

Lecturer support and student academic performance: the moderating role of age

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ABSTRACT

Lecturer support is an important factor influencing students' academic outcomes in higher education. This study examines the effects of lecturer support dimensions, accessibility and approachability (AccApp), expectation and guidance (E&G), and positive encouragement (PE) on undergraduate students academic performance (SAP), with age tested as a potential moderating variable. Using a quantitative cross-sectional design, data were collected from 250 undergraduate students at the School of Business Management, Universiti Utara Malaysia (UUM), through convenience sampling. Data were analyzed using partial least squares structural equation modeling (PLS-SEM) with SmartPLS 4.0. The results indicate that lecturer AccApp are positively associated with academic performance, whereas excessive expectations and directive guidance are negatively associated. PE was not found to have a significant direct influence. Although age exhibited a positive direct effect on academic performance, it did not significantly moderate the relationships between lecturer support dimensions and student outcomes. These findings highlight the importance of accessible and equitable E&G from lecturers to enhance academic performance in Malaysian higher education. This study contributes to a thorough understanding of the factors impacting SAP and offers insights for lecturers, institutions and government to work holistically to foster an inclusive environment for all parties involved. Recommendations and practical implications for future research are discussed.

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1. INTRODUCTION

The development of a nation heavily depends on the quality and competencies of its workforce, which are cultivated through strong academic foundations in educational institutions. Academic performance serves as a key determinant of students' success, shaping their readiness to enter competitive labor markets and assume future leadership roles. In addition to students' personal effort, external factors, particularly lecturer support, play a critical role in influencing academic outcomes. Supportive lecturers can enhance students' engagement, motivation, and overall performance, enabling them to develop both technical and soft skills necessary for career readiness. The COVID-19 pandemic disrupted higher education worldwide, forcing a rapid transition from face-to-face learning to online teaching. This shift exposed gaps in student engagement, access to resources, and institutional support, leading to increased stress, psychological challenges, and delays in academic progress.

Prior studies identified factors such as family support, teacher quality, student-teacher relationships, and the learning environment as significant determinants of academic performance, with student motivation acting as a mediating factor [1]–[5]. Despite a gradual economic recovery, a mismatch between graduates' qualifications and job opportunities persists, and youth unemployment remains a concern, emphasizing the need for students to develop both academic excellence and employable skills [6]. Age further influences how students respond to lecturer support, with older students potentially facing distinct academic and adjustment challenges. In this context, lecturer support becomes critical, especially in the aftermath of the COVID-19 pandemic in 2020. Effective, equitable, and inclusive guidance from lecturers helps students adapt to post-pandemic learning environments, improve academic performance, and develop key skills for future careers.

Building on social justice and equity theories, this study operationalizes equitable access as measured by lecturer approachability and guidance, hypothesizing that these dimensions will have a differential impact on students of varying ages. The study explicitly connects these theories with its research questions and hypotheses, emphasizing that fair and inclusive distribution of educational resources should inform both the research design and the interpretation of findings. In educational contexts, these theories advocate recognizing and addressing disparities in access and outcomes, ensuring that all students, regardless of age, gender, or background, can achieve their full potential.

Nevertheless, research on undergraduate students in Malaysian higher education institutions (HEIs), especially regarding the moderating role of age in these relationships, remains scarce and is underexplored, warranting further investigation. Accordingly, a proposed research framework is illustrated in Figure 1 to address these research gaps. This study aims to examine the effects of lecturer support on students academic performance (SAP) and also investigate the moderating role of age in this relationship. To achieve these objectives, the study is guided by the following research questions:

- Do lecturer support dimensions have a significant impact on SAP?
- Does age moderate the relationship between lecturer support dimensions and SAP?

SAP, academic performance remains a central indicator of student success in higher education, reflecting students' ability to achieve both short- and long-term educational objectives. In Malaysia, delayed graduation and weaker academic outcomes have been linked to limited interaction with lecturers and increased academic workload, highlighting the importance of supportive instructional practices [7]. Previous studies [8]–[11] consistently identify lecturer support as a key external factor influencing academic performance. However, evidence regarding its specific dimensions remains inconclusive.

Academic performance is crucial for both students' future success and national development, shaping their readiness to become skilled professionals and future leaders. Numerous studies across educational levels including kindergarten, primary and secondary schools, colleges, and public and private universities have explored factors influencing academic performance [12]–[17]. Despite their contributions, these studies show mixed findings and gaps that warrant further investigation. In higher education, SAP is often measured using the cumulative grade point average (CGPA), which reflects the achievement of short- and long-term educational goals [12]–[17]. Wentzel and Wigfield [18] highlighted the importance of academic and social motivation, whereas Kocsis and Molnár [19] emphasized institutional factors affecting dropout rates. While both studies recognize critical influences on performance, they differ in focus: one prioritizes personal motivation, while the other emphasizes systemic or institutional factors. This contrast suggests that both internal and external determinants of SAP need to be studied simultaneously, with a gap addressed in the present study, which focuses on lecturer support and age as a moderator.

Similarly, Masud *et al.* [20] reported that parenting styles and socio-demographic factors affect SAP, whereas Adamu *et al.* [21] emphasized institutional and personal influences. These conflicting findings reveal that the relative weight of personal versus environmental factors is context-dependent, indicating a need for research in specific higher education settings, such as Malaysian public universities, after the post-pandemic period. Research by Xhomara [22] and Uleanya [23] highlighted the role of lecturers in influencing academic outcomes. Xhomara [22] found that structured lecturer support combined with individual study habits strongly predicts academic success, while Uleanya [23] emphasized the quality of lecturer-student relationships. Although both studies demonstrate the importance of lecturers, they differ in focus: one emphasizes formal academic support, while the other focuses on relational and emotional support, suggesting uncertainty about which dimensions of lecturer support are most impactful. This ambiguity motivates the present study to investigate this issue further.

Dube and Mlotshwa [24] found that supportive lecturers, parental involvement, technology, and adequate facilities enhance SAP, while family background, language barriers, and negative peer influence hinder performance. In contrast, Prasetyo *et al.* [11] reported no significant relationship between lecturer competency and SAP, whereas Gee [25] found lecturer competency positively correlates with student satisfaction and performance. These contradictions indicate that the impact of lecturer characteristics and support on SAP remains inconsistent and context-specific, highlighting the need for a focused investigation

in Malaysian HEIs. Worth mentioning that multiple factors, including student motivation, family background, institutional support, and lecturer interactions, could affect SAP [18]–[25]. However, gaps remain in understanding which specific aspects of lecturer support consistently influence academic performance, particularly in the Malaysian context post-pandemic. Therefore, the present study addresses these gaps by examining how lecturer support affects SAP and by including age as a potential moderating factor.

CGPA reflects performance in tests, coursework, and examinations [26]–[28]. Universities use academic performance as a key metric of institutional effectiveness, and high-achieving students enhance the university's reputation [29]. Past studies have yielded mixed findings about what influences academic success. Similarly, research on general academic performance shows conflicting results. While McKenzie and Schweitzer [29] emphasize institutional quality and resources, Abdullah *et al.* [30] highlight social support, including lecturers and peers, as critical for academic adjustment. This suggests ambiguity over whether structural or relational factors more strongly drive performance. Despite evidence that both personal, institutional, and relational factors influence academic performance [18]–[30], few studies have investigated the specific dimensions of lecturer support in post-pandemic Malaysian public universities, and the moderating role of age on these relationships remains underexplored. Addressing these gaps, the present study investigates how the dimensions of lecturer support influence SAP and whether age moderates these effects, offering insights for enhancing student academic outcomes.

Lecturer support is recognized as a key factor influencing student academic success, affecting motivation, engagement, and performance [31]–[37]. However, empirical findings on lecturer support are mixed. Some studies emphasize structured academic guidance and instructional clarity, while others highlight the importance of relational quality and approachability. This variation suggests uncertainty regarding which forms of lecturer support are most influential, reinforcing the need to examine distinct support dimensions within specific institutional contexts.

Teacher support, often used interchangeably with lecturer support, has been linked to improved student motivation and well-being [32]–[37]. Wentzel [32] found that supportive relationships with teachers, parents, and peers enhance multiple aspects of student motivation, while Klem and Connell [33] reported a strong relationship between teacher support and student engagement and achievement. In contrast, Strati *et al.* [34] highlighted that factors such as class size, curriculum, and student background can moderate the effect of teacher support, suggesting that its impact is context-dependent. These contradictions indicate a need to examine lecturer support in specific higher education settings, such as Malaysian public universities, post-pandemic.

Research also shows inconsistencies regarding the type of lecturer support. As mentioned earlier, Xhomara [22] emphasized structured academic guidance, while Uleanya [23] focused on relational support through lecturer-student interactions. Similarly, Dube and Mlotshwa [24] found that supportive lecturers, parental involvement, and adequate facilities improve SAP, whereas Prasetio *et al.* [11] found no significant effect of lecturer competency, and Gee [25] reported that lecturer competency positively affects student satisfaction and, in turn, SAP. Moreover, Affuso *et al.* [38] included teacher support, parental roles, motivation, and self-efficacy; Ansong *et al.* [39] examined teacher support across assessment types; and Tao *et al.* [40] incorporated student engagement in SAP. Even all these studies support the positive role of lecturer support, they do not differentiate its specific dimensions, leaving it unclear which form of lecturer support could influence SAP. Therefore, the contradictory and inconsistent findings in previous studies highlight uncertainty regarding which dimensions of lecturer support most effectively enhance SAP, underscoring the need for further nuanced research. While previous research underscores the significance of lecturer support [22]–[25], [30], [32]–[40], there remains a paucity of evidence regarding the specific dimensions of lecturer support and the moderating effects of age on SAP within Malaysian public universities, particularly in the post-pandemic era after 2020. Consequently, a comprehensive investigation is warranted to advance the existing body of knowledge in this area.

The role of age, age has been increasingly recognized as a potential moderating variable in the relationship between lecturer support and SAP. However, limited research has systematically examined how age influences the effectiveness of lecturer support among students in Malaysian public universities, especially in the context following the COVID-19 pandemic. Senior students' prior experience with university routines contrasts with juniors' limited exposure, resulting in variations in adjustment, motivation, and learning strategies. This highlights the importance of age as a factor that may affect students' academic outcomes. Age is known to influence cognitive development, learning styles, and motivation. Older students often perform better academically due to greater maturity and experience, while younger students may face challenges from developmental differences [41]–[43]. However, past studies have produced contradictory findings. Some report that older students achieve higher outcomes due to cognitive and social advantages [41]–[43], while others suggest that relative-age effects are inconsistent, varying by context and subject [44]. For instance, students were found to report lower subjective well-being than their younger peers [45], [46]. Despite examining age in relation to teacher support, prior research has largely overlooked its moderating

effect on academic outcomes especially SAP, creating a gap in understanding how age influences the effectiveness of lecturer support on students' CGPA.

In the current context, age has emerged as a potentially important moderator of student learning outcomes, specifically CGPA based on academic performance. Yet, empirical evidence on its moderating role in the relationship between lecturer support and SAP in Malaysian public universities remains limited, underscoring the need for further investigation. Examining this interaction is particularly relevant given the diverse student age profiles. Addressing this gap will clarify whether lecturer support is equally effective across age groups or varies, providing practical guidance for targeted academic interventions.

Social justice and equity theories highlight the importance of providing all students with equitable access to educational resources, facilities, and support systems. This study is rooted in the social justice principle that fostering positive relationships and a supportive climate is essential for equitable outcomes. Social justice and equity theories recognize that individual characteristics (such as age) intersect with broader social structures to shape educational experiences and outcomes. The moderation hypotheses explore whether the influence of each dimension of lecturer support on academic performance differs by age, acknowledging that equity is not about uniformity but about responsiveness to diverse needs. Each hypothesis operationalizes a core equity principle, removing barriers, affirming student identity, ensuring high expectations, and adapting to diverse needs, demonstrating how social justice and equity theories inform both the factors examined and the attention to individual differences (age) in shaping academic outcomes. Therefore, several hypotheses are listed as:

- H1: the dimensions of lecturer support significantly influence SAP.
- H2: age moderates the relationship between the dimensions of lecturer support and SAP.

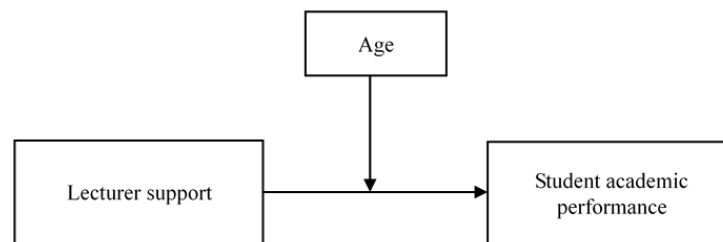


Figure 1. Proposed research model

2. METHOD

2.1. Research design, population, and sampling

This quantitative study employed a cross-sectional design to examine students' perceptions of academic performance during a defined academic semester. Cross-sectional data collection allows for efficient analysis within a limited timeframe and is less resource-intensive than longitudinal approaches. Data were collected via an online survey and analyzed using SPSS and SmartPLS 4.0. The population comprised 10,489 students enrolled in the second semester of 2022 (A222) at the School of Business and Management (SBM), Universiti Utara Malaysia (UUM). A complete sampling frame could not be established due to administrative constraints, making the probability-based sampling technique infeasible. Given the study's objective of examining relationships among variables rather than generalizing findings to the entire population, convenience sampling was deemed appropriate. While this approach facilitated timely and cost-effective data collection, it has limitations, including potential lack of representativeness, sampling bias, and reduced statistical power. Additional limitations of online data collection include low response rates, possible inaccurate responses, and exclusion of students without internet access or sufficient digital literacy. These considerations were carefully accounted for in the study design and interpretation of results.

For behavioral research, a sample size of 30-500 is generally considered suitable [47]. Although larger samples can yield more precise estimates, they are often costly and may lead to errors or inefficient resource use. Conversely, small samples may reduce the effectiveness of hypothesis testing. To ensure an adequate sample size, a sample size calculator [48] was used to determine the minimum number of respondents required to meet the desired statistical criteria. Based on Table 1, the parameters were established to guide this study. The calculation indicated that 371 participants were needed to achieve 95% confidence at a $\pm 5\%$ margin of error. Additionally, according to Krejcie and Morgan's table [49], a population of 10,000 requires a sample size of 370.

Although the initial sample size calculation indicated that 371 respondents were required, a total of 250 valid responses were collected and retained for analysis due to voluntary participation and constraints on online data collection. This sample size is considered adequate for partial least squares structural equation modeling (PLS-SEM), which is suitable for exploratory research and performs reliably with small-to-medium samples. Accordingly, the final dataset was sufficient to examine the hypothesized relationships among the study variables.

Table 1. Parameters for sample size calculation

Parameter	Value
Confidence level	95%
Margin of error	5%
Population proportion	50%
Population size	10,489
Sample size	371

2.2. Pre-test and pilot study

Prior to data collection, a pre-test was conducted to validate the questionnaire and establish face validity. Two senior lecturers reviewed the instrument for clarity, relevance, and technical accuracy, resulting in minor revisions to wording and formatting. This ensured that each construct accurately measured the intended concept, as errors could affect respondents' perceptions and compromise data quality. A pilot study was subsequently conducted with 30 participants, consistent with recommendations that 10–30 participants are sufficient for survey research [50]. Reliability analysis of the pilot data produced a Cronbach's alpha of 0.958 for the lecturer support construct, indicating high internal consistency, consistent with previous studies reporting values between 0.91 and 0.97 [51], [52].

2.3. Data collection procedure and ethical considerations

Data collection commenced after obtaining approval from SBM lecturers. Participation in the survey was entirely voluntary, and students were informed of their rights and the study's purpose before proceeding. No personal or sensitive information was collected, and completion of the survey was considered implied consent. The confidentiality and anonymity of all participants were strictly maintained throughout the process.

2.4. Research instrument

SAP was measured using the CGPA, which reflects continuous assessment and examination results [12]. CGPA is widely recognized as a curriculum-based indicator of student learning and provides a comprehensive measure of academic progress. Students' most recent internal examination results were used, with scores ranging from 0.00 to 4.00, consistent with prior research [12], [20]. At UUM, academic performance is graded on a standard scale: A+, A, A-, B+, B, B-, C+, C, C-, D, and F. For analytical purposes, CGPA was further classified into first class (3.67–4.00), second class upper (3.00–3.66), and second class lower (2.00–2.99).

Lecturer support was measured using the teacher support scale (TSS) developed by Metheny *et al.* [52]. All 21 items were adapted for this study and measured on a 5-point Likert scale (1=strongly disagree; 5=strongly agree), which has been reported to have high reliability in the study (0.96). Age was included as a potential moderator and measured as a continuous variable in years to examine its moderating effect on the relationships between the dimensions of lecturer support and SAP. Table 2 summarizes the constructs.

Table 2. Summary of constructs

No.	Constructs	No. of items	Scale	Source
1	SAP	-	0.00-4.00 (CGPA)	[12], [20]
2	Lecturer support	21	5-point Likert	[52]
3	Age	-	Continuous (years)	Self-reported

2.5. Data analysis

Data analysis in this study was conducted in two stages. First, SPSS was used to carry out descriptive and preliminary statistical analyses, providing an overview of the dataset and facilitating comprehensive data processing. In the second stage, SmartPLS 4.0 was utilized for more advanced statistical analyses. SmartPLS was selected due to its user-friendly interface, robust performance with small-to-medium

sample sizes, and suitability for predictive modeling, making it especially appropriate for exploratory and theory-development research. Compared to other SEM tools such as AMOS, Mplus, and LISREL, SmartPLS provides greater flexibility for prediction-oriented analyses and does not require strict distributional assumptions. In contrast, AMOS is primarily designed for confirmatory modeling.

To account for potential confounding effects on SAP, gender, bachelor program, and semester were included as control variables in the analysis. Controlling for these variables ensured that the relationships between lecturer support dimensions and SAP were not influenced by extraneous factors. By reducing confounding effects, the analysis minimized potential bias and enhanced internal validity, thereby providing more robust and reliable results. Incorporating control variables enabled a more accurate assessment of the effects of lecturer support on SAP.

3. RESULTS AND DISCUSSION

3.1. Demographic profile

The response rate in this study is 67.38%, which exceeds the rates commonly reported in survey-based studies in the social sciences, ranging from 20% to 30% [53]. As shown in Table 3, female students constituted the majority of respondents (74%), while males accounted for 26%. Most respondents were aged 22-23 years (63.2%). The largest proportions were enrolled in the Bachelor of Human Resource Management (BHRM) (32%) and the Bachelor of Business Administration (BBA) (29.2%), followed by other programs (18.4%) including Bachelor of Entrepreneurship (BEnt). The majority of respondents were in semesters 4 to 6 (72.0%), indicating that most participants were senior-level undergraduate students.

Table 3. Demographic profile of respondents

No.	Demographic characteristic	Category	Number of respondents	Percentage (%)
1	Gender	Female	185	74
		Male	65	26
		Total	250	100
2	Age	20	12	4.8
		21	48	19.2
		22	77	30.8
		23	81	32.4
		24	26	10.4
		25	5	2
		27	1	0.4
		Total	250	100
3	Bachelor program	Bachelor of Marketing	26	10.4
		BBA	73	29.2
		BEnt	25	10
		BHRM	80	32
		Others	46	18.4
		Total	250	100
4	Semester	1	6	2.4
		2	45	18
		3	5	2
		4	83	33.2
		5	5	2
		6	97	38.8
		7	5	2
		8	3	1.2
		10	1	0.4
		Total	250	100

3.2. The measurement model assessment

3.2.1. Convergent validity

Convergent validity was assessed to determine the extent to which multiple indicators are correlated, indicating that they effectively represent the same underlying concept. High inter-item correlations indicate that items consistently reflect the same underlying construct. Factor loadings above 0.50 suggest that an item has a strong relationship with its construct and explains a meaningful portion of its variance [54], while items with lower loadings may indicate insufficient representation of the construct. Internal consistency was assessed using Cronbach's alpha to evaluate the extent to which items in a scale are interrelated.

A Cronbach's alpha value exceeding 0.70 is generally considered acceptable for reliability [55]; lower values suggest inconsistent item responses. Composite reliability (CR), which accounts for individual

item loadings, is often preferred in SEM [56], and values above 0.70 indicate good reliability. In addition, average variance extracted (AVE) was used to evaluate the proportion of variance explained by the construct relative to the measurement error. An AVE value of 0.50 or higher reflects adequate convergent validity, while values below this threshold may indicate potential issues with construct measurement [56], [57].

The measurement model assessment was conducted as illustrated in Figure 2. A total of eight items were deleted due to low factor loadings (<0.4) and to improve the CR and AVE for each dimension, as outlined in Table 4. Given that the expectation dimension was reduced to a single item after item removal, confirmatory approaches such as confirmatory factor analysis (CFA) or structural model assessment were no longer viable, as these methods require multi-item constructs to ensure reliability and validity. Exploratory factor analysis (EFA) was therefore employed to empirically explore the underlying factor structure within the current dataset, rather than imposing a predefined structure that was no longer supported.

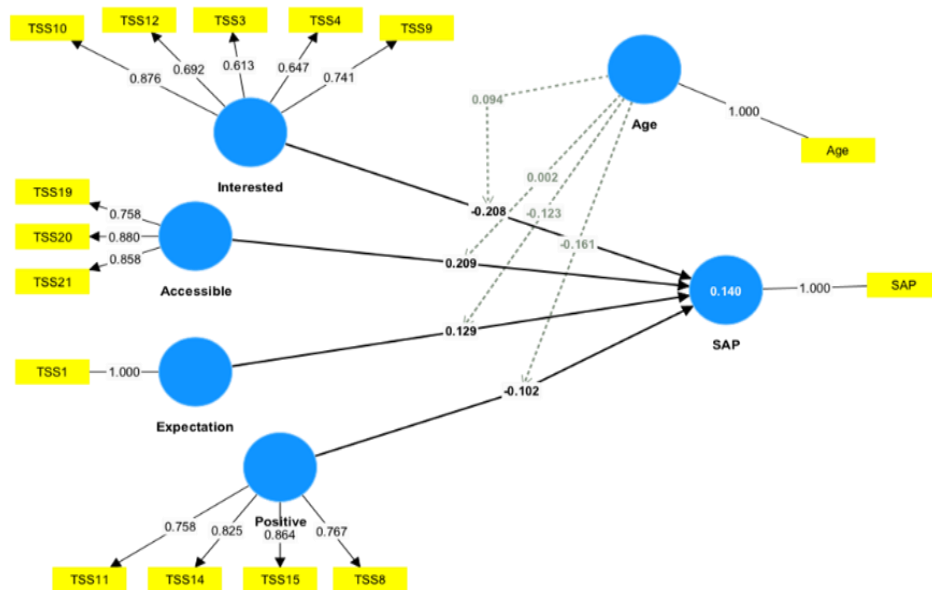


Figure 2. The measurement model

Table 4. Convergent validity

Dimensions	Items	Factor loadings	Cronbach's alpha	CR	AVE
Accessibility (Acc)	TSS19	0.758	0.795	0.872	0.695
	TSS20	0.88			
	TSS21	0.858			
Expectation (Exp)	TSS1	1	0.784	0.841	0.518
Interest (Int)	TSS3	0.613			
	TSS4	0.647			
	TSS9	0.741			
	TSS10	0.876			
Positive regard (Pos)	TSS12	0.692	0.824	0.88	0.648
	TSS8	0.767			
	TSS11	0.758			
	TSS14	0.825			
	TSS15	0.864			
	Age	1.000			
SAP	1.000				

This approach is supported by methodological literature, which recommends EFA when theoretical models do not fit the data or when dimensionality is uncertain due to insufficient or problematic items. By conducting EFA, we ensured that the factor structure was empirically determined and appropriate for the present sample, thus enhancing the validity of subsequent analyses. Furthermore, Lazarová *et al.* [58] has demonstrated that dimensionality can vary across samples, underscoring the importance of adapting the analytic approach to the specific characteristics of the data. Therefore, EFA was essential for accurately identifying the latent structure of lecturer support in this context and for providing a solid foundation for further analysis.

After conducting the EFA, the analysis revealed three primary dimensions that accounted for a substantial portion of the variance in the dataset (49%). This finding indicates that the data are best represented by three latent factors, each contributing meaningfully to the observed variables. The EFA, using varimax rotation, identified three underlying factors of lecturer support, as shown in Table 5. Following the removal of two items from the expectation and guidance (E&G) dimension (items 1 and 2), the results improved considerably and were deemed satisfactory.

Accessibility and approachability (AccApp) comprises items that reflect lecturers' approachability, willingness to listen, and support for both academic and personal issues. Positive encouragement (PE) is characterized by items that demonstrate lecturers' encouragement, recognition, and personal care for students. E&G include items related to academic demands, guidance provision, and the promotion of learning and achievement. After categorizing each item into its respective dimension, a new measurement model assessment and convergent validity analysis were conducted.

Table 5. New dimensions of LS

Dimension	Label	Items (number-content)
1	AccApp	6, 7, 17, 18, 19, 20, 21
2	PE	3, 5, 8, 11, 12, 14, 15
3	E&G	1, 2, 4, 9, 10, 13, 16

As shown in Table 6, all values for Cronbach's alpha, CR, and AVE met established thresholds, indicating satisfactory reliability and convergent validity. All items exhibited factor loadings above 0.50, confirming their adequacy in representing their respective constructs. Furthermore, the AVEs for all three dimensions exceeded 0.50, demonstrating that each construct accounts for a substantial proportion of variance beyond measurement error. Cronbach's alpha values were above 0.70 for AccApp (0.888), PE (0.881), and E&G (0.813), and CR values for all three dimensions also surpassed 0.70. Collectively, these results confirm the robustness of the new measurement model and are further supported by an acceptable path coefficient, as illustrated in Figure 3.

Table 6. Convergent validity

Dimensions	Items	Factor loading	Cronbach's alpha	CR	AVE
AccApp	TSS17	0.761	0.888	0.900	0.564
	TSS18	0.745			
	TSS19	0.741			
	TSS20	0.813			
	TSS21	0.818			
	TSS6	0.578			
	TSS7	0.776			
PE	TSS11	0.729	0.881	0.890	0.541
	TSS12	0.713			
	TSS14	0.787			
	TSS15	0.849			
	TSS3	0.765			
	TSS5	0.515			
	TSS8	0.745			
E&G	TSS10	0.866	0.813	0.856	0.546
	TSS13	0.715			
	TSS16	0.690			
	TSS4	0.659			
	TSS9	0.747			

3.2.2. Discriminant validity

Discriminant validity was evaluated using the heterotrait-monotrait ratio of correlations (HTMT). All HTMT values between constructs were below the recommended threshold of 0.90, indicating adequate discriminant validity [54], [57]. Specifically, HTMT values ranged from 0.023 to 0.859, with the highest values observed between AccApp and E&G (0.859) and between AccApp and PE (0.856), as shown in Table 7. These results suggest that each construct is empirically distinct, thereby supporting the validity of the measurement model for subsequent structural model analysis.

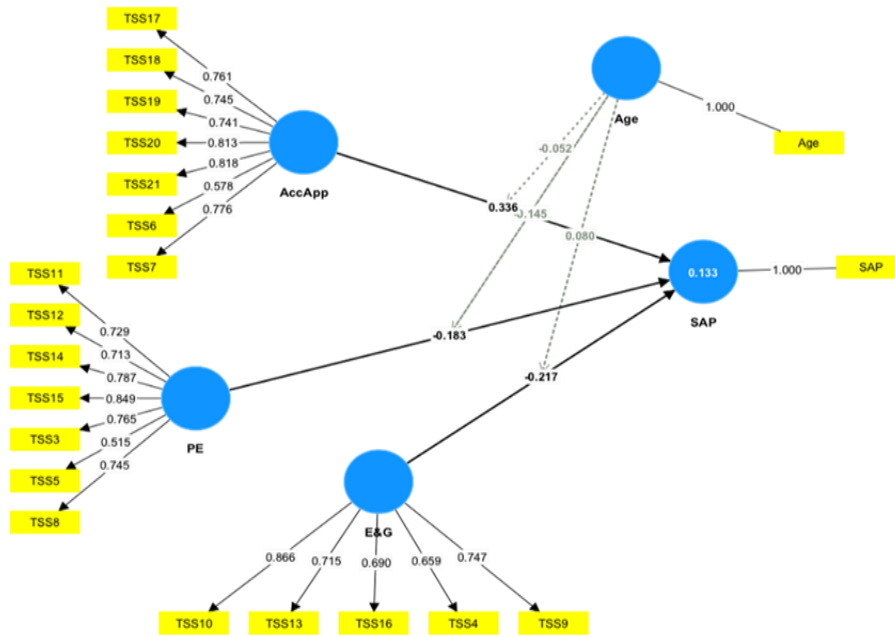


Figure 3. A new measurement model

Table 7. HTMT

Dimensions	AccApp	Age	E&G	PE	SAP	Age x PE	Age x AccApp
AccApp							
Age	0.063						
E&G	0.859	0.081					
PE	0.856	0.065	0.798				
SAP	0.060	0.225	0.116	0.076			
Age x PE	0.033	0.090	0.066	0.051	0.115		
Age x AccApp	0.039	0.085	0.043	0.046	0.085	0.738	
Age x E&G	0.065	0.162	0.092	0.079	0.023	0.658	0.578

3.3. The structural model assessment

Following the successful evaluation of the measurement model, the structural model was assessed. As shown in Figure 4, the model comprises interconnected circles (or ellipses) representing latent variables, with arrows indicating the hypothesized relationships among them. These directional arrows are annotated with path coefficients and often accompanied by p-values or t-values to denote the strength and significance of each relationship. Additionally, indicator variables depicted as boxes are linked to their respective latent constructs by arrows. The results of the hypothesized relationships are presented in Tables 7 and 8.

The results of the structural model, presented in Table 8, indicate that the path from AccApp to SAP was positive and significant ($\beta=0.336$, $t=1.994$, $p=0.023$), thereby supporting the hypothesized relationship. The path from E&G to SAP was negative yet significant ($\beta=-0.217$, $t=1.886$, $p=0.030$), also lending support to the hypothesis. In contrast, the path from PE to SAP was negative and nonsignificant ($\beta=-0.183$, $t=1.253$, $p=0.105$), providing no empirical support for this relationship. Additionally, age demonstrated a positive and significant effect on SAP ($\beta=0.202$, $t=3.441$, $p=0.000$), reinforcing its role within the model. These findings clarify which relationships among the constructs were empirically supported. Furthermore, the model accounted for 13.3% of the variance in SAP ($R\text{-square}=0.133$; adjusted $R\text{-square}=0.108$), indicating modest explanatory power for the included predictors and moderation terms.

The moderation analysis results are summarized in Table 9. Interaction terms between age and each lecturer support dimension were included to examine whether age moderated the relationships with SAP. The findings indicate that none of the interaction effects was statistically significant. These results suggest that age does not significantly moderate the relationships between the lecturer support dimensions and SAP in this study.

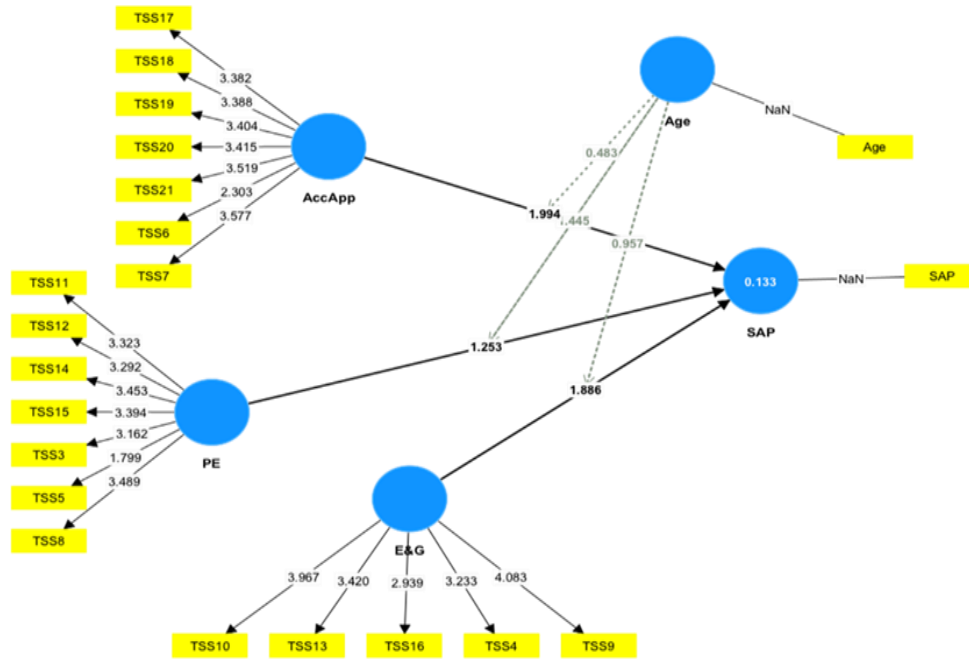


Figure 4. Structural model assessment

Table 8. Findings of the direct effect

Path	Path coefficients	Standard deviation	t-values	p-values	Result
AccApp->SAP	0.336	0.168	1.994	0.023	Supported
E&G->SAP	-0.217	0.115	1.886	0.030	Supported
PE->SAP	-0.183	0.146	1.253	0.105	Not supported
Age->SAP	0.202	0.059	3.441	0.000	Supported

Table 9. Findings of the moderation effect

Path	Value/Path coefficients	Standard deviation	t-values	p-values	Result
Age x PE->SAP	-0.145	0.101	1.445	0.074	Not accepted
Age x AccApp->SAP	-0.052	0.108	0.483	0.315	Not accepted
Age x E&G->SAP	0.080	0.084	0.957	0.169	Not accepted

3.4. Discussion

The results indicate that lecturer AccApp are positively associated with SAP. When lecturers are perceived as available and open to communication, students are more likely to seek guidance and remain engaged in the learning process. This finding supports social justice and equity perspectives, which emphasize fair access to academic support for all students. During both the pre- and post-COVID-19 pandemic periods, UUM’s SBM prioritized lecturer accessibility and open communication, enabling students to better navigate academic and personal challenges. These proactive efforts fostered strong rapport between lecturers and students, which, in turn, improved attitudes, increased motivation, and enhanced perceptions of learning. This finding echoes that of Madolo and Thengimfene [59] who reported that students who perceive their lecturers as accessible and approachable tend to achieve higher academic results. It also aligns with prior evidence that rapport-building and instructor availability are fundamental to fostering positive educational outcomes, particularly during transitional periods such as the return to campus post-pandemic [60].

Next, the results show a significant negative relationship between the E&G dimension and SAP. Excessive expectations and overly prescriptive guidance can create inequitable learning environments, leaving some students feeling overwhelmed or unsupported. This finding reinforces the need for balanced and inclusive teaching practices that recognize and accommodate diverse student needs. This finding is in line with a previous study by Talley [61] who reported that overemphasis on academic demands and academic pressure can negatively impact student achievement, particularly in high-pressure contexts. In this case, excessive academic demands or overly directive guidance might increase pressure and stress among students, particularly during the challenging transition period of the COVID-19 pandemic. For instance,

UUM students returning to campus after a period of remote learning in 2022 may have struggled to readjust to higher academic expectations, resulting in lower performance.

This result aligns with previous studies [62], [63], who found that excessive or controlling E&G can increase student anxiety and worry, which, in turn, negatively impact performance. Overly directive teaching was also associated with lower motivation and engagement, resulting in poorer academic outcomes. Conversely, other research [64], [65] suggests that high E&G can be beneficial in some contexts, indicating that the impact may depend on implementation style, student perceptions, and contextual factors.

The findings indicate that the relationship between PE and SAP was negative and not statistically significant. Social justice and equity theories emphasize not only equitable access to resources and support, but also the importance of tailoring educational practices to address the diverse needs of all students. This study's results are consistent with the work of Lindorff [66], who suggested that encouragement alone may not directly improve academic outcomes but could positively influence non-academic aspects such as motivation and well-being. In this study, it appears that PE, in the absence of academic support or clear guidance, may not be sufficient to improve academic performance. Students may benefit more from tangible support, such as constructive feedback, access to resources, or structured guidance, to enhance their academic achievement. Furthermore, the effects of encouragement may be more closely linked to non-academic outcomes, such as increased motivation, well-being, or engagement, rather than to direct improvements in grades. Cultural or contextual factors within the university environment could influence how students perceive and respond to lecturers' encouragement, potentially diminishing its effectiveness in boosting academic results. Even though encouragement can foster a positive learning environment, it may not directly translate into improved academic performance unless integrated with other instructional supports [67].

The study found a direct positive effect of age on academic performance, but age did not significantly moderate the relationship between dimensions of lecturer support and SAP. Social justice and equity frameworks emphasize that all students, regardless of age, should have fair access to supportive educational resources. The findings suggest that while older students may inherently perform better, possibly due to greater maturity or experience, the benefits of lecturer support are equally important for students of all ages. This underscores the value of inclusive teaching practices that ensure equitable support and opportunities for academic success, addressing the diverse needs of both younger and older learners without discrimination or bias. These findings are consistent with those of Momanyi *et al.* [68] who found a direct effect of age and no significant moderation of student academic success. Further, both studies by Košir and Tement [69] proven that some age-specific differences exist in the relations between teacher personal support and achievement. Thus, it could be seen that academic performance may be more strongly influenced by other variables, such as prior educational background, motivation, learning strategies, or socio-economic status, learning environment, or personal circumstances, which could diminish the observable impact of age as a moderator. This could be demonstrated by examining the remaining 86.7% of the variance in SAP, which is not explained by the current study's model. Next, it is possible that the need for lecturer support, whether encouragement, accessibility, or guidance, is relatively universal among students, regardless of age. All students, irrespective of age, may equally value and respond to such support, especially in the challenging context of post-pandemic academic adjustment during 2022.

In the context of Malaysian public universities, cultural norms may consistently emphasize lecturer support across age groups. Students might share similar expectations and reactions to support practices, reducing the likelihood of age-related differences. Therefore, these findings suggest that, in this context, age does not significantly alter the impact of various lecturer support dimensions on academic performance. Future research could explore other potential moderating variables, such as gender, academic discipline, or prior educational experience or examine broader age ranges to further investigate differential effects. The modest explanatory power of the model suggests that SAP is influenced by multiple personal and contextual factors beyond lecturer support alone, which is consistent with prior research in higher education settings.

Based on the findings, the most crucial practical implications for lecturers are to make themselves available for consultations, foster approachability in both class and online settings, and encourage open communication with students. Lecturers should provide clear, structured guidance while avoiding unrealistic academic demands, and promote flexibility, empathy, and individualized support, particularly during periods of transition or stress, such as the post-pandemic return to campus. Moreover, PE should be integrated with actionable feedback, academic resources, and targeted support to effectively enhance students' motivation and well-being. Since age did not moderate the impact of lecturer support, support strategies should be inclusive and address the needs of all students, rather than focusing on specific age groups. These recommendations align with evidence-based practices and social justice principles, ensuring that all students receive the support necessary for academic success.

Institutions, especially public HEIs in Malaysia, should provide ongoing training for lecturers to develop interpersonal skills, effective communication, and strategies for balancing academic demands with student well-being. Workshops on student-centered teaching and rapport-building can enhance the overall

learning environment. Schools and universities should foster a culture that values lecturer-student rapport, accessibility, and holistic support. Institutional rewards and incentives can reinforce these values and motivate lecturers to maintain strong connections with students. Although age was not a significant moderator, institutions should still recognize the diversity in student backgrounds and experiences. Providing accessible academic advising, mental health resources, and peer support programs can further enhance student success. By adopting practices informed by social justice and equity frameworks, lecturers and institutions can foster inclusive environments that support the academic achievement of all students, particularly those who may be at greater risk of exclusion or underperformance due to systemic barriers. All parties should work together to create a supportive, balanced, and flexible academic environment.

4. CONCLUSION

As student academic outcomes become a central focus of the Ministry of Higher Education, the significant role of lecturer support in fostering student success is crucial. Nonetheless, how to effectively improve lecturer support to achieve good student outcomes is not fully explained in the previous literature, especially given the presence of age as a moderator in lecturer support-performance studies. Also, it is rarely explored in Malaysian HEIs. Thus, the current study addresses this issue by examining this relationship among undergraduate students at SBM, UUM. The current study found that lecturer accessibility and approachability significantly enhance SAP, whereas excessive E&G negatively influence academic performance. PE did not show any significant effect. On the other hand, age had a direct positive effect on SAP, even though it did not moderate any dimension of lecturer support or SAP.

Lecturers should prioritize being accessible and approachable, offer balanced guidance, and integrate encouragement with concrete academic support. Institutions should foster a supportive culture, provide professional development, and regularly review academic demands to optimize student outcomes. Additionally, institutions should consider implementing structured mentor programs and ongoing professional development workshops focusing on inclusive pedagogy, effective communication, and student-centered support. These initiatives can better equip lecturers to address diverse student needs and foster equitable learning environments.

The study's findings may be limited by reliance on self-reported data, which could lead to common-method bias and social desirability effects. Future research should incorporate objective academic performance metrics and multi-informant data sources to enhance measurement validity. Second, although gender, program, and semester were controlled, other potentially confounding variables, such as socioeconomic status, prior academic achievement, and psychological well-being, were not included and may have influenced the results. Third, the use of convenience sampling and the focus on a single institution limit the generalizability of the findings to other contexts and populations. Fourth, the cross-sectional design prevents conclusions about causality and the directionality of relationships among variables. Finally, the study was conducted during the post-pandemic transition period, which may have influenced student experiences and responses in ways not fully captured by the study's measures. In other words, future research should include multiple institutions and broader demographic groups, explore additional variables (such as motivation or learning strategies), and consider longitudinal designs to better understand causal relationships and changes over time. Addressing these limitations in future research will help to strengthen the robustness and applicability of the findings. Overall, the study provides evaluative insights into how specific lecturer support practices relate to student academic outcomes. By emphasizing accessibility, balanced guidance, and inclusive support strategies, Malaysian HEIs can strengthen teaching practices that promote academic success across diverse student groups.

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AUTHOR CONTRIBUTIONS STATEMENT

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CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

DATA AVAILABILITY

The data that support the findings of this study are available on request from the corresponding author, [NHZ].

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