e-Bangi Faculty of Social Sciences and Humanities Universiti Kebangsaan Malaysia
Journal of Social Sciences and Humanities

ISSN: 1823-884x
Volume 23, Issue 2, DOI: https://doi.org/10.17576/ebangi.2026.2302.16

Original Research Article

Beyond the Classroom: Artificial Intelligence and Social Media in Digital Learning Ecosystems and Their Impact on Student Academic Performance in Malaysia

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Received:25 February 2026 / Accepted:29 May 2026

Abstract. The rapid integration of Artificial Intelligence and Social Media into higher education has significantly transformed student learning environments, creating new opportunities and challenges for academic performance. This study aims to examine the impact of artificial intelligence and social media usage on student academic performance in Malaysia. A quantitative research design was employed, and data were collected from 300 university students using a structured questionnaire comprising 19 items across three constructs: artificial intelligence usage, social media usage, and academic performance. The data were analysed using descriptive statistics, reliability analysis, Pearson correlation, and multiple regression analysis via IBM SPSS Statistics. The findings indicate that both artificial intelligence and social media usage have significant positive effects on academic performance, with artificial intelligence demonstrating a stronger influence ($\beta = 0.511$, $p < 0.001$). The regression model explains 61.7% of the variance in academic performance ($R^2 = 0.617$, $F(2, 297) = 239.733$, $p < 0.001$), indicating strong explanatory power. The study concludes that the structured and purposeful integration of digital technologies plays a crucial role in enhancing student learning outcomes. These findings make several important contributions: theoretically, they extend the Unified Theory of Acceptance and Use of Technology (UTAUT) by demonstrating its applicability to integrated AI and social media usage in a non-Western higher education context; practically, they provide educators and academic administrators with evidence-based guidance for designing technology-enriched learning environments; and from a policy perspective, the findings inform institutional digital learning strategies in Malaysian public universities, offering a model for responsible and effective technology integration that can be adapted across the broader Southeast Asian higher education landscape.

Keywords Artificial intelligence; social media; academic performance; higher education; Malaysia.

Introduction

The increasing integration of Artificial Intelligence and Social Media has fundamentally transformed the landscape of higher education. Artificial intelligence refers to computational systems capable of performing tasks that typically require human intelligence, such as learning, problem-solving, and decision-making (Russell & Norvig, 2021), and in educational contexts, it is commonly applied through adaptive learning systems, intelligent tutoring, and automated feedback mechanisms (Adıgüzel et al., 2023; Chen, 2025; Vieriu, 2025). In contrast, social media encompasses digital platforms that enable users to create, share, and exchange information, facilitating interaction and collaboration among students. Within this study, artificial intelligence usage is conceptualised as the extent to which students utilise AI-based tools such as ChatGPT to support learning activities, while social media usage refers to the academic-oriented use of platforms such as

WhatsApp, Telegram, and YouTube for communication, collaboration, and information access. Together, these technologies form a digital learning ecosystem that shapes students' academic engagement and performance.

The growing reliance on digital technologies in higher education raises important questions regarding their effectiveness in enhancing academic outcomes (Romaniuk, 2024; Yaseen et al., 2025; Al-Rahmi et al., 2022). While artificial intelligence offers opportunities for personalised and efficient learning, social media presents both benefits and risks. Students increasingly depend on these technologies for academic tasks, yet concerns remain regarding potential distractions, reduced attention span, and cognitive overload associated with excessive social media use. This issue is particularly relevant for university students, who represent a key population navigating digitally mediated learning environments. If not properly understood and managed, the widespread use of these technologies may lead to inconsistent learning outcomes and reduced academic effectiveness.

Existing literature provides substantial evidence on the individual effects of artificial intelligence and social media. Studies indicate that artificial intelligence enhances learning efficiency through adaptive feedback and personalised content delivery, contributing to improved academic performance (Chen, 2025; Phua et al., 2025). More recent research further emphasises that AI-driven learning environments significantly improve student engagement and self-regulated learning, particularly when integrated into structured pedagogical frameworks (Shahzad et al., 2024; Dahri et al., 2024). In contrast, research on social media presents mixed findings. While some studies highlight its role in facilitating collaborative learning and communication (Rasid et al., 2024), others emphasise its negative impact due to distraction and cognitive overload (Martin et al., 2025). Recent evidence also suggests that the effectiveness of social media in education depends heavily on students' digital literacy and intentional usage patterns, highlighting the importance of structured academic integration (Al-Zahrani & Alasmari, 2024).

Despite these insights, a critical gap remains in the literature. Most studies examine artificial intelligence and social media independently, with limited attention given to their combined influence on academic performance. Furthermore, empirical evidence within the Malaysian higher education context remains relatively scarce, despite the country's rapid digital transformation and increasing adoption of educational technologies. From a theoretical perspective, this study is grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT), which explains how users adopt and utilise technology based on perceived usefulness, ease of use, and social influence. The application of UTAUT in this study provides a framework for understanding how students' engagement with artificial intelligence and social media translates into academic outcomes.

This study contributes to the literature in several ways. First, it extends existing research by examining the combined effects of artificial intelligence and social media within a single empirical model. Second, it provides context-specific evidence from Malaysia, addressing the limited availability of local empirical studies. Third, it offers practical insights for educators and policymakers on how digital technologies can be integrated effectively to enhance learning outcomes.

Given the gaps identified in the literature, this study addresses two primary research questions. First, what is the relationship between artificial intelligence adoption and student academic performance in Malaysian higher education institutions? Second, how does social media engagement influence academic outcomes within digital learning ecosystems? Correspondingly, this study tests three hypotheses: H1: AI adoption positively influences student academic performance; H2: Social media engagement positively influences student academic performance. By addressing these questions, this study aims to provide empirical insights into the interplay between AI technologies, social media platforms, and academic achievement in the Malaysian higher education context, thereby contributing to both theoretical understanding and practical applications of digital learning ecosystems.

Artificial Intelligence in Higher Education

Artificial intelligence has emerged as a transformative force in higher education, offering tools that personalise learning, automate administrative processes, and provide intelligent feedback. Generative AI technologies

such as ChatGPT have demonstrated substantial potential in supporting student learning by delivering instant explanations, summarising complex information, and facilitating academic writing (Adıgüzel, 2023; Vieriu, 2025). Empirical evidence consistently indicates that engagement with AI-powered tools is associated with higher academic self-efficacy and improved learning outcomes (Chen, 2025; Kuş, 2025).

Recent studies further reinforce the positive role of artificial intelligence in academic contexts. Rajesha and Nirmala (2025) found that frequent AI tool usage is significantly associated with improved academic performance and better time management among higher education students. Similarly, Cobos-Gutierrez (2024) reported that regular use of AI technologies contributes positively to academic performance among secondary school students, suggesting that these benefits extend across educational levels. Pacheco-Mendoza et al. (2023) highlighted that factors such as frequency of use, diversity of AI tools, and time invested in AI-supported learning significantly influence academic outcomes. These findings suggest that artificial intelligence enhances learning by enabling interactive engagement and facilitating access to educational resources.

Moreover, artificial intelligence has been shown to strengthen students' self-efficacy, which is a critical determinant of academic success (Liang et al., 2023). In the Malaysian context, Phua et al. (2025) demonstrated that AI integration improves students' ability to process and retain academic information, while Al-Zahrani (2024) reported increased motivation and engagement in AI-assisted learning environments. Collectively, these studies indicate that artificial intelligence contributes to academic performance not only through cognitive support but also by enhancing motivational and behavioural factors.

Social Media and Academic Performance

Social media platforms have become integral to the daily academic practices of university students, functioning as tools for both social interaction and educational collaboration. Platforms such as WhatsApp, Telegram, and YouTube facilitate real-time communication, peer-to-peer learning, and the sharing of academic resources (Rasid et al., 2024; Mohamed, 2024). When used purposefully, social media has been shown to positively influence academic performance, particularly through collaborative learning and knowledge exchange (Paul & Paul, 2024).

Empirical findings on the impact of social media, however, remain mixed. Iqbal et al. (2023) reported a strong positive relationship between social media usage and academic performance, attributing this to enhanced interaction between students and instructors. Similarly, Paul and Paul (2024) found that educational uses of social media are positively associated with academic outcomes. Bedua et al. (2021) also identified significant relationships between social media usage patterns and academic performance, suggesting that both frequency and purpose of use are important determinants.

In contrast to earlier concerns about the negative impact of social media, recent evidence indicates that positive effects are more prevalent, particularly when social media is used for academic purposes. A systematic review by Mihret and Joshi (2024) concluded that beneficial effects of social media on academic performance outweigh negative effects in higher education contexts. Additionally, studies using structural equation modelling in Malaysia demonstrate that perceived usefulness, ease of use, and collaborative learning via social media significantly enhance academic performance and student satisfaction (Al-Rahmi et al., 2022). These findings suggest that the impact of social media is not inherently negative but is highly dependent on how it is utilised within learning environments.

Theoretical Framework: Unified Theory of Acceptance and Use of Technology (UTAUT)

This study is grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT), which provides a comprehensive framework for understanding technology adoption in educational contexts. The UTAUT model, originally developed by Venkatesh et al., identifies four key determinants of technology acceptance: performance expectancy, effort expectancy, social influence, and facilitating conditions. Subsequent extensions, particularly UTAUT2, incorporate additional constructs such as hedonic motivation and habit, enhancing its explanatory power in voluntary usage contexts (Xue et al., 2024; Enríquez et al., 2024).

Empirical research demonstrates that UTAUT constructs significantly predict students' behavioural intentions to use both social media and artificial intelligence tools in higher education (Al-Rahmi et al., 2022; Williams et al., 2021). Among these constructs, performance expectancy consistently emerges as the strongest predictor of technology adoption, as students are more likely to use technologies that they perceive as beneficial for improving academic performance (Xue et al., 2024). The integration of UTAUT with Task-Technology Fit theory further suggests that academic outcomes are enhanced when technological tools align with learning tasks (Al-Rahmi et al., 2022).

Recent studies also highlight the role of psychological and contextual factors in technology adoption. AI usage has been found to be influenced by factors such as perceived usefulness, ease of use, and AI aversion (Jain et al., 2022), while enjoyment and habit significantly influence continued usage intentions (Lavidas et al., 2024). Furthermore, facilitating conditions, including institutional support and technological infrastructure, play a crucial role in determining both intention and actual usage of AI and social media platforms (Enríquez et al., 2024).

In this study, UTAUT serves as the theoretical lens for understanding how students adopt and utilise artificial intelligence and social media technologies. The measurement items for artificial intelligence usage capture performance expectancy and effort expectancy, reflecting students' perceptions of how AI enhances learning efficiency and outcomes. Social media usage items reflect social influence and facilitating conditions, capturing peer interaction, lecturer engagement, and collaborative learning. This theoretical grounding strengthens the conceptual validity of the study and situates it within established technology acceptance literature.

Methodology

This study adopts a quantitative, cross-sectional survey design to examine the relationships between artificial intelligence usage, social media usage, and student academic performance. A cross-sectional design was selected because it allows for the simultaneous collection of data from a sample at a single point in time, making it appropriate for examining the current state of technology usage and its associations with academic outcomes (Creswell & Creswell, 2018). A quantitative approach is considered appropriate as it enables the systematic measurement of variables and facilitates statistical analysis to test hypothesised relationships. Specifically, a survey-based method was employed, as it allows for the efficient collection of data from a relatively large number of respondents and supports the use of inferential statistical techniques to determine relationships and predictive effects among variables (Romaniuk, 2024).

Data were collected using a structured questionnaire administered through an online platform (Google Forms). The survey method was selected due to its suitability for capturing self-reported perceptions and behavioural patterns related to technology usage in a higher education context. The target population for this study consists of undergraduate students enrolled in the Malaysian universities, as this group represents active users of both artificial intelligence tools and social media platforms in academic settings. A purposive sampling technique was employed to ensure that respondents had relevant experience with the technologies under investigation. A total of 300 valid responses were obtained. The sample size of 300 was determined based on Krejcie and Morgan's (1970) sample size table, which recommends a minimum of 291 participants for a population of approximately 10,000 students, and was further supported by Hair et al.'s (2010) guideline that a minimum of 10 respondents per indicator variable is required for regression analysis with 19 items in the instrument, a minimum of 190 responses was required. The final sample of 300 thus exceeds both thresholds, ensuring adequate statistical power for the analyses conducted.

The data collection procedure was carried out in the following stages. The questionnaire was developed and pilot-tested with 30 students to verify reliability before full deployment. The participants were recruited via purposive sampling from undergraduate programmes at all Malaysian universities; students who actively used at least one AI tool and one social media platform for academic purposes were eligible to participate. Then, the finalised questionnaire was distributed electronically via Google Forms through institutional communication channels, including class group chats on WhatsApp and Telegram, and student portals.

Finally, responses were monitored and follow-up reminders were sent to maximise the response rate. Participants were provided with comprehensive information about the study's purpose, procedures, potential risks and benefits, and their rights as research participants. Participation was entirely voluntary, and respondents were assured of full confidentiality and anonymity throughout the process.

The research instrument consisted of 19 items measuring three constructs: artificial intelligence usage (8 items), social media usage (6 items), and academic performance (5 items). All items were measured using a five-point Likert scale ranging from strongly disagree to strongly agree. The instrument was developed by the researchers based on established scales from prior literature. The AI Usage subscale was adapted from Adıgüzel et al. (2023) and Chowdhury (2024), grounded in UTAUT constructs of performance expectancy and effort expectancy. The Social Media Usage subscale was adapted from Al-Rahmi et al. (2022) and Rasid et al. (2024), reflecting academic-oriented platform use. The Academic Performance subscale was adapted from Capinding (2024) and Romaniuk (2024), capturing self-reported learning progress and goal attainment. A pilot study was conducted with 30 undergraduate students prior to full data collection. Cronbach's alpha values from the pilot study were: AI Usage ($\alpha = 0.912$), Social Media Usage ($\alpha = 0.889$), and Academic Performance ($\alpha = 0.905$), all indicating excellent internal consistency and confirming the suitability of the instrument for full-scale deployment. The measurement items were adapted from established and validated instruments in the literature to ensure content validity. In addition, the questionnaire was translated into Bahasa Malaysia to enhance clarity and comprehension among respondents. The instrument was conceptually aligned with the Unified Theory of Acceptance and Use of Technology (UTAUT), where items measuring artificial intelligence usage operationalise performance expectancy and effort expectancy, while social media usage items reflect social influence and facilitating conditions (Xue et al., 2024; Enríquez et al., 2024). Reliability analysis was conducted using Cronbach's alpha, and all constructs demonstrated excellent internal consistency, exceeding the recommended threshold of 0.70. In total, one research instrument (a structured questionnaire) comprising three subscales was used in this study: (1) the AI Usage subscale measuring students' perceptions of AI tools in supporting learning (8 items); (2) the Social Media Usage subscale measuring academic-oriented use of social media platforms (6 items); and (3) the Academic Performance subscale measuring self-reported learning progress and career goal attainment (5 items).

Data analysis was performed using IBM SPSS Statistics. Descriptive statistics, including means and standard deviations, were computed to summarise respondents' perceptions of artificial intelligence usage, social media usage, and academic performance. Pearson correlation analysis was conducted to examine the strength and direction of relationships among the variables. Subsequently, multiple regression analysis was performed to test the hypotheses and to determine the predictive power of artificial intelligence and social media usage on academic performance. The choice of regression analysis is justified as it allows for the simultaneous examination of multiple independent variables and their contribution to a single dependent variable, which aligns with the objectives of this study.

The Findings

A total of 300 valid responses were analysed. The sample comprised 215 female (71.7%) and 85 male (28.3%) respondents. In terms of year of study, the majority were Year 1 (38.0%) and Year 2 (36.7%) students, with Year 3 (13.0%) and Year 4 or Final Year (12.3%) forming smaller proportions. Regarding daily internet usage, 47.3% reported using the internet for 4–8 hours per day, 41.0% for 1–4 hours, and 11.7% for more than 8 hours (see Table 1). The findings are then presented covering descriptive statistics, reliability analysis, Pearson correlation, and multiple regression analysis.

Based on Table 1, the sample is predominantly female, with early-year students forming the largest proportion of respondents. In terms of digital behaviour, most students reported moderate daily internet usage. The distribution suggests that respondents are actively engaged in digitally mediated learning environments, making them suitable for examining technology-related academic outcomes. The figure assessed the concentration of respondents within the moderate usage category, indicating sustained and regular engagement with online learning resources.

Table 1. Demographic Profile of Respondents

Category	Item	Frequency	Percentage (%)
Gender	Male	85	28.3%
	Female	215	71.7%
	Total	300	100.0%
Year of Study	Year 1	114	38.0%
	Year 2	110	36.7%
	Year 3	39	13.0%
	Year 4 / Final Year	37	12.3%
	Total	300	100.0%
Daily Internet Usage	1–4 hours	123	41.0%
	4–8 hours	142	47.3%
	More than 8 hours	35	11.7%
	Total	**300**	**100.0%**

AI Tools and Social Media Platforms Used

Table 2 presents the AI tools used by respondents. ChatGPT was the most widely used AI tool (n = 279, 93.0%), followed by Gemini (n = 92, 30.7%) and Grammarly (n = 34, 11.3%). Other tools included DeepSeek (n = 21), Microsoft Copilot (n = 16), Perplexity (n = 12), Notion AI (n = 8), and Quill Bot (n = 6). The results show a clear dominance of ChatGPT compared to other AI tools, indicating a strong reliance on generative AI for academic tasks. Other tools demonstrate comparatively lower adoption, suggesting limited diversification in AI usage.

Table 2. AI Tools Used by Respondents

AI Tool	Frequency (n)	Percentage (%)
ChatGPT	279	93.0%
Gemini	92	30.7%
Grammarly	34	11.3%
DeepSeek	21	7.0%
Microsoft Copilot	16	5.3%
Perplexity	12	4.0%
Quill Bot	6	2.0%
Notion AI	8	2.7%
Others	6	2.0%

Table 3 presents the social media platforms used by respondents. Telegram (n = 238, 79.3%), WhatsApp (n = 236, 78.7%), and YouTube (n = 227, 75.7%) were the three most frequently used platforms, reflecting their predominant use for academic communication and content sharing. TikTok (n = 174, 58.0%) and Microsoft Teams (n = 163, 54.3%) were also widely used, with Instagram (n = 132), Facebook (n = 98), LinkedIn (n = 59), and Twitter (n = 40) used less frequently. Communication-based platforms such as Telegram and WhatsApp are the most widely used, followed by content-driven platforms like YouTube. This pattern indicates that students utilise social media for both interaction and access to learning materials. The

figure highlights the contrast between the concentrated use of a dominant AI tool and the more diversified use of social media platforms, reflecting different patterns of technological engagement.

Table 3. Social Media Platforms Used by Respondents

Social Media Platform	Frequency (n)	Percentage (%)
Telegram	238	79.3%
WhatsApp	236	78.7%
YouTube	227	75.7%
TikTok	174	58.0%
Microsoft Teams	163	54.3%
Instagram	132	44.0%
Facebook	98	32.7%
LinkedIn	59	19.7%
Twitter	40	13.3%
Others	13	4.3%

Table 4. Descriptive Statistics for All Construct Items (N = 300)

Construct	Code	Item	Mean	SD
AI Usage	AI1	AI systems like ChatGPT improve my learning performance.	4.153	0.816
	AI2	AI systems like ChatGPT improve my learning efficiency.	4.160	0.866
	AI3	AI systems like ChatGPT help achieve better learning outcomes.	4.147	0.825
	AI4	AI systems like ChatGPT facilitate group work and collaboration.	4.160	0.835
	AI5	AI systems like ChatGPT optimise my learning process.	4.140	0.806
	AI6	I am amazed by the multifunctional capabilities of AI systems like ChatGPT.	4.303	0.792
	AI7	AI systems like ChatGPT enrich my learning experience.	4.130	0.801
	AI8	AI helps me formulate follow-up questions more precisely in learning.	4.053	0.787
Social Media Usage	SM1	Social media strengthens interaction and learning communities.	4.110	0.748
	SM2	I receive peer feedback more quickly through social media.	4.290	0.792
	SM3	Lecturers provide feedback more quickly through social media.	4.100	0.864
	SM4	Social media encourages me to be more active in class.	3.863	0.960
	SM5	Social media facilitates multitasking while studying.	4.100	0.883
	SM6	Social media is an effective academic communication channel.	4.210	0.805
Academic Performance	AP1	I make progress in the quantity of my learning.	4.137	0.787
	AP2	I make progress in the quality of my learning.	4.237	0.737
	AP3	I achieve my personal career goals.	4.137	0.787
	AP4	I develop important skills for my future career.	4.207	0.783
	AP5	I actively seek career development opportunities.	4.243	0.837

Note. All items measured on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). SD = Standard Deviation.

Descriptive Statistics

Table 4 presents the descriptive statistics for all 19 questionnaire items across three constructs. For the AI Usage construct (8 items; AI1–AI8), mean scores range from 4.053 (AI8) to 4.303 (AI6), indicating consistently high agreement across learning performance, efficiency, outcomes, collaboration, and process optimisation.

For the Social Media Usage construct (6 items; SM1–SM6), mean scores range from 3.863 (SM4) to 4.290 (SM2). The highest-rated item, SM2 (M = 4.290, SD = 0.792), indicates strong agreement that social media enables faster peer feedback. SM4 (M = 3.863, SD = 0.960) records the lowest mean and highest standard deviation in this construct, suggesting greater variability in perceptions of social media's ability to encourage active classroom participation. For the Academic Performance construct (5 items; AP1–AP5), mean scores range from 4.137 (AP1, AP3) to 4.243 (AP5), reflecting high self-perceived academic progress. All standard deviation values across the three constructs are below 1.00, indicating consistent and homogeneous responses across the 300 respondents.

All constructs record high mean values, indicating strong agreement among respondents. Artificial intelligence usage demonstrates consistently high scores across all items, reflecting positive perceptions of its usefulness and functionality. Social media usage shows slightly greater variability, particularly in engagement-related items, suggesting differing experiences among students. Academic performance also records high mean values, indicating positive self-perceived learning outcomes. The figures illustrate the overall consistency of responses, with artificial intelligence usage showing slightly higher agreement compared to social media usage.

Inferential Analysis

Prior to inferential analysis, internal consistency of all constructs was verified using Cronbach's alpha. Table 5 presents the Cronbach's alpha coefficients for each construct. All three constructs demonstrate excellent internal consistency, with alpha values exceeding the recommended threshold of 0.70 (Romaniuk, 2024). The AI Usage construct records the highest alpha ($\alpha = 0.930$, 8 items), followed by Academic Performance ($\alpha = 0.921$, 5 items) and Social Media Usage ($\alpha = 0.903$, 6 items).

Table 5. Reliability Analysis Results — Cronbach's Alpha (N = 300)

Construct	No. of Items	Cronbach's Alpha	Interpretation
AI Usage	8	0.930	Excellent
Social Media Usage	6	0.903	Excellent
Academic Performance	5	0.921	Excellent

Note. Cronbach's alpha interpretation: ≥ 0.90 = Excellent; 0.80–0.89 = Good; 0.70–0.79 = Acceptable (Romaniuk,2024).

All constructs demonstrate excellent internal consistency, with Cronbach's alpha values exceeding accepted thresholds. This ensures that the measurement scales are reliable and suitable for subsequent inferential analyses. The Pearson correlation and multiple regression results are presented below.

Table 6. Pearson Correlation Matrix (N = 300)

Variable	AI Usage	Social Media Usage	Academic Performance
AI Usage	1.000	0.685 **	0.745 **
Social Media Usage	0.685 **	1.000	0.692 **
Academic Performance	0.745 **	0.692 **	1.000

*Note. ** Correlation is significant at the 0.01 level (2-tailed). N = 300 for all variables.*

Table 6 presents the Pearson correlation matrix for the three constructs. AI Usage and Academic Performance exhibit a strong positive correlation ($r = 0.745$, $p < 0.01$), indicating that higher AI usage is significantly associated with better academic performance. Social Media Usage is also significantly correlated with Academic Performance ($r = 0.692$, $p < 0.01$). The correlation between AI Usage and Social Media Usage ($r = 0.685$, $p < 0.01$) indicates a moderate to strong positive relationship between the two predictor variables. Multicollinearity was assessed in the regression model and found to be within acceptable limits.

Multiple Regression Analysis

Table 7 presents the results of the multiple regression analysis, with Academic Performance as the dependent variable and AI Usage and Social Media Usage as independent predictors. The overall model is statistically significant ($F(2, 297) = 239.733$, $p < 0.001$) and explains 61.7% of the variance in academic performance ($R^2 = 0.617$, Adjusted $R^2 = 0.615$). AI Usage is the stronger predictor ($\beta = 0.511$, $t = 10.383$, $p < 0.001$), followed by Social Media Usage ($\beta = 0.342$, $t = 6.934$, $p < 0.001$). Both artificial intelligence usage and social media usage significantly predict academic performance, thereby supporting H1 and H2. Artificial intelligence emerges as the stronger predictor, indicating a more substantial contribution to academic performance compared to social media usage. This finding suggests that while both technologies are beneficial, artificial intelligence plays a more direct and influential role in enhancing learning outcomes

Table 7. Multiple Regression Analysis: Predictors of Academic Performance

Predictor	B	SE	β	t	p
Constant	3.112	0.825	—	3.773	< 0.001
AI Usage	0.328	0.032	0.511	10.383	< 0.001
Social Media Usage	0.282	0.041	0.342	6.934	< 0.001

Note. Dependent Variable: Academic Performance. B = Unstandardized coefficient; β = Standardized coefficient.

Discussion

This study set out to examine the combined influence of artificial intelligence and social media usage on student academic performance in the Malaysian higher education context. The findings provide strong empirical support for both hypotheses, demonstrating that the use of digital technologies significantly enhances academic outcomes. More importantly, the results reveal that artificial intelligence exerts a stronger influence than social media (AI: $\beta = 0.511$ vs. Social Media: $\beta = 0.342$), suggesting that not all digital tools contribute equally to learning effectiveness. This finding is consistent with the growing body of evidence demonstrating that purposeful technology use enhances student learning outcomes (Romaniuk, 2024; Yaseen et al., 2025). The combined predictive power observed in this study ($R^2 = 0.617$) is notably higher than findings from studies examining either technology in isolation (e.g., Capinding, 2024; Mohamed, 2024), suggesting that an integrated digital learning ecosystem may produce synergistic benefits beyond what individual technologies can achieve independently.

The stronger effect of artificial intelligence ($\beta = 0.511$, $p < 0.001$) highlights its direct role in supporting cognitive and academic processes. Unlike social media, which primarily facilitates communication and interaction, artificial intelligence functions as an active learning tool that enhances understanding, problem-solving, and knowledge construction. This finding aligns with prior studies emphasising the capacity of AI-driven systems to improve learning efficiency through personalised feedback and adaptive learning mechanisms (Chen, 2025; Phua et al., 2025). The dominance of generative AI tools such as ChatGPT further reinforces this interpretation, indicating a shift from passive information consumption towards interactive and assisted learning. However, the relatively lower evaluation of AI's ability to support higher-order questioning suggests that while AI enhances efficiency, its role in fostering deeper critical thinking may still require

pedagogical guidance. This extends existing literature by highlighting a nuanced distinction between functional effectiveness and cognitive depth in AI-supported learning environments.

The positive relationship between social media usage and academic performance ($\beta = 0.342$, $p < 0.001$) offers an important counterpoint to earlier concerns about the negative impact of social media on students. While distractive use of social media has been associated with lower academic achievement (Martin et al., 2025), the academic-oriented use captured in this study including peer collaboration, lecturer communication, and information sharing that appears to support learning. This finding is consistent with Khan (2025), whose systematic review concluded that academically purposive social media use positively correlates with performance, and with Paul and Paul (2024), who found that educational and collaborative social media use significantly predicted academic outcomes. The high mean scores for SM2 ('I receive peer feedback more quickly through social media'; M = 4.290) and SM6 ('Social media is an effective academic communication channel'; M = 4.210) suggest that students predominantly engaged with social media in academically productive ways, consistent with Rasid et al. (2024).

From a theoretical perspective, the findings provide strong support for the applicability of the Unified Theory of Acceptance and Use of Technology (UTAUT) in a digital learning context (Venkatesh et al., 2003). The significant effects of both AI and social media usage on academic performance align with UTAUT's core premise that technology adoption is driven by performance expectancy. This study extends the UTAUT framework in several important ways. First, it demonstrates the framework's applicability to emerging AI tools (e.g., ChatGPT, Gemini) that were not present when UTAUT was originally developed, thereby broadening its theoretical scope. Second, by examining two distinct technology types simultaneously, this study reveals differential performance expectancy patterns: AI tools exhibit a stronger predictive effect ($\beta = 0.511$) compared to social media ($\beta = 0.342$), suggesting that UTAUT constructs may vary in strength depending on the nature of the technology and its alignment with core academic tasks. Third, the findings contribute to the cross-cultural validation of UTAUT by demonstrating its predictive validity in a Malaysian higher education context such a setting underrepresented in the UTAUT literature (Xue et al., 2024; Enríquez et al., 2024). Fourth, this study integrates UTAUT with academic performance outcomes, extending beyond the framework's original focus on behavioural intention and actual use, and demonstrating that technology adoption ultimately translates into measurable academic gains.

The study also contributes empirically by providing context-specific evidence from Malaysia, a setting that remains underrepresented in the global literature on AI and social media in education (Phua et al., 2025; Rasid et al., 2024). The novelty of this study lies in several distinct contributions. First, this study is among the first to examine AI and social media as an integrated digital learning ecosystem rather than as isolated variables, offering a more ecologically valid representation of students' actual technology environment. Second, it provides empirical evidence from a Southeast Asian public university context, a geographic and institutional setting that is systematically underrepresented in the global educational technology literature, which tends to be dominated by Western and East Asian samples. Third, the differential effect sizes observed (AI: $\beta = 0.511$ vs. Social Media: $\beta = 0.342$) constitute a novel empirical finding not previously documented in the Malaysian context, providing nuanced insight into the relative contributions of different technology types. Fourth, the study's use of a validated, theory-driven instrument adapted from multiple established scales represents a methodological contribution that future researchers in similar contexts can build upon.

Overall, the findings suggest that the effectiveness of digital technologies in higher education depends not only on their availability but also on their functional role in supporting learning processes. Artificial intelligence emerges as a core academic tool, while social media functions as a complementary platform for communication and collaboration. This distinction provides important implications for educators and policymakers, particularly in designing learning strategies that maximise the benefits of digital technologies while addressing their limitations. This study also contributes methodologically by demonstrating the robustness of regression-based analysis in examining digital learning ecosystems within a developing country context. The relatively high explanatory power of the model suggests that artificial intelligence and social media usage are not only relevant predictors but also central components in contemporary academic performance frameworks.

Conclusion

This study set out to examine the impact of Artificial Intelligence and Social Media usage on student academic performance in Malaysia. The findings provide clear empirical evidence that both technologies significantly contribute to academic outcomes, with artificial intelligence demonstrating a stronger influence. By applying the UTAUT framework, the study confirms that students' perceptions of usefulness, social influence, and supporting conditions play a critical role in shaping how digital technologies translate into academic performance.

The significance of these findings lies in highlighting the differentiated roles of digital tools within higher education. Artificial intelligence functions as a core academic support mechanism that enhances learning efficiency and cognitive performance, while social media serves as a complementary platform that facilitates communication and collaborative learning. From a practical perspective, higher education institutions should prioritise the structured integration of artificial intelligence tools through curriculum design, digital literacy training, and guided usage frameworks, while simultaneously promoting purposeful and academically oriented use of social media platforms to support collaborative learning. Such efforts are essential to maximise the benefits of digital technologies while mitigating potential risks associated with unstructured usage. These findings carry several important practical implications. For educators, intentional pedagogical integration of AI tools such as using ChatGPT for formative feedback, idea generation, and concept clarification can meaningfully enhance student learning outcomes (Chen, 2025; Kuş, 2025). Educators should scaffold students' academic use of social media by establishing clear norms for platform use in collaborative learning activities (Rasid et al., 2024). For academic administrators, the findings underscore the need to develop structured digital literacy frameworks equipping students with skills to use AI and social media purposefully and ethically (Al-Zahrani & Alasmari, 2024). For national education policymakers, the evidence supports the inclusion of AI literacy and responsible social media use as core competencies within higher education curricula, aligned with Malaysia's national digital economy agenda (Phua et al., 2025).

Despite its contributions, this study is subject to several limitations that point to productive directions for future research. First, the use of a single-institution sample from UKM limits generalisability; future research should employ larger, multi-institutional, and multi-country samples to enhance external validity and enable cross-cultural comparisons. Second, the cross-sectional design precludes causal inference; longitudinal studies are needed to establish directionality of the relationship between technology usage and academic performance over time. Third, this study relied on self-reported measures of academic performance, which may be subject to social desirability bias; future studies should incorporate objective performance indicators such as GPA or examination scores. Fourth, the study did not differentiate between specific AI tools or social media platforms; future research should examine the differential effects of individual tools (e.g., ChatGPT vs. Gemini; Telegram vs. TikTok) on specific academic outcomes. Fifth, future studies should explore potential moderating variables such as digital literacy, self-regulation, and academic discipline that may influence the relationship between technology use and academic performance. Sixth, qualitative or mixed-methods approaches would provide richer insight into the mechanisms through which AI and social media influence student learning, complementing the quantitative findings of this study.

Overall, this study contributes to the growing body of knowledge on digital learning by demonstrating that the effectiveness of technology in education depends not merely on access, but on how strategically and purposefully it is used to support learning outcomes.

Acknowledgement: This research was funded by the *Geran Inisiatif Penyelidikan*, Faculty of Economics and Management, Universiti Kebangsaan Malaysia (Grant No. EP-2024-042). The authors would like to express their sincere appreciation for the financial support that facilitated the completion of this study.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest: The authors declare no conflict of interest.

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