students and examined whether parenting practices mediate the relationship between student engagement and motivation, and academic performance. A total of 182 Grade 10 students participated in the study, completing validated instruments that measured parenting practices, engagement, motivation, and academic performance indicators. Using survey data and regression-based mediation analysis, the study tested whether student engagement and motivation mediate the relationship between parenting practices and academic performance. Results showed that student engagement significantly predicted academic performance, indicating a direct positive effect on Mathematics achievement. However, parenting practices did not significantly mediate the relationships between engagement and academic performance or between motivation and academic performance. Although students reported generally high engagement and motivation and moderate parenting support, no significant indirect effects were found in the mediation model. Overall, the findings suggest that academic performance in Mathematics is more strongly influenced by direct student engagement than by parenting-mediated pathways. The study highlights the importance of instructional strategies that promote active participation and sustained engagement in improving academic outcomes.

**Keywords:** student engagement, student motivation, parenting practices, academic performance, mathematics education

## INTRODUCTION

Mathematics education remains a critical concern in basic education due to persistent challenges in student achievement. Research shows that student engagement and motivation are significant predictors of academic performance, as they influence learners' effort, participation, and persistence in learning tasks (Kang and Wu, 2022). Likewise, parenting practices play an important contextual role, as supportive home environments can enhance students' engagement and motivation, thereby influencing academic outcomes (Camillo & Balandra, 2022). From a reciprocal interaction perspective, student behavior may also influence parenting practices, such that highly engaged learners may elicit greater parental monitoring, support, and involvement as parents respond to observable academic behaviors (Bandura, 1986). This suggests that parenting is not only a predictor of academic outcomes but may also function as a responsive mechanism shaped by student engagement.

However, findings on the direct and indirect effects of parenting practices remain inconsistent, particularly when engagement and motivation are considered as mediating variables. In Mathematics, where learners often encounter abstract concepts and problem-solving difficulties, these factors become especially important in explaining variations in academic performance (Kang & Wu, 2022; Bacat et al., 2025).

In the Philippine context, particularly among Grade 10 students, Mathematics continues to be one of the most challenging subjects, with learners showing varying levels of performance despite instructional interventions (Apelo, 2024). This suggests the need to further examine how parenting practices, engagement, and motivation interact in influencing academic outcomes.

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## LITERATURE REVIEW

### Student Engagement and Academic Outcomes

Student engagement refers to learners' active involvement in academic tasks, encompassing behavioral, emotional, and cognitive dimensions, and is widely recognized as a key factor in predicting academic achievement. It is characterized by students' participation, effort, persistence, and cognitive investment in learning activities, all of which contribute to improved academic performance in school settings (Fredricks et al., 2004; Reeve & Tseng, 2011).

### Motivation and Academic Performance

Academic motivation represents the internal drive that influences students' willingness to initiate and sustain learning behaviors. It is considered a key psychological determinant of academic success, as motivated learners tend to demonstrate greater persistence, effort, and self-regulation in academic tasks (Wigfield & Eccles, 2000; Steinmayr et al., 2019). Research consistently shows that academic motivation is positively associated with academic performance, particularly in Mathematics, where sustained effort and persistence are essential for mastering complex concepts (Wu et al., 2022; Kang & Wu, 2022). In addition, studies highlight a strong relationship between motivation and student engagement, suggesting an interactive process in which motivated learners are more likely to actively participate, invest effort, and persist in learning activities that enhance achievement outcomes (Dogan, 2015; Reeve & Tseng, 2011). However, findings also indicate that the strength of this relationship may vary depending on contextual, instructional, and individual factors, implying that motivation alone may not always guarantee higher academic performance (Kaliisa et al., 2023).

### Parenting Practices and Academic Achievement

Parenting practices encompass the behaviors, support systems, and home learning environments that caregivers provide to facilitate children's academic development. A substantial body of meta-analytic evidence consistently demonstrates that parental involvement, particularly in the form of academic support, supervision, and high educational expectations, is positively associated with students' academic achievement across different educational levels (Castro et al., 2015; Jeynes, 2005). These findings suggest that students who experience greater parental engagement tend to perform better academically due to increased academic support and motivation at home. However, research also indicates that the strength of these relationships may vary depending on the type of parental involvement and contextual factors such as socioeconomic status, family background, and cultural setting, highlighting the complexity of how parenting influences academic outcomes (Castro et al., 2015; Sirin, 2005; Jeynes, 2016).

### Mediating Pathways Among Parenting, Engagement, and Motivation

Although the direct relationships among parenting practices, student engagement, motivation, and academic achievement are well established in the literature, evidence regarding their mediating mechanisms remains limited and inconsistent. Mediation studies suggest that parenting practices influence academic outcomes indirectly by shaping students' psychological and behavioral processes, particularly engagement and motivation (Castro et al., 2015; Jeynes, 2016). Empirical findings further indicate that parental support and involvement are positively associated with higher levels of student engagement, which in turn contributes to improved academic performance (Wang et al., 2024; Fredricks et al., 2004). However, the strength and consistency of these indirect relationships vary across contexts due to differences in measurement approaches, sample characteristics, and study designs, reflecting the complexity of modeling parenting effects.

This variability highlights the need for further empirical investigation into the indirect pathways through which parenting practices operate via engagement and motivation to influence academic performance, particularly in Mathematics, where learners often encounter abstract concepts and higher cognitive demands that may intensify the role of these mediating factors (Kang & Wu, 2022; Sirin, 2005).

Thus, this study investigated the mediating effect of parenting on the relationship between students’ engagement, motivation and Mathematics Academic Performance of the selected Grade 10 students from the five secondary schools of Makilala East District, Schools Division Office of Cotabato.

## METHODOLOGY

This study employed a quantitative descriptive-correlational research design with regression-based mediation analysis to examine the relationships among parenting practices, student engagement, motivation, and academic performance in Mathematics. The study was conducted in five selected public secondary schools in Cotabato, Philippines during the School Year 2025–2026. Participants were Grade 10 students selected through a purposive multi-stage sampling procedure, wherein schools were first identified based on accessibility and willingness to participate, followed by the inclusion of all Grade 10 students within the selected schools. Out of 200 students invited to participate, 182 completed the survey, yielding a response rate of 91%.

Data were collected using a structured questionnaire composed of standardized and adapted measures. Student engagement was assessed in terms of behavioral, emotional, and cognitive dimensions, while motivation was measured through intrinsic motivation, extrinsic motivation, and self-efficacy. Parenting practices were evaluated in terms of monitoring, support, and involvement in academic context. All items were rated on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Sample items included statements such as “I enjoy learning Mathematics” and “My parents encourage me to do my best in Mathematics,”.

The data gathering procedure began after securing ethical clearance from the Graduate School Dean and obtaining permissions from the Schools Division Superintendent, District Supervisor, and school principals. Prior to the main data collection, the instrument underwent expert validation and pilot testing, after which minor revisions were made to improve clarity and reliability. The final questionnaire was administered in printed form during students’ vacant hours with assistance from class advisers to avoid class disruptions.

The dataset was screened for completeness prior to analysis. Missing data were minimal (less than 5%) and randomly distributed; thus, listwise deletion was applied in all inferential analyses. Descriptive statistics, including mean and standard deviation, were used to summarize the data, while Ordinary Least Squares (OLS) regression-based mediation analysis was employed to test the hypothesized relationships at a 0.05 level of significance.

## RESULTS

### Level of Students’ Engagement in Mathematics

**Table 1. Level of Student Engagement in Mathematics in terms of behavioral, emotional, and cognitive dimensions**

Item	Mean	SD	Level
1. Behavioral Engagement	3.75	0.87	High
2. Emotional Engagement	3.39	0.87	Moderate
3. Cognitive Engagement	3.50	0.85	High
<b>Overall</b>	<b>3.50</b>	<b>0.85</b>	<b>High</b>

As shown in Table 1, students demonstrated an overall high level of engagement in Mathematics across behavioral, emotional, and cognitive dimensions, indicating that learners are generally active participants in the learning process. This suggests that engagement is evident in students’ observable classroom behavior, mental effort in learning tasks, and emotional responses toward the subject.

Behavioral engagement emerged as the most prominent dimension, indicating that students consistently show active participation, attention, and effort in Mathematics activities. Cognitive engagement was also highly

evident, reflecting students’ ability to apply thinking strategies, sustain mental effort, and engage in problem-solving processes. However, emotional engagement was comparatively lower, suggesting that students’ interest, enjoyment, and positive feelings toward Mathematics are less developed than their behavioral and cognitive involvement.

Overall, the results indicate that while students are strongly engaged in terms of behavior and thinking processes, their emotional connection to Mathematics is relatively weaker. This implies that enhancing students’ interest and positive emotional experiences in Mathematics may further strengthen their overall engagement

### Students’ Motivation in Mathematics

**Table 2. Extent of Motivation in Mathematics in terms of Intrinsic Motivation, Extrinsic Motivation, and Self-Efficacy**

Item	Mean	SD	Level
1. Intrinsic Motivation	3.37	0.91	Moderate
2. Extrinsic Motivation	3.75	0.75	High
3. Self-Efficacy	3.28	0.84	Moderate
<b>Grand</b>	<b>3.47</b>	<b>0.86</b>	<b>High</b>

As shown in Table 2, students exhibited an overall high level of motivation in Mathematics, indicating generally positive motivational disposition toward learning the subject. This suggests that learners are driven by both internal and external factors that support their engagement in academic tasks.

Among the motivational dimensions, extrinsic motivation was the most dominant, implying that students are largely influenced by external factors such as rewards, grades, and academic requirements. In contrast, intrinsic motivation and self-efficacy were comparatively lower, suggesting that students’ interest in Mathematics and confidence in their own abilities are less strongly developed. Overall, the findings indicate that students’ motivation is more externally driven rather than internally sustained, with implications for strengthening intrinsic interest and self-belief in Mathematics learning.

### Students’ Academic Performance in Mathematics

**Table 3. Level of Academic Performance in Mathematics among Students**

Interval	f	SD	Level
90 – 100	49	26.92	Outstanding
85 – 89	44	24.17	Very Satisfactory
80 – 84	49	26.92	Satisfactory
75 – 79	29	15.93	Fairly Satisfactory
74 – below	11	6.04	Did Not Meet Expectations
<b>n = 182</b>	<b>Mean = 84.57</b>	<b>SD = 6.46</b>	<b>Very Satisfactory</b>

As shown in Table 3, students’ academic performance in Mathematics is generally at a very satisfactory level, indicating that most learners are meeting expected learning competencies in the subject. The distribution of grades shows that a considerable number of students fall within the higher performance categories, reflecting strong academic achievement among a large portion of the respondents. However, there is also a noticeable presence of students in the lower performance levels, suggesting variability in achievement across learners.

The results imply that while students generally perform well in Mathematics, academic achievement is not uniform across all respondents. This variation highlights the need for continued instructional support to sustain high-performing students while also addressing the learning needs of those with lower performance levels.

## Level of Parenting Practices

**Table 4. Level of Parenting Practiced among Students in terms of monitoring, support, and involvement in their academic learning context?**

Item	Mean	SD	Level
1. Monitoring	2.96	1.02	Moderate
2. Support	3.53	1.02	High
3. Involvement in Academic Learning	3.23	1.10	Moderate
<b>Grand</b>	<b>3.24</b>	<b>1.07</b>	<b>Moderate</b>

As shown in Table 4, students' perception of parenting practices in terms of monitoring, support, and involvement is generally at a moderate level, indicating that parental academic guidance is present but not highly intensive across all dimensions. This suggests that parenting practices are inconsistently experienced by students in their academic learning context.

Among the indicators, parental support emerged as the strongest dimension, indicating that students perceive relatively higher emotional, motivational, and academic assistance from parents. In contrast, monitoring and involvement were comparatively lower, suggesting limited parental supervision and less active participation in students' day-to-day academic activities.

The results imply that while parents provide adequate support to learners, their monitoring and direct involvement in academic tasks are not as strongly manifested. This indicates a balanced but not highly intensive level of parenting practices, which may influence how students are guided and supported in their Mathematics learning.

## Mediation of Parenting Between Students' Engagement and Academic Performance and between Students Motivation and Academic Performance

**Table 5. Path Coefficients for the Mediation Model**

Predictor	Path	B	SE	Z	P	95% CI LL	95% CI UL
Student Engagement	Student Engagement → Parenting (a)	0.43	0.09	4.92	< .001	0.26	0.61
	Parenting → Math Proficiency (b)	-0.69	0.94	-0.73	.466	-2.49	1.16
	Student Engagement → Math Academic Performance (c)	3.00	1.02	2.95	.003	0.97	4.98
Student Motivation	Student Motivation → Parenting (a)	-0.13	0.07	-1.75	.081	-0.27	0.01
	Parenting → Math Proficiency (b)	0.32	0.90	0.35	.723	-1.43	2.08
	Student Motivation → Math Academic Performance (c)	0.33	0.72	0.45	.650	-1.13	1.72

Table 5 presents the path coefficients for the mediation model examining the relationships among student engagement, student motivation, parenting practices, and Mathematics academic performance. The results provide evidence of differing patterns of relationships across the two predictor variables in relation to academic performance.

For student engagement, the results show a statistically significant positive relationship with parenting practices ( $B = 0.43, p < .001$ ), indicating that higher levels of engagement are associated with increased parental monitoring, support, and involvement. This suggests that engaged students may elicit stronger parental responsiveness in their academic activities. However, the path from parenting practices to Mathematics performance was not statistically significant ( $B = -0.69, p = .466$ ), indicating that parenting practices do not significantly predict academic performance in this model. Consequently, the indirect effect of student engagement on academic performance through parenting practices is not supported, as the mediation pathway

( $a \times b$ ) is not statistically established. Despite this, student engagement demonstrated a significant direct effect on academic performance ( $B = 3.00, p = .003$ ), suggesting that engagement is a strong direct predictor of Mathematics achievement.

For student motivation, the relationship with parenting practices was not statistically significant ( $B = -0.13, p = .081$ ), although it approached marginal significance. Similarly, parenting practices did not significantly predict Mathematics performance ( $B = 0.32, p = .723$ ), and student motivation did not significantly predict academic performance ( $B = 0.33, p = .650$ ). These findings indicate that student motivation does not exhibit a statistically detectable direct or indirect effect on Mathematics performance within the proposed model.

In conclusion, the mediation analysis provides no empirical evidence supporting parenting practices as a mediating mechanism between student engagement or student motivation and Mathematics academic performance. Instead, student engagement emerges as the only significant predictor of academic performance, highlighting its central role in explaining Mathematics achievement in this context.

**Table 6. Direct, Indirect, and Total Effects of Student Engagement and Motivation on Mathematics Academic Performance Through Parenting**

Predictor	Effect	B	SE	Z	p	95% CI LL	95% CI UL
Student Engagement	Indirect Effect	-0.30	0.42	-0.71	.481	-1.16	0.53
	Direct Effect	3.00	1.02	2.95	.003	0.97	4.98
	Total Effect	2.71	0.95	2.85	.004	0.80	4.55
Student Motivation	Indirect Effect	-0.04	0.14	-0.31	.760	-0.34	0.23
	Direct Effect	0.33	0.72	0.45	.650	-1.13	1.72
	Total Effect	0.28	0.70	0.41	.686	-1.12	1.65

**Note. B = unstandardized coefficient; SE = standard error; CI = confidence interval.**

Table 6 presents the direct, indirect, and total effects of student engagement and student motivation on Mathematics academic performance through parenting practices. The results indicate distinct patterns of relationships between the two predictors and academic performance within the mediation model.

For student engagement, the indirect effect through parenting practices was not statistically significant ( $B = -0.30, p = .481$ ), as the confidence interval included zero. This indicates that parenting practices do not significantly mediate the relationship between student engagement and Mathematics academic performance. In other words, the influence of engagement on academic performance is not transmitted through parenting practices in this model. However, the direct effect of student engagement on academic performance was statistically significant and positive ( $B = 3.00, p = .003$ ), suggesting that higher levels of engagement directly contribute to better Mathematics performance. The total effect was also significant ( $B = 2.71, p = .004$ ), confirming an overall positive association between engagement and academic performance.

For student motivation, the indirect effect through parenting practices was likewise not significant ( $B = -0.04, p = .760$ ), with the confidence interval also including zero. Similarly, both the direct effect ( $B = 0.33, p = .650$ ) and total effect ( $B = 0.28, p = .686$ ) were not statistically significant. These findings suggest that student motivation does not have a statistically detectable influence on Mathematics academic performance in this sample, either directly or indirectly through parenting practices.

Overall, the mediation analysis provides no evidence that parenting practices function as a mediating mechanism between student engagement or student motivation and Mathematics academic performance. Instead, the results highlight student engagement as the only significant predictor of academic performance, indicating that engagement plays a more direct and influential role in Mathematics achievement within the present context.

## CONCLUSION

The findings of this study indicate that student engagement emerged as a significant direct predictor of Mathematics academic performance, suggesting that learners who are more actively and cognitively engaged in

learning tend to achieve higher academic outcomes. This highlights the critical role of engagement as a key determinant of students' success in Mathematics.

In contrast, parenting practices did not provide evidence of a mediating effect between student engagement and academic performance, nor between student motivation and academic performance. Likewise, student motivation did not demonstrate a statistically significant direct or indirect relationship with academic performance within the proposed model. These results suggest that the hypothesized mediation pathways are not supported in the present study.

The results emphasize that student engagement plays a more central role in explaining Mathematics achievement compared to student motivation and parenting practices within this context. The findings contribute to the growing body of literature on academic performance by underscoring the importance of fostering meaningful student engagement in Mathematics learning.

From an educational perspective, these results suggest that instructional strategies that promote active participation, cognitive involvement, and sustained engagement may be more effective in improving Mathematics performance than relying primarily on parental mediation alone. Future research may further explore additional contextual, instructional, or psychological factors that could better explain the mechanisms influencing academic achievement, as well as examine potential moderating variables that may shape these relationships across different learning environments.

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