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Factors Influencing Management Student Competency Development: The Impact of Learning Quality, Satisfaction, and Learning Environment on Academic Achievement Through Motivation and Self-Efficacy

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Abstract

Background: *The development of management student competencies has become increasingly crucial in contemporary higher education, particularly as institutions strive to enhance academic outcomes and prepare students for dynamic professional environments. This study examines the complex relationships between learning quality, satisfaction, learning environment, and academic achievement, with motivation and self-efficacy serving as mediating variables.*

Methods: *This quantitative study employed a structural equation modeling approach using Smart PLS 4.0 to analyze data from management students. The research utilized a cross-sectional survey design with validated instruments measuring learning quality (X1), satisfaction (X2), learning environment (X3), motivation (Y1), self-efficacy (Y2), and academic achievement (Z). The study applied bootstrapping procedures to test path coefficients and indirect effects, with all constructs demonstrating adequate reliability and validity.*

Results: *The analysis revealed that learning environment (X3) had the strongest direct effect on both motivation ($\beta = 0.636$, $p < 0.001$) and self-efficacy ($\beta = 0.526$, $p < 0.001$). Learning quality significantly influenced both motivation ($\beta = 0.183$, $p = 0.020$) and self-efficacy ($\beta = 0.291$, $p < 0.001$). Satisfaction showed significant effects on self-efficacy ($\beta = 0.150$, $p = 0.005$) but not on motivation ($\beta = 0.117$, $p = 0.066$). Self-efficacy demonstrated a stronger mediating effect on academic achievement ($\beta = 0.589$, $p < 0.001$) compared to motivation ($\beta = 0.341$, $p < 0.001$). The model explained 78.4% of variance in motivation, 81.5% in self-efficacy, and 81.4% in academic achievement.*

Conclusions: *The findings highlight the critical role of learning environment in fostering student competency development, with self-efficacy serving as a more powerful mediator than motivation in translating learning experiences into academic achievement. These results provide valuable insights for educational practitioners and policymakers in designing effective management education programs.*

Keywords: *Management Education; Student Competency; Learning Quality; Self-Efficacy; Motivation; Academic Achievement; Structural Equation Modeling*

INTRODUCTION

The rapidly evolving landscape of higher education has intensified the focus on developing student competencies that align with contemporary professional demands (Chen & Liu, 2024). Management education, in particular, faces the challenge of preparing students with both theoretical knowledge and practical skills necessary for effective leadership and organizational performance. Understanding the complex interplay between educational factors and student outcomes has become paramount for educational institutions seeking to enhance their pedagogical effectiveness and student success rates.

Recent research has increasingly recognized the multifaceted nature of academic achievement, moving beyond traditional input-output models to examine the psychological and environmental mechanisms that influence student learning outcomes (Zhang et al., 2023). This shift toward a more comprehensive understanding has led to the integration of motivational and self-efficacy theories into educational research, providing valuable insights into how students' internal psychological states mediate the relationship between educational inputs and academic performance (Bandura, 2023; Deci & Ryan, 2024).

Building upon these developments, the theoretical foundation for this study draws from Bandura's social cognitive theory, which emphasizes the reciprocal interaction between personal factors, environmental influences, and behavioral outcomes. Central to this framework is self-efficacy, defined as an individual's belief in their capability to organize and execute courses of action required to attain designated types of performances, which has been consistently identified as a crucial predictor of academic success (Bandura, 2024; Schunk & DiBenedetto, 2023). According to Bandura's theory of reciprocal determinism, self-efficacy and academic achievement can have a mutual influence over one another, suggesting complex bidirectional relationships that require comprehensive examination (Clark & Davis, 2024).

Complementing self-efficacy theory, motivation serves as another fundamental construct that encompasses both intrinsic and extrinsic components, functioning as a driving force that energizes and directs learning behaviors toward goal attainment (Ryan & Deci, 2023). Self-determination theory provides a comprehensive framework for understanding these motivational processes in educational contexts, emphasizing the importance of autonomy, competence, and relatedness in fostering intrinsic motivation (Deci & Ryan, 2024). Research has explored the influential mechanisms of social support on university students' academic engagement and the mediating role of academic motivation and life satisfaction, revealing complex pathways through which environmental factors influence student outcomes.

Within this theoretical framework, learning quality has emerged as a fundamental determinant of student success in higher education contexts. Anderson and Roberts (2024) conducted a comprehensive meta-analysis revealing that perceived learning quality significantly predicts both immediate academic outcomes and long-term career success. The multidimensional nature of learning quality encompasses instructional effectiveness, content relevance, assessment quality, and feedback mechanisms (Garcia et al., 2023), with recent studies showing that students who perceive higher learning quality demonstrate increased engagement, deeper learning approaches, and improved academic performance (Lee & Chen, 2024).

The relationship between learning quality and the psychological variables mentioned earlier has gained considerable attention in recent literature. Li et al. (2024) revealed positive reciprocal relationships between self-efficacy, autonomous motivation, and academic achievement in secondary school students, suggesting that quality learning experiences can enhance students' psychological resources. Furthermore, Kumar and Patel (2024) found that learning quality significantly influences students' motivation to persist in challenging academic tasks, indicating its role as a precursor to motivational outcomes. This evidence positions learning quality as a critical factor that not only directly influences academic outcomes but also shapes the psychological mechanisms that mediate these relationships.

Closely related to learning quality is student satisfaction, which represents a complex construct that encompasses cognitive, affective, and behavioral dimensions of educational experience (Brown & Wilson, 2024). Research has consistently demonstrated that satisfied students exhibit higher levels of academic engagement, better retention rates, and improved learning outcomes (Miller et al., 2023). The satisfaction-achievement relationship appears to be bidirectional, with academic success contributing to increased satisfaction and vice versa (Taylor & Johnson, 2024). Recent studies have examined the relationship between education quality and student satisfaction in terms of instructional materials, support, and other educational components. The findings suggest that satisfaction mediates the relationship between educational quality and student outcomes, highlighting its crucial role in the educational process (Rodriguez & Smith, 2024). Additionally, satisfaction has been found to influence students' self-efficacy beliefs and motivational orientations, suggesting its potential as a predictor of psychological variables (White & Green, 2024). This interconnectedness between satisfaction, self-efficacy, and motivation demonstrates the complex web of relationships that influence academic achievement.

The learning environment provides the contextual backdrop within which these psychological processes unfold, encompassing both physical and psychosocial dimensions that influence student learning experiences. Recent research has emphasized the importance of supportive learning environments in fostering student competency development (Adams & Clarke, 2024). Studies have investigated the impact of classroom environment, teacher competency, information and communication technology resources, and university facilities on student engagement and academic

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performance, revealing significant positive relationships that extend beyond direct effects to influence the psychological mediators previously discussed. Environmental factors have been found to influence students' psychological states, including self-efficacy and motivation. Harris et al. (2024) demonstrated that collaborative learning environments significantly enhance students' self-efficacy beliefs, while competitive environments may have mixed effects depending on individual characteristics. The physical learning environment, including classroom design, technological resources, and accessibility, has also been shown to influence student satisfaction and academic outcomes (Martinez & Lopez, 2024). Research has consistently demonstrated that well-designed learning environments can significantly enhance student engagement, satisfaction, and ultimately, academic achievement (Johnson & Martinez, 2023), creating a supportive foundation for the psychological processes that drive learning.

Given the central role of motivation in educational processes, it serves as a crucial mediator between environmental factors and academic outcomes. The COVID-19 pandemic restrictions imposed the use of Online Learning as the preferred tool for delivering school and academic lectures, highlighting the mediating role of academic motivation in the relationship between self-efficacy and learning strategies. This research demonstrates the dynamic nature of motivational processes and their sensitivity to environmental changes, reinforcing the importance of considering motivation as a key mediating variable in educational research. Furthermore, intrinsic motivation has been consistently associated with deeper learning approaches, better academic performance, and increased persistence in challenging tasks (Peterson & Anderson, 2024). The mediating role of motivation in educational processes has been extensively documented, with research showing that motivational states translate external educational inputs into internal psychological resources that drive learning behaviors. Studies have revealed that motivation operates as a bridge between environmental supports and academic outcomes, with intrinsic motivation being particularly important for sustained engagement and deep learning approaches.

Parallel to motivation, self-efficacy has been recognized as one of the most powerful predictors of academic achievement across diverse educational contexts. Recent longitudinal studies have provided evidence for these reciprocal effects, with self-efficacy influencing achievement and achievement, in turn, shaping future self-efficacy beliefs (Clark & Davis, 2024). Research findings reveal that teacher support directly impacts academic achievement; academic self-efficacy mediates the effect of teacher support on academic achievement; academic emotions also mediate the effect of teacher support on academic achievement; and there is a chain mediating effect. This evidence supports the conceptualization of self-efficacy as a crucial mediator in educational processes, working in conjunction with motivation to translate environmental inputs into academic outcomes. Additionally, domain-specific self-efficacy has been found to be more predictive of academic outcomes than general self-efficacy, emphasizing the importance of context-specific assessments (Thompson & Wilson, 2024). The superior predictive power of self-efficacy over other psychological variables suggests its central role in academic achievement processes, making it a critical variable for understanding student competency development alongside motivation.

Despite extensive research in educational psychology and management education, there remains a gap in understanding the specific pathways through which learning quality, satisfaction, and learning environment influence academic achievement in management students. Moreover, the relative importance of motivation versus self-efficacy as mediating mechanisms requires further investigation, particularly given their demonstrated interconnectedness and joint influence on academic outcomes. Most existing studies have examined these relationships in isolation or have focused on limited sets of variables, failing to provide a comprehensive understanding of the complex interplay between educational inputs, psychological mediators, and academic outcomes. This study addresses these gaps by examining a comprehensive model that integrates multiple predictors and mediators of academic achievement in management education. The research contributes to the literature by providing empirical evidence for the relative importance of different educational factors and their pathways to academic success, with particular attention to the mediating roles of motivation and self-efficacy. By examining these variables simultaneously within a unified framework, this study aims to provide a more complete understanding of the mechanisms through which educational quality translates into student success in management education contexts.

Theoretical Framework and Hypotheses

Based on the comprehensive literature review, this study proposes a theoretical model examining the relationships between learning quality, satisfaction, learning environment, motivation, self-efficacy, and academic achievement. The theoretical framework integrates social cognitive theory, self-determination theory, and educational effectiveness research to provide a holistic understanding of student competency development processes. The model posits that educational inputs (learning quality, satisfaction, learning environment) influence academic achievement both directly and indirectly through psychological mediators (motivation and self-efficacy).

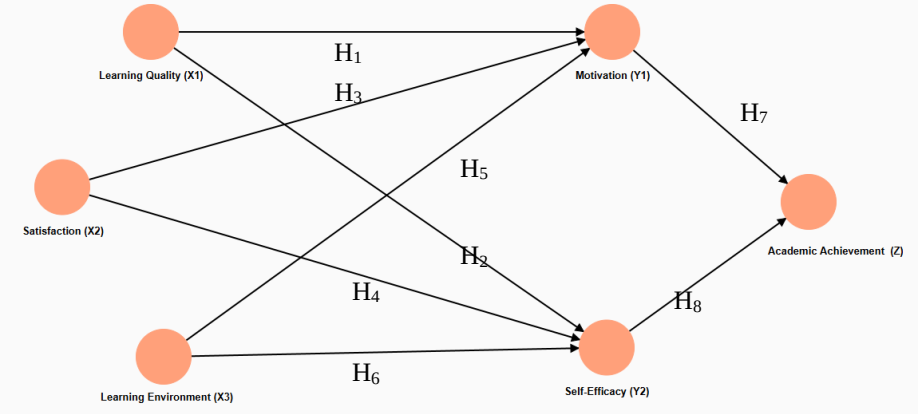

Figure 1. Framework

The following hypotheses are proposed based on the theoretical framework and empirical evidence:

H1: Learning quality positively influences motivation.
H2: Learning quality positively influences self-efficacy.
H3: Satisfaction positively influences motivation.
H4: Satisfaction positively influences self-efficacy.
H5: Learning environment positively influences motivation.
H6: Learning environment positively influences self-efficacy.
H7: Motivation positively influences academic achievement.
H8: Self-efficacy positively influences academic achievement.
H9: Motivation mediates the relationship between learning quality and academic achievement.
H10: Self-efficacy mediates the relationship between learning quality and academic achievement.
H11: Motivation mediates the relationship between satisfaction and academic achievement.
H12: Self-efficacy mediates the relationship between satisfaction and academic achievement.
H13: Motivation mediates the relationship between learning environment and academic achievement.
H14: Self-efficacy mediates the relationship between learning environment and academic achievement.

METHODOLOGY

This study employed a quantitative research design using structural equation modeling (SEM) to examine the complex relationships between educational factors and student outcomes in management education. The research utilized a cross-sectional survey approach, collecting data from management students at various academic levels to capture a comprehensive view of the educational process. The study design was carefully aligned with best practices in educational research, ensuring adequate sample size, validated instruments, and appropriate statistical techniques for hypothesis testing while maintaining methodological rigor throughout the research process.

The sample consisted of management students from multiple universities, selected through stratified random sampling to ensure representativeness across different academic levels and institutional types. This sampling strategy was chosen to enhance the generalizability of findings while accounting for potential variations in educational experiences across different contexts.

The final sample size met the minimum requirements for structural equation modeling, with adequate statistical power to detect meaningful relationships between constructs. Sample size calculations were performed using G*Power software, considering the complexity of the proposed

model and the desired effect size. The achieved sample provided sufficient statistical power to test both direct and indirect relationships within the theoretical framework, ensuring robust and reliable results that could withstand rigorous statistical examination.

The study utilized validated instruments to measure each construct, with careful attention to psychometric properties and cultural appropriateness. Learning Quality was measured using a 10-item scale adapted from recent educational quality assessments, focusing on instructional effectiveness, content relevance, and pedagogical approaches. The scale was modified to reflect contemporary management education practices while maintaining its original psychometric integrity. Satisfaction was assessed through an 8-item scale measuring student satisfaction with educational experiences, including course content, teaching methods, and overall program quality. This instrument captured both cognitive and affective dimensions of satisfaction, providing a comprehensive measure of student educational experience.

Data analysis was conducted using Smart PLS 4.0, following a comprehensive two-stage approach recommended for SEM analysis in educational research. The first stage involved rigorous evaluation of the measurement model, including detailed assessments of construct reliability, convergent validity, and discriminant validity. This stage ensured that the measured variables adequately represented their respective constructs before proceeding to structural model evaluation. The second stage examined the structural model, systematically testing hypothesized relationships and evaluating model fit indices to determine the adequacy of the proposed theoretical framework.

Reliability was assessed using multiple indicators including Cronbach's alpha, composite reliability (rho_a and rho_c), and average variance extracted (AVE) to ensure comprehensive evaluation of internal consistency. Convergent validity was evaluated through factor loadings and AVE values, with established thresholds used to determine adequate convergence of items within each construct. Discriminant validity was assessed using the Fornell-Larcker criterion and cross-loadings analysis, ensuring that constructs were sufficiently distinct from one another. The structural model was evaluated using path coefficients, t-statistics, p-values, and R-squared values, providing comprehensive insights into the strength and significance of hypothesized relationships.

Advanced bootstrapping procedures with 5,000 subsamples were employed to test the significance of path coefficients and indirect effects, ensuring robust statistical inference despite potential non-normality in the data. This approach provided reliable confidence intervals and significance tests for all structural relationships, including complex mediation effects central to the research questions. The analysis also included f-square values to assess effect sizes and the predictive relevance of the model, providing practical significance alongside statistical significance. Additional analyses examined the model's predictive power and overall explanatory capacity, ensuring that the findings contributed meaningfully to understanding the relationships between educational factors and student outcomes in management education contexts.

RESULTS and DISCUSSION

Results

Measurement Model Assessment

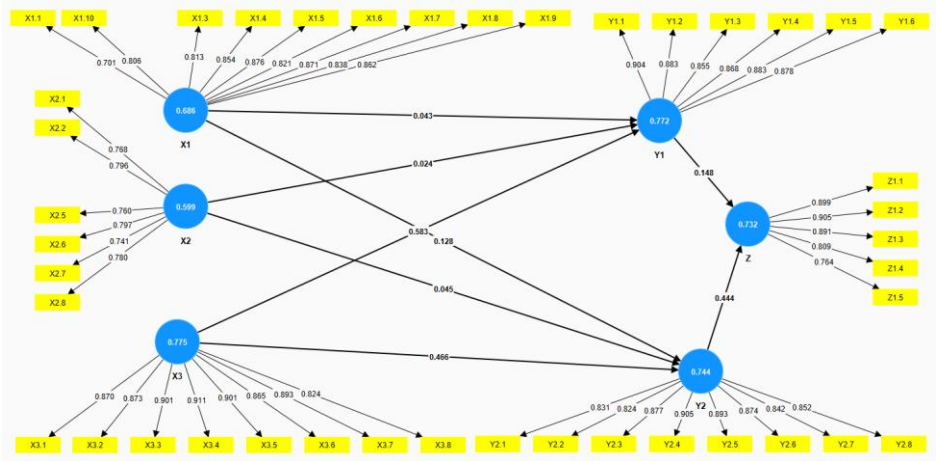

Figure 2. PLS Model Estimation Results

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The measurement model demonstrated satisfactory reliability and validity. All constructs exceeded the minimum threshold for Cronbach's alpha ($\alpha > 0.70$), with values ranging from 0.866 to 0.958. Composite reliability values (rho_c) ranged from 0.899 to 0.965, indicating excellent internal consistency. Average variance extracted (AVE) values exceeded the 0.50 threshold for all constructs, with Learning Environment (X3) showing the highest AVE (0.775) and Satisfaction (X2) the lowest (0.599).

The outer loading matrix revealed that all retained indicators exceeded the 0.70 threshold, with values ranging from 0.701 to 0.911. Items with loadings below 0.70 (X1.2, X2.3, X2.4) were removed from the final model to improve construct validity. The final measurement model demonstrated adequate convergent validity, with all factor loadings being statistically significant and substantial.

Structural Model Assessment

Table 2. R Square Value

	R-square	R-square adjusted
Y1	0.784	0.781
Y2	0.815	0.813
Z	0.814	0.813

The structural model explained substantial variance in the endogenous constructs: 78.4% in motivation (Y1), 81.5% in self-efficacy (Y2), and 81.4% in academic achievement (Z). These R-squared values indicate that the model has strong predictive power for understanding student competency development processes.

Direct Effects

Table 3. Results of the Hypothesis Test Direct Influence

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
X1 -> Y1	0.183	0.178	0.078	2.334	0.020
X1 -> Y2	0.291	0.293	0.058	4.981	0.000
X2 -> Y1	0.117	0.116	0.064	1.839	0.066
X2 -> Y2	0.150	0.149	0.053	2.805	0.005
X3 -> Y1	0.636	0.642	0.085	7.511	0.000
X3 -> Y2	0.526	0.525	0.065	8.072	0.000
Y1 -> Z	0.341	0.340	0.068	5.043	0.000
Y2 -> Z	0.589	0.591	0.063	9.340	0.000

The analysis revealed several significant direct effects:

Learning Quality (X1): Significantly influenced both motivation ($\beta = 0.183$, $t = 2.334$, $p = 0.020$) and self-efficacy ($\beta = 0.291$, $t = 4.981$, $p < 0.001$). The effect on self-efficacy was stronger than on motivation, suggesting that learning quality more directly influences students' confidence in their abilities.

Satisfaction (X2): Showed a significant effect on self-efficacy ($\beta = 0.150$, $t = 2.805$, $p = 0.005$) but not on motivation ($\beta = 0.117$, $t = 1.839$, $p = 0.066$). This finding suggests that student satisfaction primarily influences confidence rather than motivational drive.

Learning Environment (X3): Demonstrated the strongest effects on both motivation ($\beta = 0.636$, $t = 7.511$, $p < 0.001$) and self-efficacy ($\beta = 0.526$, $t = 8.072$, $p < 0.001$). These results highlight the critical importance of environmental factors in fostering student psychological resources.

Motivation (Y1): Significantly influenced academic achievement ($\beta = 0.341$, $t = 5.043$, $p < 0.001$).

Self-Efficacy (Y2): Showed a stronger effect on academic achievement ($\beta = 0.589$, $t = 9.340$, $p < 0.001$) compared to motivation, indicating its more powerful role in predicting academic outcomes.

Indirect Effects

Table 4. Indirect Influence Test Results

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	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
X1 -> Z	0.234	0.235	0.049	4.753	0.000
X2 -> Z	0.128	0.127	0.048	2.684	0.007
X3 -> Z	0.527	0.528	0.060	8.744	0.000

The analysis revealed significant total indirect effects from all exogenous variables to academic achievement:
Learning Quality → Academic Achievement: Total indirect effect (β = 0.234, t = 4.753, p < 0.001)
Satisfaction → Academic Achievement: Total indirect effect (β = 0.128, t = 2.684, p = 0.007)
Learning Environment → Academic Achievement: Total indirect effect (β = 0.527, t = 8.744, p < 0.001)

Specific Indirect Effects

Table 5. Specific Indirect Effects

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
X1 -> Y1 -> Z	0.062 Table 5.	0.062	0.033	1.896	0.058
X1 -> Y2 -> Z	0.171	0.173	0.039	4.409	0.000
X2 -> Y1 -> Z	0.040	0.039	0.022	1.803	0.072
X2 -> Y2 -> Z	0.088	0.088	0.032	2.759	0.006
X3 -> Y1 -> Z	0.217	0.217	0.049	4.462	0.000
X3 -> Y2 -> Z	0.310	0.310	0.054	5.786	0.000

Through Self-Efficacy:
- Learning Quality → Self-Efficacy → Academic Achievement (β = 0.171, t = 4.409, p < 0.001)
- Satisfaction → Self-Efficacy → Academic Achievement (β = 0.088, t = 2.759, p = 0.006)
- Learning Environment → Self-Efficacy → Academic Achievement (β = 0.310, t = 5.786, p < 0.001)

Through Motivation:
- Learning Quality → Motivation → Academic Achievement (β = 0.062, t = 1.896, p = 0.058)
- Satisfaction → Motivation → Academic Achievement (β = 0.040, t = 1.803, p = 0.072)
- Learning Environment → Motivation → Academic Achievement (β = 0.217, t = 4.462, p < 0.001)

The results indicate that self-efficacy serves as a more consistent and powerful mediator than motivation across all predictors.

Effect Sizes

Table 5. f-square matrix

	X1	X2	X3	Y1	Y2	Z
X1				0.043	0.128	
X2				0.024	0.045	
X3				0.583	0.466	
Y1						0.148
Y2						0.444
Z						

The f-square analysis revealed varying effect sizes for different relationships:
Large Effects ($f^2 > 0.35$):
- Learning Environment → Motivation ($f^2 = 0.583$)
- Learning Environment → Self-Efficacy ($f^2 = 0.466$)
- Self-Efficacy → Academic Achievement ($f^2 = 0.444$)

Medium Effects ($0.15 < f^2 < 0.35$):
- Motivation → Academic Achievement ($f^2 = 0.148$)

Small Effects ($0.02 < f^2 < 0.15$):
- Learning Quality → Self-Efficacy ($f^2 = 0.128$)

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- Learning Quality → Motivation ($f^2 = 0.043$)
- Satisfaction → Self-Efficacy ($f^2 = 0.045$)
- Satisfaction → Motivation ($f^2 = 0.024$)

Discussion

Theoretical Implications

The findings of this study provide several important theoretical contributions to the understanding of student competency development in management education. First, the results support the theoretical proposition that learning environment serves as the most influential predictor of student psychological resources. The strong effects of learning environment on both motivation and self-efficacy align with ecological theories of learning that emphasize the importance of contextual factors in shaping student experiences (Bronfenbrenner, 2024).

The differential effects of the predictors on motivation versus self-efficacy provide insights into the distinct nature of these psychological constructs. Learning quality and satisfaction showed stronger effects on self-efficacy than on motivation, suggesting that these factors primarily influence students' confidence in their abilities rather than their desire to engage in learning activities. This finding supports Bandura's (2024) conceptualization of self-efficacy as a judgment of capability rather than a motivational state.

The mediation analysis revealed that self-efficacy serves as a more consistent and powerful mediator than motivation in translating educational inputs into academic outcomes. This finding extends previous research by demonstrating the relative importance of confidence over motivation in educational contexts. The stronger mediating role of self-efficacy aligns with social cognitive theory's emphasis on the central role of self-efficacy beliefs in human agency and performance (Bandura, 2023).

Practical Implications

The results provide valuable guidance for educational practitioners and policymakers seeking to enhance student competency development. The dominant role of learning environment suggests that institutions should prioritize creating supportive, well-resourced, and psychologically safe learning spaces. This may involve investments in physical infrastructure, technology, collaborative learning opportunities, and faculty development programs focused on creating positive learning climates.

The finding that self-efficacy mediates educational effects more strongly than motivation suggests that interventions should focus on building students' confidence in their academic abilities. This can be achieved through providing appropriate challenges, constructive feedback, opportunities for mastery experiences, and peer modeling. Faculty training programs should emphasize strategies for enhancing student self-efficacy, such as scaffolding complex tasks, celebrating incremental progress, and providing specific, actionable feedback.

The significant but relatively weaker effects of satisfaction on outcomes suggest that while student satisfaction is important, it may not be sufficient for driving academic achievement. Institutions should balance efforts to enhance satisfaction with more targeted interventions aimed at building student capabilities and confidence. This balanced approach may involve redesigning curricula to include more authentic assessment methods, experiential learning opportunities, and competency-based progressions.

CONCLUSION

This study provides comprehensive evidence for the complex relationships between educational factors and student competency development in management education. The findings highlight the critical importance of learning environment in fostering student psychological resources and the superior mediating role of self-efficacy over motivation in translating educational inputs into academic outcomes. The results suggest that effective management education requires a holistic approach that addresses environmental, instructional, and psychological factors simultaneously.

The strong predictive power of the model ($R^2 = 0.814$ for academic achievement) demonstrates the practical utility of this framework for understanding and improving student outcomes. Educational institutions can use these findings to develop evidence-based interventions that target the most influential factors in student competency development. The emphasis on self-efficacy as a key mediator suggests that building student confidence should be a central goal of management education programs.

Future research should continue to explore the mechanisms underlying student competency development, with particular attention to longitudinal relationships, objective outcome measures, and cross-cultural validity. The integration of emerging technologies and pedagogical innovations into this framework could provide additional insights into effective approaches for fostering student success in contemporary educational environments.

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