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INSTITUTIONAL LEADERSHIP AND ORGANISATIONAL FACTORS INFLUENCING STUDENT RETENTION AND PERFORMANCE IN MALAYSIAN HIGHER EDUCATION: EVIDENCE FROM LEARNING ANALYTICS

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ABSTRACT

This study examines how institutional and organisational factors influence Student Performance in Malaysian higher education institutions (HEIs), with particular emphasis on the role of student retention and its interaction with key moderating variables. Employing a quantitative research design, data were collected from 450 students across 14 public and private HEIs in Malaysia using a structured survey instrument. Hierarchical moderated regression analysis was applied to examine the direct relationship between student retention and Student Performance, as well as the moderating effects of academic integration, financial integration, social integration, and student motivation. The findings indicate that student retention has a significant positive relationship with Student Performance. Financial integration and student motivation demonstrate strong moderating effects, strengthening the relationship between retention and performance. In contrast, academic and social integration show more limited direct influence but contribute through interaction effects. From a leadership and institutional management perspective, the results highlight the importance of data-driven decision-making in designing targeted strategies that enhance student persistence and academic outcomes. Institutional leaders play a critical role in strengthening financial support systems, fostering inclusive learning environments, and promoting motivational frameworks that support sustained student engagement. The study contributes empirical evidence to the literature on student success in Malaysian higher education, providing practical insights for policymakers and institutional leaders seeking to improve both retention and academic performance through integrated governance and organisational strategies.

Keywords: Student retention, institutional leadership, Malaysian higher education, student motivation, financial and social integration.



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INTRODUCTION

Retention in higher education is a central concern for universities, governments, and students. Students who are unable to persist or who take longer to complete their programs often face serious negative consequences, including financial difficulties, loss of academic momentum, and diminished labour market prospects (Kuh, 2003). Although some institutions may view extended enrolment as a source of additional fee revenue (Baker & Levesque, 2005), forward-looking universities generally prioritize timely graduation in order to safeguard institutional reputation and ensure student success. Understanding the factors that contribute to retention is therefore critical for both individual learners and higher education institutions (HEIs).

A factor consistently linked to student retention and overall success is academic performance. Students achieving higher levels of performance are more likely to persist and eventually graduate (Kuh, 2003; Kuh & Ikenberry, 2009). However, the relationship between academic performance and retention is not always straightforward. Prior studies suggest that this relationship can be moderated by student demographics (Hossler et al., 1999) and institutional characteristics (Pascarella & Terenzini, 2005), indicating the need for more nuanced and context-sensitive analysis.

Against this backdrop, the present study examines the relationship between Student Performance and attainment within Malaysian HEIs, while investigating whether retention plays a moderating role in this relationship. To the best of our knowledge, no prior research has explicitly explored the moderating effect of retention between performance and attainment in the Malaysian higher education context. More importantly, student retention should not be viewed solely as a student-level outcome but as a strategic leadership and institutional management responsibility. Effective retention requires coordinated governance, proactive institutional policies, and data-informed decision-making supported by organisational systems and student-centred practices. In this regard, institutional leaders, senior management, and policymakers play a critical role in shaping retention strategies, allocating resources, and fostering environments that promote student persistence and academic success. By addressing this gap, the study aims to generate new insights into how institutional leadership and organisational practices influence student success and to provide evidence-based recommendations for strengthening retention and enhancing overall student achievement in Malaysian HEIs.

Malaysian Higher Education

The Malaysian education sector comprises a diverse mix of institutions, including public and private universities, colleges, and vocational schools. The government plays a pivotal role in shaping this sector, with the Ministry of Education (MOE) responsible for policy formulation, standard setting, and the provision of funding to educational institutions. The system is organized into three levels: primary, secondary, and tertiary education. While primary and secondary education are compulsory for all children aged 6 to 16 and provided free of charge, tertiary education, although not compulsory, is widely available and relatively affordable. At this level, students can access a broad range of opportunities across universities, colleges, and vocational institutions.

Over the past decade, Malaysia's higher education landscape has undergone significant growth and transformation. The expansion in the number of higher education institutions has been accompanied by government-led initiatives to enhance both quality and accessibility. A central framework guiding these reforms is the *Malaysia Education Blueprint* (Ministry of Education Malaysia, 2013), which articulates a long-term vision for educational development and highlights key priorities for improvement. Additionally, targeted policies have been introduced to strengthen teaching and learning practices while also broadening participation among disadvantaged and underrepresented groups in higher education (Ministry of Education Malaysia, 2015).

Within this dynamic context, the issue of student retention has gained increasing importance. As Malaysian higher education institutions expand in size and diversity, understanding the factors that influence students' persistence



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and success becomes critical for sustaining quality outcomes, institutional reputation, and national educational goals.

LITERATURE REVIEW

In recent years, learning analytics has gained prominence in higher education, including Malaysia. Defined as the measurement, collection, analysis, and reporting of learner data, it aims to enhance understanding and optimize learning environments.

Empirical evidence highlights its positive effects on Student Performance. Zaidatol Akmaliah et al. (2018) reported improved grades, while Noor Shafinaz et al. (2019) found gains in multiple-choice assessments. Attainment and retention are also interconnected: Nor Asmawati et al. (2019) noted that higher attainment predicted persistence, while Rokiah et al. (2020) showed engagement enhanced both persistence and performance. Similarly, Khairul Azhar et al. (2020) found that retention moderated the link between performance and satisfaction.

In Malaysia, learning analytics has been central to retention strategies. Early warning systems and advising initiatives support students at-risk. Noor Khairunnisa et al. (2020) demonstrated improved outcomes through analytics-driven early alerts. Ching Ching et al. (2017) observed increased participation and reduced dropout, while Norshahida et al. (2018) linked analytics to improved assessments. Norlida et al. (2018) further confirmed enhanced performance and retention through analytics-based interventions.

Motivation has also emerged as a key factor. Chew et al. (2018) showed that motivated students engaged more actively with analytics tools, boosting performance. Thus, learning analytics functions as both a monitoring and motivational mechanism. Challenges persist, particularly around ethics. Hasliza et al. (2018) reported privacy and security concerns, echoing global debates on data misuse, bias, and accountability (Gosper et al., 2017; McWilliam et al., 2018). These issues highlight the need for responsible frameworks. Despite such challenges, the potential of learning analytics remains significant. Studies suggest its capacity to identify struggling students, provide timely interventions, and inform course design (Gosper et al., 2017; Wise et al., 2014). By analysing engagement data, institutions can foster effective learning and improve teaching practices. Current Malaysian studies, however, are often small-scale, which limits generalizability. Broader, longitudinal research is needed to assess long-term impacts on performance, retention, and motivation.

Overall, the literature suggests that learning analytics can enhance grades, engagement, motivation, and persistence, particularly when embedded in strategies like early warning systems. Yet, addressing privacy, ethics, and governance remains essential for sustainable adoption and impact.

Impact of Learning Analytics on Student Performance

The application of learning analytics in higher education has gained substantial attention in recent years as institutions seek evidence-based strategies to improve teaching and learning outcomes. Learning analytics entails the systematic collection and analysis of data from student activities and interactions to generate insights that can guide both instructors and learners. In Malaysia, although still relatively new, learning analytics has been increasingly recognized as a promising approach to enhance Student Performance and attainment in higher education.

Several empirical studies have examined the relationship between learning analytics and Student Performance in the Malaysian context. Farooq et al. (2021), in their investigation at a Malaysian university, reported that the adoption of learning analytics had a positive influence on Student Performance. Similarly, Lim and Lim (2021) demonstrated that learning analytics significantly improved academic outcomes within a private university setting, reinforcing its potential to support institutional teaching and learning objectives.



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Further evidence is provided by Alias et al. (2019), who investigated the role of learning analytics in a Malaysian polytechnic. Their study highlighted that learning analytics contributed to improved performance, particularly among low-performing students who benefited most from targeted interventions derived from data insights. These findings collectively suggest that learning analytics not only enhances general Student Performance but also provides an effective means of supporting vulnerable student groups.

Taken together, these studies affirm the growing relevance of learning analytics in Malaysia's higher education sector. By leveraging data-driven insights, institutions can create more personalized and responsive learning environments that support diverse learner needs and improve overall academic achievement.

Student Performance. A substantial body of research indicates that students who remain engaged and persist within their academic programmes are more likely to achieve stronger academic outcomes. Student retention, therefore, reflects not only institutional capacity to support learners but also the stability of the academic environment that enables students to perform effectively. When students remain enrolled and actively engaged in their programmes, they benefit from continuous academic support, structured learning pathways, and sustained interaction with faculty and peers, all of which contribute to improved academic performance.

Empirical studies in higher education contexts have shown that persistence in academic programmes is closely associated with stronger academic achievement and degree completion rates. Students who successfully remain within their institutions are more likely to accumulate academic credits, maintain consistent study habits, and access institutional support systems that enhance learning outcomes.

Within the Malaysian higher education context, institutional strategies that strengthen student retention, such as academic advising, financial support mechanisms, and inclusive campus environments, may therefore play a critical role in improving academic performance.

Hypothesis 1: Student retention is positively related to Student Performance in Malaysian higher education institutions.

Table 1
Student Performance Positively Related to Student Retention

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	1.535	.213	7.210	.000	
	Student Retention	.559	.043	.530	13.023	.000

Note. Dependent Variable: Student Performance.

Table 1 reports the results of the statistical model examining the relationship between Student Performance and student retention. The model includes unstandardized coefficients (B), standard errors, standardized coefficients (Beta), t-values, and significance levels to assess the strength and direction of the relationship. The unstandardized coefficients (B) indicate the expected change in Student Performance for each one-unit change in student retention, whereas the standardized coefficients (Beta) provide an estimate of the effect in standard deviation units. The associated t-values and significance levels determine the statistical significance of these effects. The results reveal that student retention has a positive and statistically significant relationship with Student Performance. Specifically, the standardized coefficient (Beta = 0.530) demonstrates a strong effect size, while the p-value (0.000) confirms that the relationship is highly significant. These findings suggest that higher levels of student retention are associated with improved academic performance, reinforcing the importance of persistence as a determinant of



student success.

These findings indicate that institutional leaders who prioritise structured retention policies and continuity support systems can significantly strengthen student academic performance and overall institutional success.

Social Integration

Social integration refers to the extent to which students feel connected to peers, faculty, and staff, while academic integration reflects their sense of belonging to the academic community. Both are widely recognized as critical determinants of student persistence and academic outcomes in higher education institutions (HEIs). Prior research suggests that these forms of integration moderate the relationship between Student Performance and retention, shaping whether students persist in their studies.

In Malaysia, where HEIs host diverse student populations, several studies provide empirical evidence of these moderating effects. Said and Tan (2015) found that higher levels of social integration among international students were positively associated with retention and academic performance. Factors such as language barriers, cultural adaptation, and social support networks influenced students' ability to integrate successfully. Ismail et al. (2017) highlighted academic integration as another important factor, showing that students with stronger academic integration were more likely to persist and achieve higher grades. The study emphasized that academic integration fosters engagement with the academic environment, which enhances both performance and persistence. Tan and Lai (2016) examined both social and academic integration simultaneously and confirmed that higher levels of integration strengthened the positive link between performance and retention. They recommended that HEIs actively promote initiatives that support both social connectedness and academic engagement.

Taken together, the evidence demonstrates that social and academic integration are key moderators of the relationship between Student Performance and retention. Fostering supportive networks and academic engagement opportunities is vital for ensuring persistence and long-term success, particularly in diverse and international educational contexts.

Hypothesis 2: Social integration moderates the relationship between Student Performance and student retention in Malaysian higher education institutions.

Academic Integration

This hypothesis suggests that academic integration is a key factor shaping the relationship between Student Performance and retention. Students who feel connected to the academic community are more likely to persist despite the challenges.

Academic integration is widely recognized as a determinant of student retention and performance in higher education institutions (HEIs), including in Malaysia. Ismail et al. (2017) found that academic integration moderated the relationship between performance and retention, with higher integration linked to stronger persistence and outcomes. Similarly, Tan and Lai (2016) reported that academic integration strengthened this relationship, recommending that HEIs prioritize it as a strategy to enhance both success and retention. Lim et al. (2019) further highlighted the role of academic support services, such as tutoring, mentoring, and advising, in promoting academic integration and improving retention. Collectively, these studies underscore that fostering supportive academic environments and resources is critical for sustaining engagement, persistence, and long-term student success.

Hypothesis 3: Academic integration moderates the relationship between Student Performance and student retention in Malaysian higher education institutions.



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Financial Integration

This hypothesis posits that financial integration influences the relationship between Student Performance and retention significantly. Financial integration refers to the extent to which students feel financially secure and supported, with research showing that students free from financial stress are more likely to persist and perform well in higher education.

In Malaysia, rising education costs have increased the importance of financial factors in student success. Ng (2017) found that financial integration moderated the link between performance and retention, with financially stable students demonstrating greater persistence and achievement. Similarly, Arifin and Hassan (2018) reported that financial support, such as scholarships and loans, strengthened this relationship by allowing students to focus on academics without financial burdens. Abdullah et al. (2020) emphasized the role of government-funded scholarships, showing they significantly predicted retention, particularly for low-income students. Structured financial aid programs were highlighted as vital in fostering integration and enhancing both persistence and performance.

Collectively, these studies confirm that financial integration is a critical moderator of performance and retention in Malaysian HEIs. By alleviating financial stress and providing reliable support, institutions can promote equitable access, sustained academic engagement, and long-term student success.

Hypothesis 4: Financial integration moderates the relationship between Student Performance and student retention in Malaysian higher education institutions.

Motivation

This hypothesis suggests that motivation significantly moderates the relationship between Student Performance and retention in Malaysian HEIs. Motivated students are more likely to persist despite academic or financial challenges, making motivation a critical determinant of persistence and success in diverse and demanding contexts. Ling and Mahmood (2015) demonstrated that motivation strengthened the link between performance and retention, with highly motivated students better able to translate strong academic results into long-term persistence. They recommended targeted support mechanisms to enhance motivation and improve outcomes. Similarly, Ahmad et al. (2017) found that academic self-efficacy reinforced the moderating role of motivation, showing that students with greater confidence in their academic abilities were more likely to persist. The study highlighted self-efficacy as a key driver of motivation and retention. Alsubari et al. (2020) further emphasized the role of learning engagement, reporting that motivation predicted retention when mediated by active student participation. Their findings suggest that HEIs should promote strategies fostering engagement to sustain motivation and persistence.

Collectively, these studies confirm motivation's moderating role in Malaysian HEIs. By fostering intrinsic motivation, self-efficacy, and engagement, institutions can strengthen performance–retention links and support long-term student success.

Hypothesis 5: Student motivation moderates the relationship between Student Performance and student retention in Malaysian higher education institutions.

Learning Analytics as a Tool for Educational Leadership and Institutional Management

In recent years, learning analytics has evolved beyond a purely pedagogical or student-level monitoring mechanism to become a strategic instrument for educational leadership and institutional management. Contemporary research increasingly positions learning analytics as a governance and decision-support system that enables higher education leaders to monitor institutional performance, detect early signals of student disengagement, and design targeted interventions aimed at improving retention and academic outcomes (Ferguson, 2012; Gašević et al., 2015; Long &



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Siemens, 2011).

From a leadership perspective, learning analytics provides actionable intelligence that supports evidence-based policy formulation and strategic planning. Institutional leaders can use analytics-driven insights to identify systemic barriers to student success, allocate academic and financial resources more efficiently, and evaluate the effectiveness of retention initiatives across departments and student groups (Ifenthaler & Yau, 2020; Macfadyen & Dawson, 2012). This data-informed approach enhances institutional responsiveness and promotes proactive rather than reactive management of student progression and persistence.

Moreover, learning analytics facilitates organisational learning by enabling continuous monitoring of performance indicators such as engagement, achievement, and retention trends. Through dashboards, predictive models, and early warning systems, academic leaders and administrators are able to intervene at critical stages of the student lifecycle, thereby reducing attrition risks and improving completion rates (Arnold & Pistilli, 2012; Siemens & Baker, 2012). These tools also strengthen institutional accountability by linking student outcomes with organisational practices, leadership decisions, and support structures (Greller & Drachsler, 2012).

Importantly, the integration of learning analytics into institutional strategy aligns with broader governance objectives in higher education, including quality assurance, performance management, and student-centred policy development (Daniel, 2015; Viberg et al., 2018). When embedded within leadership and management frameworks, learning analytics serves not merely as a technological innovation but as a strategic enabler of institutional effectiveness, organisational coordination, and sustainable student success (Ifenthaler & Schumacher, 2016).

Thus, rather than being viewed solely as a mechanism for analysing student-level variables, learning analytics should be understood as a critical leadership and management tool that supports institutional decision-making, enhances governance capacity, and enables higher education institutions to design more targeted, equitable, and data-driven retention strategies.

METHODOLOGY AND DATA

The present study adopted a quantitative research design to examine the relationship between student retention and Student Performance in Malaysian higher education institutions (HEIs). In addition to testing the direct effect of retention on performance, the study also examined the moderating roles of academic integration, financial integration, social integration, and student motivation. Hierarchical moderated regression analysis was employed as the primary analytical approach, enabling the study to evaluate both direct and interaction effects among the variables within a single statistical framework. The target population comprised Higher Education Institutions (HEIs) across Malaysia, including both public and private universities. Consistent with the institutional orientation of the study, academic, financial, and social integration were conceptualised as key organisational and student-related factors that may influence student retention and performance outcomes.

The research instrument consisted of two main sections. The first section captured demographic information, including gender, age, and institutional affiliation. The second section measured the key study constructs using a 7-point Likert scale, where 1 represented “strongly disagree” and 7 represented “strongly agree.” The measurement items were designed to capture students’ perceptions and experiences related to academic integration, financial integration, social integration, student motivation, Student Performance, and student retention.

With respect to data collection, a total of 485 questionnaires were distributed across selected public and private HEIs in Malaysia. Of these, 450 completed questionnaires were returned, indicating a high response rate. Following data screening procedures, 13 questionnaires were excluded due to incomplete responses and the presence of statistical outliers, resulting in a final sample of 437 valid responses used for subsequent statistical analysis.



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The quantitative data were analysed using Statistical Package for the Social Sciences (SPSS). Descriptive statistics were first employed to summarise the demographic characteristics of the respondents and provide an overview of the dataset. Reliability analysis was conducted using Cronbach's alpha to assess the internal consistency of the measurement constructs.

To examine the relationships among the study variables, hierarchical multiple regression analysis was performed. In the first step, control variables and main predictor variables were entered into the regression model to assess their direct effects on student retention and performance. In the subsequent step, interaction terms representing the moderating effects of academic integration, financial integration, social integration, and motivation on the relationship between student retention and Student Performance. This hierarchical procedure enabled the assessment of whether student motivation significantly strengthens or weakens the relationship between performance and retention.

Prior to regression analysis, standard diagnostic tests were conducted to ensure that the assumptions of regression analysis were satisfied. These included tests for multicollinearity, normality, and independence of residuals, which includes examination of Variance Inflation Factors (VIF) and Durbin–Watson statistics. The hierarchical regression results were then interpreted to determine the significance and direction of the hypothesised relationships.

The adoption of this quantitative methodological framework enabled a rigorous examination of the institutional and motivational factors influencing student retention and performance in Malaysian higher education institutions. The use of hierarchical moderated regression analysis provides empirical insights into how organisational integration factors and student motivation interact to influence key educational outcomes.

Ethical Considerations

This study adhered to established ethical standards for research involving human participants. Participation in the survey was voluntary, and informed consent was obtained from all respondents before data collection. Participants were assured that their responses would remain confidential and would be used solely for academic research purposes. No personally identifiable information was collected, and the data were analysed in aggregated form. Permission to conduct the study within the participating higher education institutions was obtained through appropriate institutional channels.

MODERATION ANALYSIS OF STUDENT RETENTION AND STUDENT PERFORMANCE

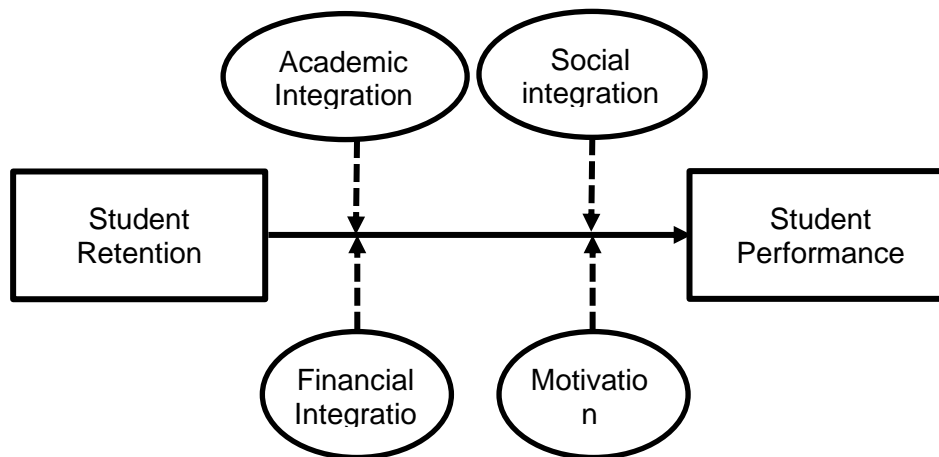
Figure 1 illustrates moderation as a statistical concept that refers to the combined effect of two or more independent variables on a dependent variable. In particular, the joint influence of any two variables is referred to as a moderation effect (Aiken & West, 1991). In the present study, moderation analysis was applied to examine how four key independent variables (Financial Integration, Motivation, Social Integration, and Academic Integration) influence student retention in Malaysian Higher Educational Institutions (HEIs).

To analyse these moderation effects, regression techniques were employed following the approach outlined by Hayes (2012). This method involves testing the interaction effect between independent variables and a dependent variable to determine whether the strength or direction of the relationship changes under different conditions. The moderation effects of the selected variables were examined to provide deeper insights into the complex interplay of institutional and individual factors that shape student retention outcomes in HEIs.



Figure 1

The Moderating Effects of Various Integrations and Student Performance on Student Retention



By examining the moderating effects of Financial Integration, Motivation, Social Integration, and Academic Integration, this study provides valuable insights into the multifaceted factors influencing student retention in higher educational institutions. The findings may serve as a foundation for shaping policies and interventions which enhances retention outcomes. For instance, if motivation is found to exert a significant moderating effect, policymakers and educators could prioritize initiatives that strengthen student motivation as a pathway to improving retention rates.

The application of moderation analysis in this study provides a nuanced perspective on how different variables interact to influence student retention. By identifying key moderators that shape the relationship between independent variables and retention outcomes, the research offers a practical framework for policymakers and institutional leaders to develop more targeted and effective strategies to reduce attrition and promote student success.

Table 2 presents the results of a hierarchical multiple linear regression analysis examining the relationship between Student Retention and Student Performance, as well as the moderating role of Academic Integration. The analysis indicates that 37.1% of the variance ($R^2 = 0.371$) in the dependent variable, Student Performance, is explained by the overall model.

In Model 1, Student Retention ($\beta = 0.510$, $t = 12.363$, $p < 0.001$) demonstrates a positive and statistically significant influence on Student Performance, explaining 26.0% of the variance ($R^2 = 0.260$). In Model 2, the moderator variable Academic Integration was introduced alongside Student Retention, resulting in a marginal increase in the explained variance to 26.1% ($R^2 = 0.261$). While Student Retention ($\beta = 0.414$, $t = 3.178$, $p = 0.002$) remained statistically significant, Academic Integration ($\beta = 0.101$, $t = 0.774$, $p = 0.439$) did not show a significant effect, as its p-value exceeded the 0.05 threshold.

In Model 3, which included the interaction term between Student Retention and Academic Integration, the explained variance increased substantially to 37.1% ($R^2 = 0.371$). The results indicate that both Student Retention ($\beta = -0.431$, $t = -2.784$, $p = 0.006$) and Academic Integration ($\beta = -0.586$, $t = -4.071$, $p = 0.010$) maintained significant relationships with Student Performance. Importantly, the interaction between Student Retention and Academic Integration ($\beta = 1.548$, $t = 8.698$, $p < 0.001$) was also statistically significant. This finding suggests that Academic Integration significantly moderates the relationship between Student Retention and Student Performance.



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The Durbin–Watson statistic of 1.267 indicates potential positive autocorrelation in the residuals, as the value falls below the commonly accepted benchmark of approximately 2.0.

Overall, the analysis confirms that Student Retention and Academic Integration significantly influence Student Performance, and the interaction between these variables is also significant. These findings provide evidence of a moderation effect. Therefore, the hypothesis (H2) that Academic Integration moderates the relationship between Student Retention and Student Performance in higher educational institutions is supported and cannot be rejected.

Table 2

Academic Integration as Moderator in Relationship Between Student Retention and Student Performance

Variables	Model 1	Model 2	Model 3
	Std. Beta (β)	Std. Beta (β)	Std. Beta (β)
<u>Independent Variable</u>			
Student Retention	0.510**	0.414*	-0.431**
t - Value	12.363	3.178	-2.784
Significant	0.000	0.002	0.006
<u>Moderator</u>			
Academic Integration	t - Value	0.101**	-0.586**
Significant		0.774	-4.071
		0.439	0.000
<u>Interaction</u>			
Student Retention x Academic Integration			1.548**
t - Value			8.698
Significant			0.000
R Square	0.260	0.261	0.371
Adjusted R	0.258	0.258	0.367
R Square Change	0.260	0.001	0.110
Significant F Change	0.000	0.439	0.000
Durbin-Watson			1.267

Note. Dependent Variable: Student Performance; Significant at level $p < 0.05$ **

The results suggest that institutional leadership must move beyond traditional academic support and implement integrated, institution-wide strategies that combine policy, engagement, and academic ecosystems to maximise Student Performance outcomes.

Figure 2 depicts the interaction between Student Retention and Academic Integration in predicting Student Performance. The results indicate that the relationship between Student Retention and Student Performance is significantly stronger under conditions of high Academic Integration. Slope analysis further demonstrates that Academic Integration substantially modifies both the strength and the trajectory of this relationship, with steeper slopes observed for HEIs characterized by greater levels of Academic Integration.

Moreover, higher levels of Academic Integration are consistently associated with enhanced Student Performance among HEIs reporting strong Student Retention. Thus, when Student Retention is high, HEIs with elevated Academic



Integration display a markedly greater propensity to improve Student Performance compared to institutions with lower Academic Integration.

Figure 2

The Impact of The Sense of Academic Integration on the Relationship Between the Student Retention and Student Performance

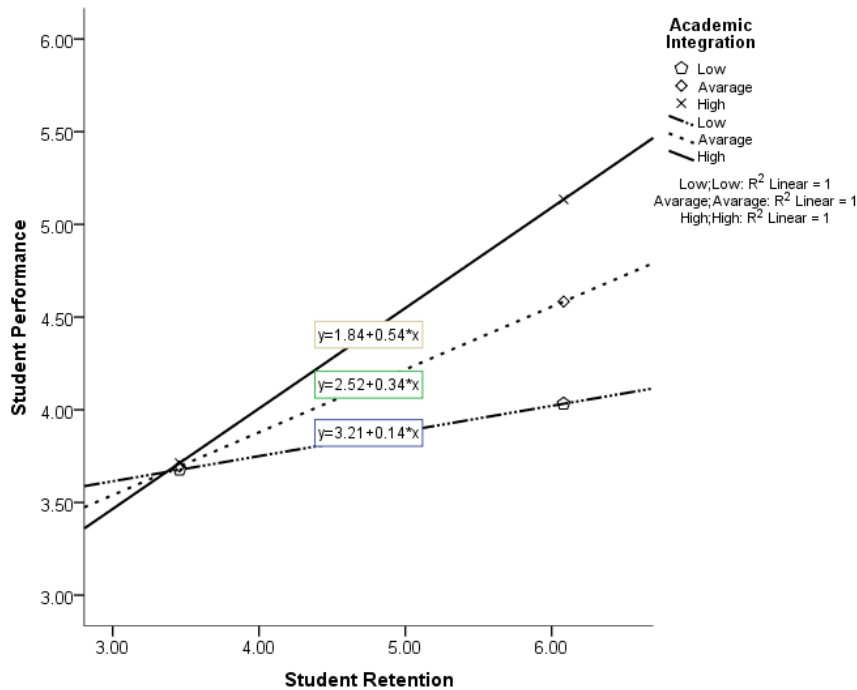


Table 3 presents the results of the hierarchical multiple linear regression analysis examining the diffusion factor variables of Student Retention and Financial Integration, along with their interaction, in predicting Student Performance. Overall, the analysis demonstrates that 56.3% of the variance (R^2) in Student Performance is explained by the combined effects of these variables.

Table 3.

Financial Integration as Moderator in Relationship Between Student Retention and Student Performance

Variables		Model 1	Model 2	Model 3
		Std. Beta (β)	Std. Beta (β)	Std. Beta (β)
Independent Variable				
Student Retention		0.510**	0.103*	-0.548**
t - Value		12.363	2.294	-6.306
Significant		0.000	0.022	0.000
Moderator				
Financial Integration	t - Value		0.628**	-0.304**
	Significant		13.954	-2.600
			0.000	0.010



Interaction

Student Retention x Financial

Integration

1.467**

t - Value

8.540

Significant

0.000

R Square	0.260	0.489	0.563
Adjusted R	0.258	0.487	0.560
R Square Change	0.260	0.229	0.074
Significant F Change	0.000	0.000	0.000
Durbin-Watson			1.370

Note. Dependent Variable: Student Performance; Significant at level $p < 0.05^{**}$

In Model 1, Student Retention ($\beta = 0.510$, $t = 12.363$, $p < 0.001$) demonstrates a positive and statistically significant effect on Student Performance, explaining 26.0% of the variance ($R^2 = 0.260$). In Model 2, the moderator variable Financial Integration was introduced, resulting in a substantial increase in the explained variance to 48.9% ($R^2 = 0.489$). Both Student Retention ($\beta = 0.103$, $t = 2.294$, $p = 0.022$) and Financial Integration ($\beta = 0.628$, $t = 13.954$, $p < 0.001$) show significant relationships with Student Performance, as their p-values fall below the 0.05 significance level.

In Model 3, the interaction term between Student Retention and Financial Integration was included to test the moderating effect. The results indicate that the explained variance further increases to 56.3% ($R^2 = 0.563$). The effects of Student Retention ($\beta = -0.548$, $t = -6.306$, $p < 0.001$) and Financial Integration ($\beta = -0.304$, $t = -2.600$, $p = 0.010$) remain statistically significant. More importantly, the interaction term between Student Retention and Financial Integration ($\beta = 1.467$, $t = 8.540$, $p < 0.001$) is highly significant, confirming the presence of a moderating effect.

The Durbin–Watson statistic (1.970) was also examined to assess autocorrelation in the residuals. Since the value is close to the recommended benchmark of 2.0, it indicates that there are no serious autocorrelation concerns in the regression model.

Overall, the findings confirm that Financial Integration significantly moderates the relationship between Student Retention and Student Performance. Therefore, the hypothesis (H1) stating that Financial Integration moderates this relationship in higher educational institutions is supported and cannot be rejected.

These findings underscore the importance of financial support mechanisms in strengthening the impact of retention strategies on student outcomes. Institutional leaders who enhance financial aid systems, affordability policies, and economic support programs may significantly improve the effectiveness of retention initiatives and, consequently, Student Performance in higher education.



Figure 3

The Impact of The Sense of Financial Integration on The Relationship Between the Student Retention and Student Performance

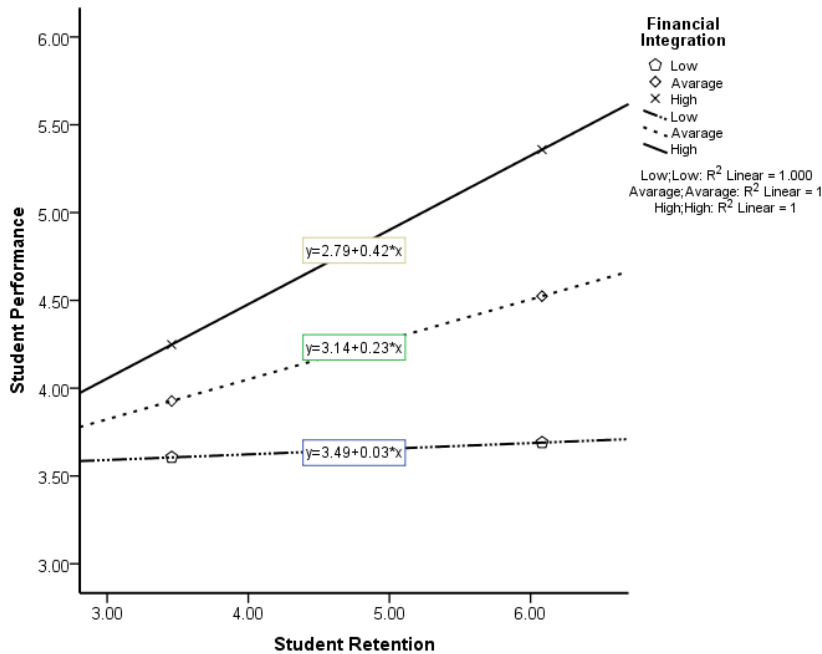


Figure 3 illustrates the interaction between Student Retention and Financial Integration on Student Performance. The findings reveal a positive and strong relationship between Student Retention and Student Performance when Financial Integration is high. The results of the slope analysis indicate that the sense of Financial Integration substantially alters both the direction and strength of the relationship between Student Retention and Student Performance.

The slope patterns demonstrate that the steepness is more pronounced for HEIs with lower values of the traits, compared to medium and high levels. A higher sense of Financial Integration is consistently associated with improved Student Performance, regardless of whether Student Retention is at a low or high level. Therefore, HEIs with strong Financial Integration exhibit a greater capacity to enhance Student Performance, highlighting the critical role of financial support in amplifying the positive effects of Student Retention.

Table 4

Social Integration Moderator In Relationship Between Student Retention And Student Performance

Variables	Model 1	Model 2	Model 3
	Std. Beta (β)	Std. Beta (β)	Std. Beta (β)
Independent Variable			
Student Retention	0.530**	0.373**	-0.375**
t - Value	13.023	2.457	-1.284
Significant	0.000	0.000	0.000

Moderator



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Social Integration	t - Value	0.162**	-0.365
Significant		1.070	-1.573
		0.000	0.116
<u>Interaction</u>			
Student Retention x Social Integration			1.270**
t - Value			2.988
Significant			0.003
R Square	0.281	0.282	0.297
Adjusted R	0.279	0.279	0.292
R Square Change	0.281	0.002	0.014
Significant F Change	0.000	0.285	0.003
Durbin-Watson			1.007

Note. Dependent Variable: Student Performance; Significant at level $p < 0.05^{**}$

Table 4 presents the results of the hierarchical multiple linear regression analysis examining the effects of Student Retention and Social Integration, as well as their interaction, on Student Performance. The analysis indicates that the full model explains 29.7% of the variance in Student Performance ($R^2 = 0.297$).

In Model 1, Student Retention ($\beta = 0.530$, $t = 13.023$, $p < 0.001$) demonstrates a positive and statistically significant effect on Student Performance, accounting for 28.1% of the variance ($R^2 = 0.281$). This result highlights the strong direct contribution of Student Retention to improved Student Performance.

In Model 2, the moderator variable Social Integration was introduced alongside Student Retention. The inclusion of Social Integration slightly increased the explained variance to 28.2% ($R^2 = 0.282$). Both Student Retention ($\beta = 0.373$, $t = 2.457$, $p < 0.05$) and Social Integration ($\beta = 0.162$, $t = 1.070$, $p > 0.05$) were examined in relation to Student Performance. While Student Retention remained statistically significant, Social Integration did not demonstrate a significant independent effect.

In Model 3, the interaction term between Student Retention and Social Integration was added to test the moderating effect. The explained variance increased modestly to 29.7% ($R^2 = 0.297$). The relationship between Student Retention and Student Performance ($\beta = -0.375$, $t = -1.284$, $p > 0.05$) was not statistically significant in this model, and Social Integration alone ($\beta = -0.365$, $t = -1.573$, $p = 0.116$) also did not show a significant direct effect. However, the interaction between Student Retention and Social Integration ($\beta = 1.270$, $t = 2.988$, $p = 0.003$) was statistically significant, indicating that Social Integration moderates the relationship between Student Retention and Student Performance.

The Durbin-Watson statistic of 1.007 suggests the presence of positive autocorrelation in the residuals, as the value is considerably below the recommended benchmark of approximately 2.0.

Overall, the findings suggest that although Social Integration does not independently predict Student Performance in the final model, its significant interaction with Student Retention demonstrates a moderating effect. Therefore, the hypothesis (H4) stating that Social Integration moderates the relationship between Student Retention and Student Performance in higher educational institutions is supported.

These results imply that institutional leaders should foster inclusive campus environments, strengthen peer engagement opportunities, and promote community-building initiatives to enhance the effectiveness of retention strategies and translate social integration into improved Student Performance.



Figure 4 shows the interaction between Student Retention and Student Integration on Student Performance. The findings show that there is a positive and high relationship between the variable Student Retention and Student Performance when there is high Student Integration. The results of the slope analysis indicate that the sense of Student Integration strongly changes the direction and strength of the relationship between Student Retention and Student Performance. The steepness of the slope is higher for HEI with high Student Integration. A higher sense of Student Integration is associated with a higher level of Student Performance for HEI with high levels of Student Retention. Therefore, the level of Student Retention received by HEI (high), when accompanied by high Student Integration, will show a greater tendency to enhance Student Performance compared with low Student Integration.

Figure 4

The Moderating Effect of Social Integration on The Relationship Between Student Retention and Student Performance

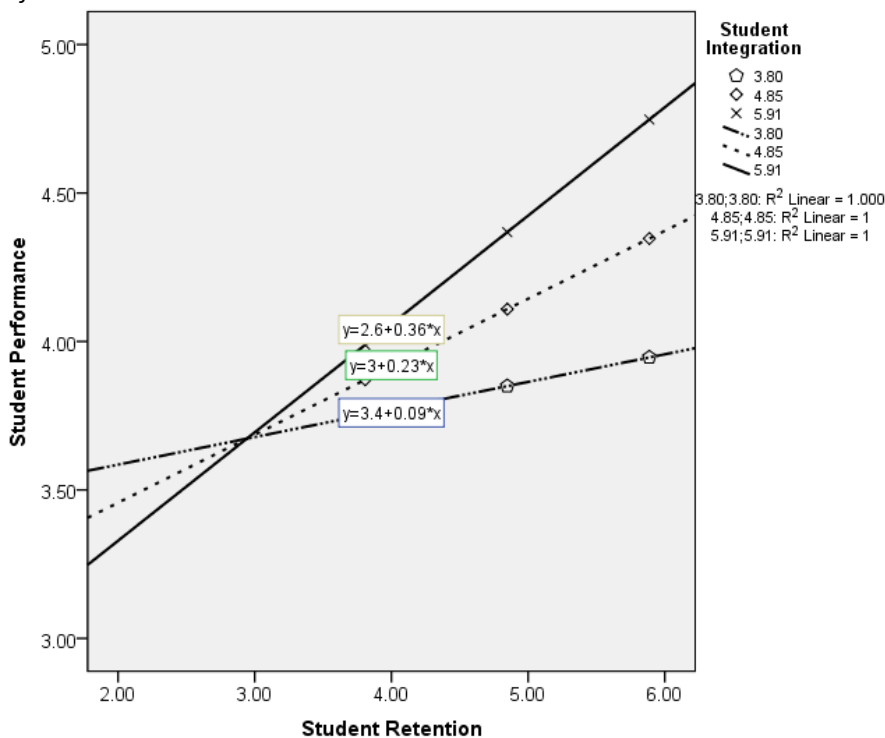


Table 5

Motivation as a Moderator in the Relationship between Student Retention and Student Performance

Variables	Model 1	Model 2	Model 3
	Std. Beta (β)	Std. Beta (β)	Std. Beta (β)
Independent Variable			
Student Retention	0.510**	-0.181*	-0.627**
t - Value	12.363	-4.723	-7.074
Significant	0.000	0.000	0.000
Moderator			
Mediation t - Value		0.955**	0.384**
Significant		24.887	3.499
		0.000	0.001



Interaction

Student Retention x Motivation

t - Value	0.956**
Significant	5.537
	0.000

R Square	0.260	0.695	0.715
Adjusted R	0.258	0.694	0.713
R Square Change	0.260	0.435	0.020
Significant F Change	0.000	0.000	0.000
Durbin-Watson			1.350

Note. Dependent Variable: Student Performance; Significant at level $p < 0.05^{**}$

Table 5 presents the results of the hierarchical multiple linear regression analysis examining the effects of Student Retention and Motivation, as well as their interaction, on Student Performance. The results indicate that the full model explains 71.5% of the variance in the dependent variable, Student Performance ($R^2 = 0.715$).

In Model 1, Student Retention ($\beta = 0.510$, $t = 12.363$, $p < 0.001$) demonstrates a positive and statistically significant effect on Student Performance, accounting for 26.0% of the variance ($R^2 = 0.260$).

In Model 2, the moderator variable Motivation was introduced alongside Student Retention. The inclusion of Motivation substantially increased the explained variance to 69.5% ($R^2 = 0.695$). Both Student Retention ($\beta = -0.181$, $t = -4.723$, $p < 0.001$) and Motivation ($\beta = 0.955$, $t = 24.887$, $p < 0.001$) show statistically significant relationships with Student Performance.

In Model 3, the interaction term between Student Retention and Motivation was incorporated to test the moderating effect. The results show that the explained variance further increased to 71.5% ($R^2 = 0.715$). The effects of Student Retention ($\beta = -0.627$, $t = -7.074$, $p < 0.001$) and Motivation ($\beta = 0.384$, $t = 3.499$, $p = 0.001$) remained statistically significant. Importantly, the interaction term between Student Retention and Motivation ($\beta = 0.956$, $t = 5.537$, $p < 0.001$) was also significant, confirming the presence of a moderation effect.

The Durbin-Watson statistic was examined to assess potential autocorrelation in the regression residuals. Values between approximately 1.5 and 2.5 are generally considered acceptable, suggesting that autocorrelation is unlikely to pose a serious concern for the regression model.

Overall, the analysis indicates that Student Retention and Motivation both have significant relationships with Student Performance, and that Motivation significantly moderates this relationship. Therefore, the hypothesis (H5) stating that Motivation moderates the relationship between Student Retention and Student Performance in higher educational institutions is supported.

These findings align with Vincent Tinto's Student Integration Model and Alexander Astin's Theory of Involvement, both of which emphasize the importance of retention and student engagement in sustaining academic performance within higher education institutions. The significant moderating effect of Motivation suggests that even when retention strategies are implemented, their effectiveness is substantially enhanced when students possess strong intrinsic or extrinsic motivation.

This interaction highlights the multidimensional nature of student success. Retention initiatives may provide structural support, but motivation acts as a catalyst that transforms these efforts into measurable performance outcomes. Consequently, higher education institutions should adopt a comprehensive approach that combines systematic retention mechanisms with targeted motivational interventions to enhance academic achievement and

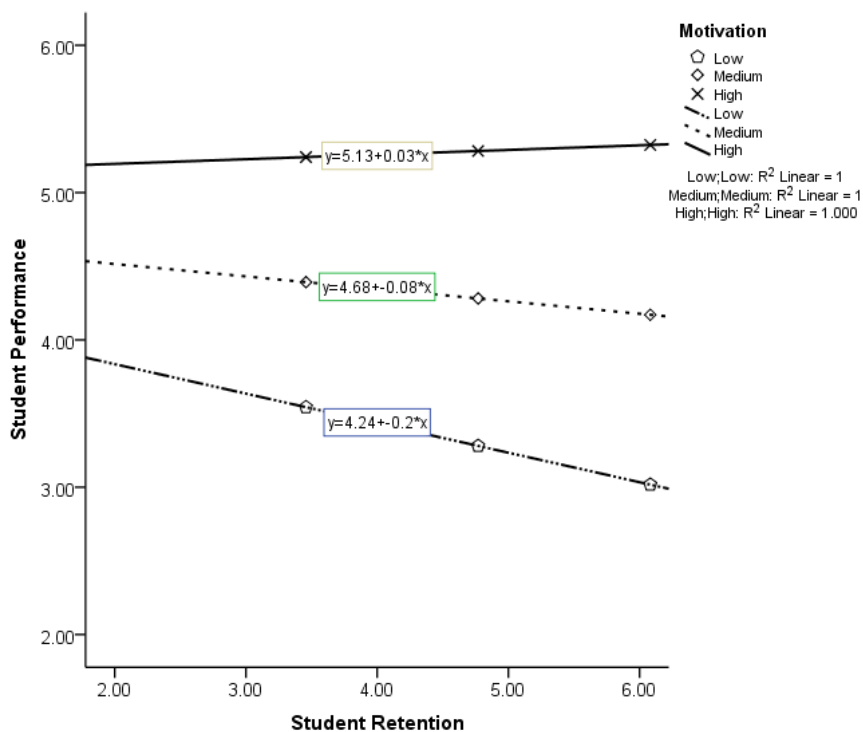


reduce attrition rates.

Figure 5 illustrates the moderating effect of Motivation on the relationship between Student Retention and Student Performance. The interaction plot shows that when Motivation is high, the relationship between Student Retention and Student Performance becomes stronger and more positive. In contrast, when Motivation is low, the relationship weakens and may even become negative, suggesting that retention strategies alone may be insufficient to sustain Student Performance in the absence of adequate motivational drivers. These results further emphasize the critical role of Motivation in amplifying the benefits of retention strategies in higher educational institutions.

Figure 5

The Impact of The Sense of Motivation on The Relationship Between the Student Retention and Student Performance.



From a theoretical perspective, these results are consistent with Baron and Kenny's (1986) moderation framework, which posits that the strength and/or direction of the relationship between an independent and dependent variable change as a function of a moderator. In this case, Motivation acts as a moderator, significantly altering the retention–performance link. These findings underscore that HEIs must not only focus on improving structural and institutional retention mechanisms but also foster higher levels of Motivation to ensure consistent and improved Student Performance outcomes.

DISCUSSION

This study examined the relationship between student retention and Student Performance in Malaysian Higher Education Institutions (HEIs) while evaluating the moderating roles of academic integration, financial integration, social integration, and student motivation. The empirical results confirm that student retention has a significant positive influence on academic performance, suggesting that students who remain engaged and persist within their institutions are more likely to achieve stronger academic outcomes. The analysis further demonstrates that



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institutional and behavioural factors can strengthen or modify this relationship through moderation effects.

From an educational leadership and institutional management perspective, these findings suggest that student success is not solely an outcome of individual effort but is strongly shaped by how institutional leaders design support systems, allocate resources, and cultivate enabling learning environments. Leadership-driven retention strategies appear to be most effective when supported by coordinated academic structures, accessible financial assistance, and inclusive social ecosystems. The moderating role of financial integration, in particular, highlights the importance of institutional affordability policies, scholarship frameworks, and targeted financial interventions in strengthening academic performance and reducing attrition.

Furthermore, the limited standalone impact of academic and social integration indicates that isolated interventions may be insufficient unless embedded within a broader institutional strategy. This reinforces the need for leaders to adopt a systemic, data-informed approach that integrates academic advising, student engagement, and organisational support mechanisms into a cohesive retention framework. The strong moderating influence of motivation also underscores the importance of leadership in shaping institutional culture, fostering student engagement, and promoting psychological and academic resilience.

From an organisational strategy perspective, the findings advocate for a shift from reactive retention measures toward proactive, analytics-informed institutional planning. Learning analytics can enable leaders to identify at-risk students, optimise resource allocation, and implement targeted interventions that enhance both retention and performance outcomes. Institutions that align leadership practices with data-driven decision-making are therefore better positioned to sustain student success and institutional effectiveness.

In terms of institutional policy, the results emphasise the necessity of integrated student success frameworks that combine academic support, financial inclusion, social belonging, and motivational development. Policies focused on affordability, inclusive learning environments, and student engagement should be treated as strategic priorities rather than operational add-ons. Such an approach enables HEIs to strengthen persistence, improve academic performance, and enhance long-term institutional sustainability.

Overall, this study positions student retention as a leadership-driven, organisational outcome shaped by strategic governance, institutional policy, and data-informed management. HEIs that adopt a holistic, leadership-oriented approach to retention are more likely to achieve sustained improvements in Student Performance and institutional success.

CONCLUSION

This study confirms a positive and statistically significant relationship between student retention and Student Performance in Higher Education Institutions (HEIs), with academic integration, financial integration, social integration, and motivation functioning as important moderating factors. The hierarchical regression results demonstrate that these institutional and behavioural moderators substantially increase the explained variance in Student Performance, highlighting their critical role in shaping educational outcomes.

From an institutional perspective, the findings emphasise that student success is not solely determined by individual capability but is strongly influenced by the quality of organisational support systems and leadership-driven strategies. Strengthening academic support mechanisms, ensuring accessible and targeted financial assistance, fostering inclusive social environments, and cultivating student motivation emerge as key institutional priorities for improving both retention and performance.

This study contributes to the higher education literature by reframing retention as an organisational and strategic



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management responsibility rather than merely a student-level phenomenon. The evidence underscores the importance of coordinated, data-informed institutional interventions that integrate academic, financial, and psychosocial dimensions of student support within a unified retention framework.

Overall, this study positions learning analytics as a strategic leadership resource, offering higher education managers evidence-based insights to guide institutional decision-making, policy formulation, and the design of sustainable student success initiatives.

LIMITATIONS

This study has several limitations that should be acknowledged. First, the sample is drawn from Malaysian higher education institutions, which may limit the generalizability of the findings to other contexts, countries, or types of institutions. Second, the data relies on administrative records and student surveys, which may not fully capture all relevant factors influencing the relationship between Student Performance, retention, and attainment. Third, while statistical techniques were employed to test for moderation effects, these methods primarily reveal patterns rather than providing a complete understanding of the underlying mechanisms driving the observed relationships. Fourth, not all potential confounding variables were controlled for, such as personal characteristics like motivation, resilience, or external socio-economic influences, which may also shape student success.

Finally, the study focuses on a specific time period and does not account for long-term outcomes of retention and performance on student attainment. Future longitudinal research would be valuable to explore the sustained impacts of these factors on student success.

POLICY AND LEADERSHIP IMPLICATIONS FOR MALAYSIAN HIGHER EDUCATION

The findings carry important implications for institutional leaders, senior management teams, and policymakers responsible for higher education governance in Malaysia.

To strengthen student retention and attainment in Malaysian higher education institutions (HEIs), several policy directions are recommended. Government agencies should expand funding for cross-contextual research to benchmark Malaysia against global best practices (Ng, 2017). Improving the quality and accessibility of student data through integrated tracking systems would enable more effective monitoring and early identification of at-risk students (Ismail et al., 2017). Future initiatives should prioritise uncovering the mechanisms linking Student Performance, retention, and attainment through robust mixed-methods research (Tan & Lai, 2016).

From a leadership and governance perspective, policies must move beyond evidence generation toward evidence implementation through targeted, data-informed institutional interventions. In addition, longitudinal research frameworks are essential for evaluating long-term academic progression, employability outcomes, and the sustained impact of retention strategies across diverse institutional contexts (Abdullah et al., 2020).

Practical Takeaway

For policymakers and higher education leaders, the key message is clear: student success cannot be explained by academic performance alone. Effective retention strategies, reliable data systems, and long-term monitoring are equally crucial. By combining evidence-driven policies with targeted student support, Malaysia can improve both educational quality and workforce readiness, strengthening its position in the global knowledge economy.

FUTURE DIRECTIONS

The trajectory of learning analytics in Malaysian higher education is highly promising, with growing emphasis on data-driven insights to enhance teaching, learning, and decision-making. As institutions expand digital



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infrastructures and evidence-based practices, learning analytics is poised to improve student outcomes, optimize course design, and strengthen accountability. Several factors support this momentum. The increasing availability of institutional data and advanced analytic tools creates opportunities to harness insights at scale. Recognition of data-driven decision-making as a means to improve retention, reduce failure rates, and personalize learning reinforces analytics as a strategic asset. Policy pressures for accountability and quality assurance further incentivize integration into institutional frameworks.

However, expansion faces notable challenges. Privacy and ethical issues, including consent, ownership, and protection of sensitive student data, require robust governance frameworks. Cultural and institutional resistance may arise if analytics is perceived as intrusive. Predictive models also risk reinforcing inequalities, disproportionately labelling disadvantaged students as “at risk” and stigmatizing them. Resource disparities add complexity. Well-funded universities may adopt advanced systems, while smaller institutions struggle, creating uneven benefits. Scalability and sustainability are equally critical, as pilot initiatives risk failure without institutional commitment, consistent funding, and policy alignment.

Looking ahead, the future of learning analytics in Malaysia depends on balancing opportunity with caution. Establishing ethical guidelines, ensuring inclusivity in data models, providing faculty training, and embedding analytics within national higher education policy are vital steps. If effectively implemented, learning analytics can become a transformative force, driving continuous improvement and fostering more adaptive, equitable, and accountable higher education.

Co-Author Contribution

The authors declare that there is no conflict of interest in this article. Author 1 was responsible for the conceptualization of the study, fieldwork, preparation of the literature review, drafting of the manuscript, and overall supervision. Author 2 provided guidance on the development of the research methodology. Author 3 provided guidance on the statistical analysis.

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Declaration of AI-Generated Content

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