

Acceptance of Google Gemini among Malaysian Higher Institution Students: A Technology Acceptance Model Approach

Rohayati Mat Ripin*, Nur Hidayah Md Noh, Nur Idalisa Norddin, Zamzulani Mohamed, Nor Aini Hassanuddin

Faculty of Computer & Mathematical Sciences, Universiti Teknologi MARA, Kampus Dungun, 23000 Dungun, Terengganu, Malaysia

*Corresponding Author

DOI: <https://doi.org/10.47772/IJRISS.2026.100800800>

Received: 02 September 2026; Accepted: 07 September 2026; Published: 18 September 2026

ABSTRACT

The increasing use of generative artificial intelligence (GenAI) in higher education has created a need to understand students' acceptance of emerging AI platforms such as Google Gemini. This study examined the acceptance and use of Google Gemini among higher education institution (HEI) students using the Technology Acceptance Model (TAM). Specifically, the study investigated the relationships between perceived ease of use, perceived usefulness, attitude, intention to use and actual use. Data were collected through an online questionnaire from 146 students at Universiti Teknologi MARA (UiTM) Terengganu and analysed using partial least squares structural equation modelling (PLS-SEM). The measurement model demonstrated satisfactory reliability, convergent validity and discriminant validity. Five of the six proposed relationships were supported. Perceived ease of use significantly influenced perceived usefulness and attitude, while perceived usefulness significantly influenced attitude. However, perceived usefulness did not significantly affect intention to use. In contrast, attitude had a significant influence on intention to use, which subsequently significantly predicted actual use. The findings indicate that students' attitudes toward Google Gemini play an important role in shaping their intention to use the technology, while perceived usefulness alone may not be sufficient to drive intention. Overall, the findings support the applicability of TAM in explaining Google Gemini acceptance among HEI students and highlight the importance of fostering positive and accessible experiences when integrating GenAI into higher education.

Keywords: Generative artificial intelligence, Google Gemini, Technology Acceptance Model, higher education, technology acceptance, students

INTRODUCTION

Generative artificial intelligence (GenAI) refers to artificial intelligence technology that can generate new content in response to user instructions, including text, images and other forms of information. In education, GenAI has attracted increasing attention because of its ability to support students in learning and academic activities. Google Gemini is one example of a GenAI platform. It is a multimodal generative AI system that can interact with users and generate different forms of content, making it a potential educational technology for learning and academic support (Imran & Almusharraf, 2024).

Google Gemini has increasingly been explored as a learning-support tool in higher education. Its potential educational applications include providing explanations, supporting information seeking, assisting students with academic tasks and offering interactive learning support. Imran and Almusharraf (2024) highlighted the potential of Gemini as an emerging educational technology, particularly because of its multimodal capabilities. Empirical research has also examined students' acceptance of Gemini in higher education. Hasanein et al. (2024) investigated Gemini acceptance among students from seven public universities in Saudi Arabia using the UTAUT framework. Similarly, Majidah et al. (2025) examined Google Gemini as a learning assistant among higher education students in Indonesia, focusing on perceived usefulness, perceived ease of use, attitude toward using and behavioural intention to use.

The use of GenAI, including Google Gemini has also begun to receive attention in the Malaysian higher education context. Ghazi et al. (2025) examined GenAI use among Malaysian college students and included ChatGPT, Canva AI and Google Gemini among the tools investigated. The study reported that students recognised the benefits of GenAI for learning while also expressing concerns about privacy, ethical use and over-reliance. In addition, Chieh and Wong (2025) examined the experiences of Malaysian undergraduates with Google Gemini and ChatGPT. Their qualitative study identified interaction, learning experiences, usability and accessibility, and emotional impact as important aspects of students' engagement with these AI tools. The study further found that Gemini offered richer multimodal resources but also presented usability challenges.

The relevance of Google Gemini to Malaysian higher education has become even more apparent with its increasing institutional availability. In March 2026, Google reported that all 20 Malaysian public universities had enabled Gemini for Education, reaching nearly 600,000 students and 75,000 faculty members (Google, 2026). The initiative provides access to AI-supported tools for learning, research and teaching within Malaysian public universities. This development indicates that Gemini is becoming increasingly embedded within the Malaysian higher education environment, making students' acceptance and actual use of the technology an increasingly relevant area of research.

However, despite the growing availability of Gemini, research examining its acceptance among Malaysian higher education students remains limited. Existing Malaysian studies have mainly examined general GenAI adoption and students' experiences with Gemini, rather than testing the factors that explain Gemini acceptance through the traditional Technology Acceptance Model (TAM). Ghazi et al. (2025) focused on the adoption, learning impact and concerns associated with several GenAI tools, while Chieh and Wong (2025) examined students' experiences and engagement with Gemini and ChatGPT. Although these studies provide useful evidence about students' use and experiences, they do not examine the complete TAM relationships involving perceived ease of use, perceived usefulness, attitude, intention to use, and actual use of Google Gemini.

Therefore, there is a need to examine what factors influence Malaysian HEI students' acceptance and use of Google Gemini. The present study addresses this gap by applying TAM to investigate the relationships between perceived ease of use, perceived usefulness, attitude, intention to use and actual use of Google Gemini among HEI students. The study therefore provides empirical evidence on whether the traditional TAM framework remains applicable to the acceptance of a contemporary GenAI platform within the Malaysian higher education context.

LITERATURE REVIEW

Technology Acceptance Model

The Technology Acceptance Model (TAM) is one of the most widely applied theoretical frameworks for explaining why individuals accept and use information technologies. The model was introduced by Davis (1989) to explain technology adoption through users' perceptions of the technology and their subsequent behavioural responses. In its original formulation, TAM centres on two fundamental beliefs: perceived usefulness and perceived ease of use. Perceived usefulness refers to the extent to which an individual believes that using a particular technology can improve the performance of a task, whereas perceived ease of use reflects the degree to which the technology is perceived as requiring minimal effort. These beliefs influence users' attitudes and behavioural intentions, and ultimately, their actual technology use. The theoretical strength of TAM lies in its relatively simple structure while retaining considerable explanatory value. Davis (1989) demonstrated that perceived usefulness and perceived ease of use are important determinants of user acceptance, establishing a foundation for subsequent technology adoption research. Later developments of the acceptance literature have continued to employ these constructs because they capture two fundamental considerations when individuals encounter a technology whether the technology is beneficial and whether it can be used without excessive difficulty.

In an educational setting, these two perceptions are particularly relevant because students generally evaluate educational technologies according to the extent to which they facilitate academic activities and how easily those technologies can be incorporated into their learning routines. The relevance of TAM has become even more

apparent with the emergence of generative artificial intelligence (GenAI), where students must evaluate not only the functionality of AI systems but also their usefulness and accessibility for academic purposes.

Adoption of Google Gemini in Higher Education

Although research on ChatGPT acceptance in higher education has expanded considerably, empirical investigations specifically addressing Google Gemini remain relatively limited. Recent systematic reviews show that many studies have examined ChatGPT acceptance among university students, while relatively few have focused specifically on Google Gemini (Ramírez et al., 2025; Yang, 2026). This difference may partly reflect the rapid research attention generated by ChatGPT following its release in late 2022, while empirical research specifically examining Google Gemini in higher education is still emerging (Hasanein et al., 2024; Qian, 2025). Nevertheless, existing studies suggest that students' acceptance of Gemini may differ from their acceptance of ChatGPT or other GenAI tools.

Hasanein et al. (2024) examined Google Gemini acceptance among students from seven Saudi public universities using the UTAUT model, highlighting the need to study Gemini specifically because students' responses may differ across GenAI platforms. Moreover, Majidah et al. (2025) studied the use of Google Gemini as a learning assistant among Indonesian higher education students. The study focused on four TAM dimensions: perceived usefulness, perceived ease of use, attitude toward using and behavioural intention to use, with generally favourable perceptions reported across all four dimensions. In addition, Pham et al. (2025) examined ChatGPT acceptance among university students and found that perceived ease of use significantly influenced perceived usefulness, while perceived usefulness positively affected intention to use. These findings further support the relevance of TAM in GenAI acceptance research.

However, evidence regarding the explanatory ability of traditional TAM for Google Gemini is not entirely conclusive. Saharah (2025) examined Google Gemini acceptance among university students by comparing TAM with UTAUT. This finding suggests that although students' perceptions of Gemini's usefulness and ease of use remain relevant, acceptance of the platform may also be influenced by contextual factors extending beyond the two core TAM beliefs. The result is therefore important because it indicates that the traditional TAM relationships should be empirically examined rather than presumed to fully explain Gemini acceptance among university students. Kurniawan et al. (2025) examined university students who used Gemini AI and found that performance expectancy, effort expectancy, social influence and facilitating conditions did not significantly predict behavioural intention or use behaviour within their UTAUT model.

The existing Gemini literature therefore provides an emerging but still developing basis for applying TAM to higher education. Some studies have reported positive perceptions of Gemini's usefulness and ease of use, while others have found that perceived ease of use or attitude does not significantly predict intention. Similarly, studies have differed in their choice of acceptance framework, with some applying TAM and others using UTAUT or related technology-adoption models. These variations indicate that the acceptance mechanisms of Google Gemini have not yet been conclusively established.

Adoption of Google Gemini in Malaysian Higher Education

In Malaysia, research on GenAI acceptance and adoption in higher education is growing. Ghazi et al. (2025) examined the use of GenAI tools, including ChatGPT, Canva AI and Google Gemini among college students and reported both academic benefits and concerns about privacy, ethical use and over-reliance. Sabran et al. (2025) used TAM to study ChatGPT acceptance among higher education students and found that perceived usefulness and interactivity significantly affected acceptance and use, while perceived ease of use and trust were not significant. Similarly, Baharuddin et al. (2024) examined ChatGPT acceptance and behavioural intention among Malaysian undergraduates using TAM and UTAUT-related constructs. More recently, Md Fared et al. (2026) investigated ChatGPT continuance intention among Malaysian undergraduates using UTAUT2, showing the increasing use of technology-acceptance models to study GenAI in Malaysian higher education.

However, research on Google Gemini in Malaysia is still limited. Existing studies involving Malaysian university students have mainly focused on their experiences, engagement, learning support, usability and

emotional responses rather than Gemini acceptance using the traditional TAM framework. For example, Chieh and Wong (2025) explored Malaysian undergraduates' experiences with Google Gemini and ChatGPT, identifying interaction, learning experiences, usability and accessibility, and emotional impact as key themes. The findings showed that Gemini provided richer multimodal resources but also presented some usability challenges. Similarly, Ghazi et al. (2025) examined the use and adoption of GenAI tools, including Google Gemini among Malaysian students with a focus on academic engagement, learning outcomes, privacy, ethical concerns and over-reliance. However, neither study examined Gemini acceptance using the traditional TAM framework. Therefore, although Malaysian research has begun to explore how students use and experience Gemini, limited evidence exists on the factors influencing its acceptance through perceived ease of use, perceived usefulness, attitude, behavioural intention and actual use.

Hypothesis Development

Perceived Ease of Use and Perceived Usefulness

Perceived ease of use refers to the extent to which users perceive a technology as easy and uncomplicated to operate (Davis, 1989). When Gemini requires less effort to operate, HEI students may be more likely to recognise its benefits for academic tasks. Majidah et al. (2025) reported favourable perceptions of Gemini's ease of use among Indonesian higher education students. Similarly, studies on ChatGPT have found that perceived ease of use positively influences perceived usefulness among university students (Pham et al., 2025; Zou & Huang, 2023). Hence, students who perceive Google Gemini as easy to use are expected to perceive it as more useful. Thus, the following hypothesis is proposed:

H1: Perceived ease of use has a positive and significant effect on perceived usefulness of Google Gemini among HEI students.

Perceived Ease of Use and Attitude

An effortless interaction may create a more positive experience, encouraging students to develop a favourable attitude toward Gemini. Majidah et al. (2025) reported positive perceptions of Gemini's ease of use among higher education students. Similarly, research on ChatGPT has shown that perceived ease of use can positively influence students' attitudes toward using GenAI (Zou & Huang, 2023). Hence, students who perceive Google Gemini as easy to use are expected to have a more favourable attitude toward the technology. Thus, the following hypothesis is proposed:

H2: Perceived ease of use has a positive and significant effect on attitude toward using Google Gemini among HEI students.

Perceived Usefulness and Attitude

Perceived usefulness (PU) refers to the extent to which users believe that a technology can enhance their task performance (Davis, 1989). When students perceive Gemini as useful for learning and academic tasks, they are likely to develop a more favourable attitude toward the technology. Majidah et al. (2025) found favourable perceptions of Gemini's usefulness among Indonesian higher education students. In addition, Sabran et al. (2025) found that PU significantly influenced ChatGPT acceptance among Malaysian university students, while other GenAI studies have similarly identified perceived usefulness as an important factor in users' evaluations of AI technologies (Zou & Huang, 2023). Hence, students who perceive Google Gemini as useful are expected to develop a more favourable attitude toward using it. Thus, the following hypothesis is proposed:

H3: Perceived usefulness has a positive and significant effect on attitude toward using Google Gemini among HEI students.

Perceived Usefulness and Intention to Use

When students believe that Gemini provides useful academic benefits, they have greater motivation to use it. Majidah et al. (2025) found favourable behavioural intentions toward using Google Gemini among Indonesian

higher education students. In addition, Md Sabran et al. (2025) found that perceived usefulness significantly influenced ChatGPT acceptance among Malaysian university students, while other TAM studies have reported a positive relationship between perceived usefulness and intention to use GenAI (Pham et al., 2025; Yang, 2026). GenAI research has similarly identified perceived usefulness as an important factor influencing users' behavioural intentions (Zou & Huang, 2023). Hence, students who perceive Google Gemini as useful are expected to demonstrate stronger intentions to use it. Thus, the following hypothesis is proposed:

H4: Perceived usefulness has a positive and significant effect on intention to use Google Gemini among HEI students.

Attitude and Intention to Use

When students develop a favourable view of Google Gemini, they are more likely to form an intention to use the technology for academic activities. Majidah et al.(2025) reported positive perceptions of both attitude and behavioural intention toward using Gemini among higher education students. Similarly, Zou and Huang (2023) found that attitude significantly and positively influenced students' intention to use ChatGPT. Hence, students who develop a favourable attitude toward Google Gemini are expected to demonstrate stronger intentions to use it. Thus, the following hypothesis is proposed:

H5: Attitude toward using has a positive and significant effect on intention to use Google Gemini among HEI students.

Intention to Use and Actual Use

Students who intend to use Gemini are more likely to translate that intention into actual academic use. Kurniawan et al. (2025) found that behavioural intention significantly predicted Gemini use among 240 university students in Indonesia. Similarly, studies on ChatGPT have reported that stronger behavioural intentions are associated with greater actual use among university students (Yang, 2026). Hence, students with stronger intentions to use Google Gemini are expected to demonstrate greater actual use. Thus, the following hypothesis is proposed:

H6: Intention to use has a positive and significant effect on actual use of Google Gemini among HEI students.

METHODOLOGY

Sampling

The study involved university students from Universiti Teknologi MARA (UiTM), Terengganu Campus. Participants were selected using convenience sampling, in which students who were readily accessible to the researchers were invited to participate. According to Hair et al. (2023), convenience sampling refers to selecting participants based on their accessibility and availability. This method was suitable for the study because the researchers could easily access students within the target population, making data collection more practical within the available time and resources.

The required sample size was determined prior to data collection using G*Power 3.1 through an a priori power analysis (Faul et al., 2009). Following Cohen's (1988) guideline, a medium effect size of 0.15 (f^2), a significance level of 0.05 and a statistical power of 0.80 were specified. The analysis considered the endogenous construct with the highest number of predictors in the proposed model and indicated that at least 107 respondents were required. A total of 146 usable responses were eventually collected, exceeding the minimum sample size. A subsequent post hoc analysis indicated an estimated statistical power of approximately 0.98. Therefore, the 146 valid responses were considered sufficient for conducting the statistical analyses in this study.

Data Collection

To assess the proposed conceptual framework, data were obtained through an online questionnaire administered via Google Forms. The online format enabled the questionnaire to be distributed to the target respondents in a practical and accessible manner. All items were measured using a five-point Likert scale, ranging from 1

(strongly disagree) to 5 (strongly agree). The questionnaire comprised five key constructs: Perceived Ease of Use, Perceived Usefulness, Attitude, Intention to Use and Actual Use. In total, 21 measurement items were included to evaluate students' perceptions, attitudes and intentions regarding the use of Google Gemini among HEI students.

Measures and Instrument

A questionnaire consisting of 21 items was developed for data collection in this study. It was divided into two main sections. The first section gathered respondents' demographic and Google Gemini-related information, including gender, study level, academic part, age, prior experience with Google Gemini, familiarity with Google Gemini and frequency of using Google Gemini for academic purposes. The second section focused on the constructs in the proposed conceptual framework, which examined HEI students' acceptance and use of Google Gemini. The constructs measured were Perceived Ease of Use, Perceived Usefulness, Attitude, Intention to Use and Actual Use. Table 1 presents the constructs and their respective measurement items. The measurement items were adopted and adapted from established instruments in previous studies and modified where necessary to suit the context of Google Gemini use among HEI students.

Table 1: Overview of the Constructs

Construct	Item	Source
Perceived Ease of Use, PEOU	4	(Yuli Bangun et al., 2025)
Perceived Usefulness, PU	3	(Venkatesh & Bala, 2008)
Attitude toward use, ATT	4	(Davis et al., 1989)
Intention to Use, ITU	3	(Choudhury & Shamszare, 2023)
Actual Use, AU	4	(Biloš & Budimir, 2024)

Respondents' Profile

The demographic profile in Table 2 shows that female students constituted the larger proportion of respondents with 90 students (61.6%) while 56 (38.4%) were male. In terms of study level, Diploma students represented the majority of the sample, accounting for 86 respondents (58.9%) compared with 60 Degree students (41.1%). For academic part, Part 2 recorded the highest number of respondents with 65 students (44.5%) followed by Part 5 with 31 students (21.2%). Regarding age, 19-year-old students formed the largest age group, comprising 81 respondents (55.5%) followed by those aged 22 years with 50 respondents (34.2%). The remaining respondents were aged between 18 and 23 years with smaller proportions across the other age groups. With respect to prior experience with Google Gemini, 74 respondents (50.7%) reported moderate experience making this the largest category followed by 54 students (37.0%) with minimal experience. Only 11 respondents (7.5%) reported extensive experience, while 7 (4.8%) had no prior experience. A similar pattern was observed for familiarity, where 93 respondents (63.7%) were moderately familiar with Google Gemini followed by 45 (30.8%) who were very familiar and 8 (5.5%) who were not at all familiar. In terms of academic usage, 98 respondents (67.1%) reported seldom using Google Gemini while 44 (30.1%) indicated that they always used it for academic purposes. Only 4 respondents (2.7%) reported never using Gemini academically. Overall, the findings indicate that most respondents had at least some prior experience and familiarity with Google Gemini although regular academic use was less common. This provides a relevant respondent profile for examining the factors influencing Google Gemini acceptance among HEI students.

Table 2: Demographic Information

Characteristics	Category	Frequency (n)	Percentage (%)
Gender	Male	56	38.4
	Female	90	61.6
Study Level	Diploma	86	58.9
	Degree	60	41.1
Part	1	17	11.6

	2	65	44.5
	3	7	4.8
	4	19	13.0
	5	31	21.2
	6	7	4.8
Age	18	3	2.1
	19	81	55.5
	20	4	2.7
	21	6	4.1
	22	50	34.2
	23	2	1.4
Prior Experience with Google Gemini	No experience	7	4.8
	Minimal experience	54	37.0
	Moderate experience	74	50.7
	Extensive experience	11	7.5
Familiarity with Google Gemini	Not at all familiar	8	5.5
	Moderately familiar	93	63.7
	Very familiar	45	30.8
Frequency of Google Gemini Usage for Academic Purposes	Always	44	30.1
	Seldom	98	67.1
	Never	4	2.7

RESULT

The proposed research model was analysed using SmartPLS 3.0 based on the partial least squares structural equation modelling (PLS-SEM) technique (Ringle et al., 2015). The analysis involved two stages. The first stage assessed the measurement model to determine the reliability and validity of the constructs. The structural model was then evaluated to examine the relationships among the constructs and assess the proposed hypotheses (Anderson & Gerbing, 1988).

As the predictor and outcome constructs were obtained from the same self-administered questionnaire, the study also considered the potential presence of common method variance (CMV). According to Podsakoff et al.(2003), Harman's single-factor test was conducted. The first unrotated factor accounted for 46.76% of the total variance which was below the commonly used 50% threshold. Thus, CMV was not considered a major concern in the dataset.

The normality of the data was subsequently assessed using Mardia's multivariate skewness and kurtosis, based on the recommendations by Hair et al. (2021) and Cain et al. (2017). The analysis indicated significant multivariate skewness ($\beta = 2.8807$, $p < 0.01$) and kurtosis ($\beta = 40.8073$, $p < 0.01$). Both statistics exceeded the suggested thresholds of +1 for skewness and +20 for kurtosis, demonstrating that the data did not meet the assumption of multivariate normality. Therefore, PLS-SEM was deemed suitable for the analysis conducted in this study.

Measurement Model

Hair et al. (2021) recommended to evaluate the reflective measurement model to establish whether the measurement items provided reliable and valid representations of the five constructs in the study, namely Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude (ATT), Intention to Use (ITU) and Actual Use (AU). The assessment considered indicator loadings, composite reliability (CR) and average variance extracted (AVE) to determine the reliability of the indicators and the convergent validity of the constructs.

As presented in Table 3, the outer loadings ranged from 0.781 to 0.917 across all retained indicators. All loading values were above the recommended threshold of 0.708 (Hair et al., 2021) indicating that each item contributed

adequately to the measurement of its corresponding construct. The reliability results were also satisfactory with CR values ranging from 0.880 to 0.937. These values exceeded the recommended minimum of 0.70 (Hair et al., 2021) demonstrating that the items within each construct showed a high degree of internal consistency. The AVE values ranged from 0.710 to 0.789 which were consistently above the minimum criterion of 0.50 (Hair et al., 2021). This indicates that each construct captured more than half of the variance in its respective indicators. Therefore, the measurement model demonstrated adequate convergent validity. Taken together, the outer loadings, CR and AVE findings confirm that the measurement items were sufficiently reliable and valid for examining students' acceptance and use of Google Gemini.

Table 3: Reliability and Convergent Validity

Construct	Items	Outer Loadings	CR	AVE
PERCEIVED EASE OF USE (PEOU)	PEOU1	0.879	0.921	0.745
	PEOU2	0.888		
	PEOU3	0.864		
	PEOU4	0.819		
PERCEIVED USEFULNESS (PU)	PU1	0.826	0.88	0.71
	PU2	0.824		
	PU3	0.877		
ATTITUDE (ATT)	ATT1	0.842	0.918	0.737
	ATT2	0.872		
	ATT3	0.88		
	ATT4	0.839		
Intention to use (ITU)	ITU1	0.897	0.896	0.743
	ITU2	0.902		
	ITU3	0.781		
ACTUAL USE (AU)	AU1	0.841	0.937	0.789
	AU2	0.917		
	AU3	0.911		
	AU4	0.88		

Discriminant validity was subsequently assessed using the Heterotrait-Monotrait (HTMT) ratio to determine whether the constructs represented empirically different concepts (Henseler et al., 2015). The HTMT values in Table 4 ranged from 0.458 to 0.863 with all values remaining below the 0.90 threshold. The highest value was observed between ATT and ITU at 0.863, but this remained within the acceptable criterion. These results indicate that PEOU, PU, ATT, ITU and AU were sufficiently distinguishable from one another. Thus, the measurement model established both adequate convergent validity and discriminant validity, supporting its suitability for subsequent structural model analysis.

Table 4: Discriminant Validity

	PEOU	PU	ATT	ITU	AU
PEOU					
PU	0.677				
ATT	0.6	0.709			
ITU	0.458	0.622	0.863		
AU	0.563	0.527	0.582	0.551	

Structural Model

Following confirmation of the measurement model, the structural model was assessed to examine the hypothesised relationships among the constructs. The evaluation considered the path coefficients (β), standard errors, t-values, p-values, confidence intervals and variance inflation factor (VIF). Hypothesis testing was conducted using the PLS-SEM bootstrapping procedure with 5,000 resamples.

The results in Table 5 demonstrate that five of the six hypothesised relationships were statistically significant at the 0.05 level. First, PEOU had a positive and statistically significant effect on PU ($\beta = 0.572$, $t = 8.505$, $p < 0.05$). This finding supports H1 and indicates that students who perceive Google Gemini as easier to operate tend to perceive the technology as more useful. The relationship between PEOU and ATT was also positive and significant ($\beta = 0.285$, $t = 3.260$, $p < 0.05$) providing support for H2. Similarly, PU demonstrated a significant positive relationship with ATT ($\beta = 0.434$, $t = 5.286$, $p < 0.05$) supporting H3. In contrast, PU did not significantly predict ITU ($\beta = 0.105$, $t = 1.605$, $p > 0.05$). Consequently, H4 was not supported. ATT emerged as a strong and significant predictor of ITU ($\beta = 0.673$, $t = 10.891$, $p < 0.05$) supporting H5. Finally, ITU significantly predicted AU ($\beta = 0.490$, $t = 8.085$, $p < 0.05$), supporting H6. Overall, the findings support H1, H2, H3, H5 and H6, whereas H4 is not supported. The strongest structural relationship was observed between ATT and ITU ($\beta = 0.673$) followed by PEOU $\rightarrow$ PU ($\beta = 0.572$), PU $\rightarrow$ ATT ($\beta = 0.434$), ITU $\rightarrow$ AU ($\beta = 0.490$), and PEOU $\rightarrow$ ATT ($\beta = 0.285$). The relatively strong ATT $\rightarrow$ ITU relationship highlights the importance of students' attitudes in shaping their intention to use Google Gemini.

The VIF values ranged from 1.000 to 1.556 remaining substantially below the commonly applied threshold of 5.00 (Hair et al., 2021). This indicates that the predictor constructs did not demonstrate problematic multicollinearity. Hence, the estimated structural relationships can be interpreted without evidence of excessive overlap among the predictor variables.

Table 5: Path Coefficient and Hypothesis Testing

	Beta, β	SE	t values	p values	LL	UL	VIF	DECISION
PEOU $\rightarrow$ PU	0.572	0.067	8.505	0.000	0.428	0.695	1.000	Supported
PEOU $\rightarrow$ ATT	0.285	0.087	3.260	0.001	0.106	0.450	1.488	Supported
PU $\rightarrow$ ATT	0.434	0.082	5.286	0.000	0.272	0.597	1.488	Supported
PU $\rightarrow$ ITU	0.105	0.064	1.605	0.109	-0.019	0.231	1.556	Not Supported
ATT $\rightarrow$ ITU	0.673	0.062	10.891	0.000	0.543	0.785	1.556	Supported
ITU $\rightarrow$ AU	0.490	0.06	8.085	0.000	0.368	0.601	1.000	Supported

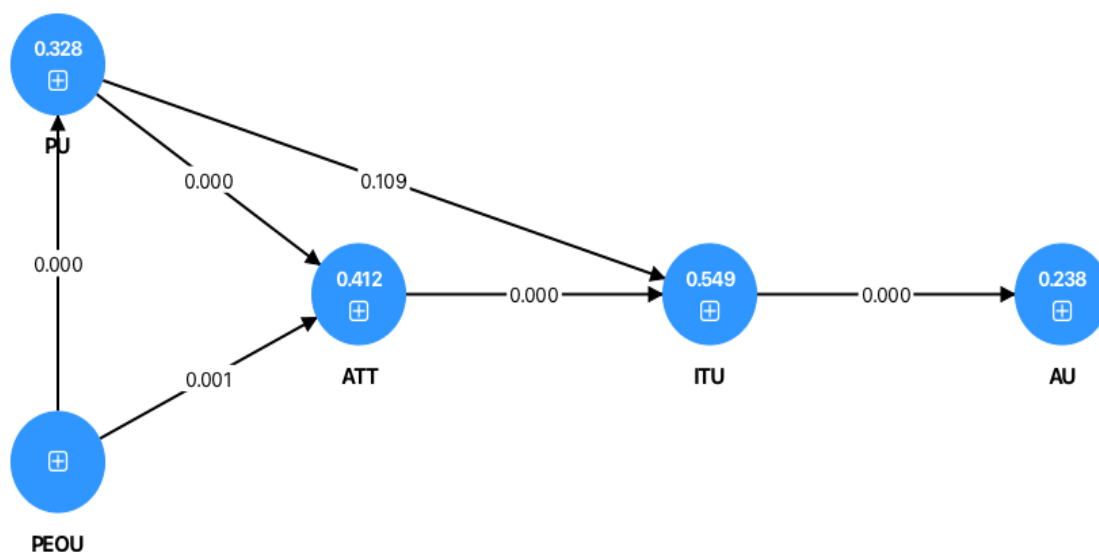


Fig. 1 Structural Model

Coefficient of Determination, Effect Size and Predictive Relevance

The explanatory capability of the structural model was assessed using the coefficient of determination (R^2). According to Chin (1998), R^2 values of 0.67, 0.33 and 0.19 indicate strong, moderate and weak levels of predictive accuracy respectively. Based on the values presented in Table 6, PU obtained an R^2 of 0.328 indicating that approximately 32.8% of its variance was explained by PEOU. This represents a moderate level of predictive accuracy. ATT recorded an R^2 of 0.412 meaning that 41.2% of its variance was accounted for by PEOU and PU, indicating moderate predictive accuracy. ITU produced an R^2 of 0.549 indicating that 54.9% of the variance in students' intention to use Google Gemini was explained by PU and ATT, which also reflects moderate predictive accuracy. Finally, AU recorded an R^2 of 0.238, suggesting that 23.8% of the variance in actual use was explained by ITU, representing a weak level of predictive accuracy.

The effect size (f^2) was examined to assess the magnitude of each predictor's contribution to its respective endogenous construct. Based on Cohen (1988), f^2 values of approximately 0.02, 0.15 and 0.35 can be interpreted as small, medium and large effects respectively. The results show that PEOU $\rightarrow$ PU produced a large effect ($f^2 = 0.488$) indicating that perceived ease of use made a substantial contribution to students' perceptions of the usefulness of Google Gemini. Similarly, ATT $\rightarrow$ ITU demonstrated a large effect ($f^2 = 0.650$) representing the strongest effect in the model and highlighting the important role of students' attitudes in explaining their intention to use Google Gemini. The remaining relationships demonstrated varying degrees of effect. PU $\rightarrow$ ATT recorded an f^2 value of 0.216 indicating a medium effect while ITU $\rightarrow$ AU produced an f^2 value of 0.312 which also represents a medium effect. PEOU $\rightarrow$ ATT yielded an f^2 value of 0.092 indicating a small effect. In contrast, PU $\rightarrow$ ITU recorded an f^2 value of only 0.015 which falls below the threshold for a small effect and therefore indicates a negligible effect.

The predictive relevance of the structural model was evaluated using the Q^2 statistic. Hair et al. (2021), suggest that a Q^2 value above zero provides evidence that the model has predictive relevance for the respective endogenous construct. The results showed that all endogenous constructs obtained positive Q^2 values with values of 0.310 for PU, 0.268 for ATT, 0.145 for ITU and 0.163 for AU. As each value exceeded zero, the findings indicate that the model possesses predictive relevance for PU, ATT, ITU and AU. Thus, the structural model demonstrates adequate predictive capability across all endogenous constructs examined in the study.

Table 6: R^2 and Effect Size

	R^2	Q^2	f^2			
			PU	ATT	ITU	AU
PEOU			0.488	0.092		
PU	0.328	0.31		0.216	0.015	
ATT	0.412	0.268			0.65	
ITU	0.549	0.145				0.312
AU	0.238	0.163				

DISCUSSION

This study examined the factors influencing the acceptance and use of Google Gemini among higher education institution (HEI) students based on the Technology Acceptance Model (TAM). The findings provide evidence on how PEOU, PU, ATT, ITU and AU are related to students' actual use of Gemini for academic purposes. Overall, the results showed that the proposed relationships were not uniformly supported with some paths demonstrating significant effects while others were not significant. These findings indicate that students' acceptance of Gemini may depend on how they perceive and evaluate the technology rather than following all relationships proposed by the traditional TAM. The following sections discuss each hypothesis in relation to previous research and consider possible explanations within the context of Google Gemini use among HEI students.

The findings supported H1, indicating that PEOU significantly influenced PU of Google Gemini. This result is consistent with Pham et al. (2025) and Zou and Huang (2023) but not aligned with Sabran et al. (2025). The relationship may be explained by the respondents' existing exposure to Gemini. As shown in the demographic profile, 50.7% had moderate experience and 63.7% were moderately familiar with Google Gemini. This familiarity may have enabled students to interact with Gemini more easily and consequently, recognise its usefulness for their academic activities. Thus, students who find Gemini easier to use are more likely to perceive greater academic value from the technology.

Similarly, H2 was supported, showing that PEOU significantly influenced students' ATT toward Google Gemini. This finding is in line with Zou and Huang (2023). In the present study, the relatively high level of familiarity among respondents may have reduced difficulties when interacting with Gemini. Moreover, although 67.1% reported using Gemini only seldom for academic purposes, most respondents had at least some previous experience with the platform. This suggests that even limited exposure may have allowed students to form favourable attitude when the technology was easy to operate. Thus, ease of interaction may contribute to a more positive attitude toward Google Gemini among HEI students.

H3 was also supported, indicating that PU had a significant positive effect on students' ATT toward Google Gemini. This finding is consistent with Zou and Huang (2023). The result can be understood in relation to the respondents' existing experience with the technology where 50.7% reported moderate experience with Gemini. Such exposure may have allowed students to recognise its practical benefits for academic activities such as obtaining information, generating ideas and supporting learning tasks. Furthermore, when students perceive that Gemini can provide meaningful academic assistance, they are more likely to evaluate the technology positively. Thus, greater perceived usefulness is likely to foster a more favourable attitude toward Google Gemini.

However, H4 was not supported, indicating that PU did not significantly influence ITU Google Gemini. This finding contradicts with Pham et al. (2025) and Zou and Huang (2023), who reported a significant relationship between perceived usefulness and intention to use ChatGPT. One possible explanation within the present study is that perceived usefulness alone may not be sufficient to encourage intention to use Gemini. Although most respondents had some degree of experience and familiarity with Gemini, 67.1% reported using it only seldom for academic purposes. This suggests that recognising the usefulness of Gemini does not necessarily translate into a stronger intention to use it regularly. Instead, students may require a favourable overall attitude toward the technology before usefulness can translate into intention, which is supported by the significant relationship between attitude and intention. Thus, H4 is not supported.

In contrast, H5 was supported and showed that ATT significantly influenced students' ITU Google Gemini. This finding is consistent with Zou and Huang (2023). The strong influence of attitude may be related to the respondents' existing familiarity with Gemini, as 63.7% were moderately familiar and 30.8% were very familiar with the platform. Having direct exposure to Gemini may enable students to form clearer evaluations of the technology, and positive evaluations can subsequently strengthen their intention to use it. Moreover, the finding suggests that students' willingness to use Gemini may depend more on how positively they view the technology than simply on whether they recognise its usefulness. Thus, a favourable attitude is an important factor in encouraging intention to use Google Gemini among HEI students.

Finally, H6 was supported, indicating that ITU significantly influenced U of Google Gemini. This finding is consistent with Kurniawan et al. (2025). The demographic profile provides further context for this relationship as 97.3% of respondents had used Google Gemini at least to some extent, with only 2.7% reporting that they had never used it for academic purposes. This indicates that the majority had already translated their willingness to use Gemini into actual academic use. Nevertheless, the fact that 67.1% reported seldom using Gemini suggests that intention does not necessarily result in frequent usage. Students may use Gemini when specific academic needs arise rather than as a regular learning tool. Thus, intention remains an important driver of actual use, although the frequency of usage may depend on students' academic needs and circumstances.

Overall, the findings demonstrate that students' acceptance of Google Gemini is shaped more strongly by their perceptions and attitudes toward the technology than by perceived usefulness alone. The significant relationships

involving perceived ease of use, attitude and intention to use indicate that students are more likely to engage with Gemini when they find the system accessible and develop a favourable attitude towards its use. However, the non-significant relationship between perceived usefulness and intention to use suggests that recognising Gemini as useful does not necessarily translate directly into an intention to use it. This may be because students' actual willingness to use Gemini depends on how they evaluate their overall experience with the technology rather than its perceived academic benefits alone. Taken together, the findings suggest that attitude plays an important role in bridging students' perceptions of Google Gemini and their intention to use it, while actual usage is ultimately influenced by students' willingness to engage with the technology.

CONCLUSION

This study examined the acceptance of Google Gemini among higher education institution (HEI) students using the Technology Acceptance Model (TAM). The findings provide evidence that TAM remains useful for explaining students' acceptance of a contemporary generative AI technology, although not all proposed relationships were supported. Perceived ease of use contributed to students' perceptions of usefulness and attitude while perceived usefulness was also associated with attitude. However, perceived usefulness did not have a significant direct influence on intention to use Google Gemini. In contrast, attitude significantly influenced intention to use which subsequently contributed to actual use.

These findings indicate that students' acceptance of Google Gemini cannot be explained solely by whether they consider the technology useful. Instead, their attitude towards the technology appears to be particularly important in determining whether they intend to use it. The significant relationship between intention to use and actual use further demonstrates that students' willingness to adopt Gemini can translate into actual engagement with the technology. Therefore, the study highlights the importance of creating positive and accessible experiences when encouraging the responsible use of Google Gemini in higher education.

RECOMMENDATIONS

Based on the findings, several recommendations can be proposed. First, HEIs should provide students with appropriate guidance and training on the effective use of Google Gemini. Since perceived ease of use contributes to students' perceptions and attitudes, practical exposure and clear guidance may help students become more comfortable when interacting with the technology. Second, lecturers should integrate Google Gemini into learning activities in a structured and meaningful manner. Rather than presenting Gemini simply as a tool for obtaining answers, students can be encouraged to use it for brainstorming, explanation, comparison of information, feedback and other learning-support activities. This may help students develop a more positive attitude towards the technology. Third, because perceived usefulness alone did not directly predict intention to use, HEIs should not assume that demonstrating the academic benefits of Gemini will automatically encourage students to use it. Greater emphasis should be placed on students' overall experience, confidence and attitude towards the technology. Finally, future researchers should further examine Google Gemini acceptance among students in different Malaysian HEI contexts. Future studies could include additional factors such as trust, perceived risk, social influence, facilitating conditions, ethical concerns, or digital literacy to provide a more comprehensive explanation of GenAI acceptance. Comparative studies involving Google Gemini and other GenAI platforms could also determine whether students' acceptance differs according to the specific AI technology being used.

REFERENCES

1. Anderson, J. C., & Gerbing, D. W. (1988). Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, 103(3), 411–423. <https://doi.org/10.1037/0033-2909.103.3.411>
2. Baharuddin, M. F., Zaki, N. D. A., Yusuff, K. N. M., & Anuar, M. A. W. (2024). Assessing the Acceptance and Behavioral Intentions Towards ChatGPT among Undergraduate Students. *Journal of Information and Knowledge Management*, 14(2), 40–49. <https://doi.org/10.24191/jikm.v14i2.3668>

3. Bilos, A., & Budimir, B. (2024). Understanding the Adoption Dynamics of ChatGPT among Generation Z: Insights from a Modified UTAUT2 Model. *Journal of Theoretical and Applied Electronic Commerce Research*, 19(2), 863–879. <https://doi.org/10.3390/jtaer19020045>
4. Cain, M. K., Zhiyong Zhang, & Yuan, K.-H. (2017). Univariate and multivariate skewness and kurtosis for measuring nonnormality: Prevalence, influence and estimation. *Behavior Research Methods*, 49(5), 1716–1735. <https://doi.org/10.3758/s13428-016-0814-1>
5. Chieh, C. C. W., & Wong, T. A. (2025). Unleashing AI in Education: A Comparative Analysis of Malaysian University Student Engagement and Learning Support between Google Gemini and ChatGPT. *Journal of Educational Technology Systems*, 54(2), 310–325. <https://doi.org/10.1177/00472395251380292>
6. Chin, W. (1998). The partial least squares approach to structural equation modeling. *Modern Methods for Business Research*, 295(2), 295–336.
7. Choudhury, A., & Shamszare, H. (2023). Investigating the Impact of User Trust on the Adoption and Use of ChatGPT: Survey Analysis. *JMIR Medical Informatics*, 25. <https://www.jmir.org/2023/1/e47184/>
8. Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences. In *Technometrics* (Vol. 31, Issue 4). Lawrence Erlbaum. <https://doi.org/10.1080/00401706.1989.10488618>
9. Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
10. Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models | *Management Science*. *Management Science*, 35(8), 982–1003.
11. Fared, M. N. M., Ishak, W. H. W., & Yamin, F. M. (2026). A Descriptive Analysis Of Undergraduate Students' Continuance Intention Toward Chatgpt Use In Malaysian Higher Education. *Journal of Technology and Operations Management*, 21(1), 34–45. <https://doi.org/10.32890/jtom2026.21.1.3>
12. Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. 41, 1149–1160.
13. Ghazi, F., Chong, G., Juhdiy, F., Khalid, A., Mazlan, M., & Ali, W. N. H. W. (2025). Adoption and Usage of Generative Artificial Intelligence (GenAI) Tools Among Bandar Penawar MARA Professional College Students. *Innovative Teaching and Learning Journal*, 9(1), 247–257. <https://doi.org/10.11113/itlj.v9.182>
14. Google. (2026, March 9). Enabling Gemini for Education across all Malaysian public universities. <https://malaysia.googleblog.com/2026/03/enabling-gemini-for-education-across.html>
15. Hair, J., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2021). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (3rd ed.).
16. Hair Jr, J., Page, M., Brunsveld, N., Merkle, A., & Cleton, N. (2023). *Essentials of business research methods*. Taylor & Francis.
17. Hasanein, A. M., Sobaih, A. E. E., & Elshaer, I. A. (2024). Examining Google Gemini's acceptance and usage in higher education. *Journal of Applied Learning & Teaching*, 7(2), 223–231.
18. Henseler, J., Ringle, C., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135.
19. Ibrahim, R., Leng, N. S., Yusoff, R. C. M., Samy, G. N., Masrom, S., & Rizman, Z. I. (2017). E-Learning Acceptance Based on Technology Acceptance Mode (TAM). *Journal of Fundamental and Applied Sciences ISSN*, 9(4S), 871–889. <https://doi.org/10.4314/jfas.v9i4S.50>
20. Imran, M., & Almusharraf, N. (2024). Google Gemini as a next generation AI educational tool: A review of emerging educational technology. *Smart Learning Environments*, 11(1), 22. <https://doi.org/10.1186/s40561-024-00310-z>
21. Kurniawan, R. Y. (2025). The Use of Unified Theory of Acceptance and Use of Technology to Analyze Students' Behavioral Interests in Utilizing Gemini AI. *International Journal of Information and Education Technology*, 15(7), 1496–1511. <https://doi.org/10.18178/ijiet.2025.15.7.2351>
22. Majidah, Rullyana, G., & Triandari, R. (2025). Google Gemini as a Learning Assistant: Exploring Student Perceptions. *Jurnal PAJAR (Pendidikan Dan Pengajaran)*, 9(2), 163–172. <https://doi.org/10.33578/pjr.v9i2.10008>
23. Pham, L., Klaus, T., & Bateh, J. (2025). Key factors influencing intention to use ChatGPT: An empirical study of U.S. students. *Acta Psychologica*, 260, 105516. <https://doi.org/10.1016/j.actpsy.2025.105516>

24. Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
25. Qian, Y. (2025). Pedagogical Applications of Generative AI in Higher Education: A Systematic Review of the Field. *International Journal of Educational Technology in Higher Education*, 69, 1105–1120.
26. Ramírez, A. M., Castañeda, G. M. F., Guerra, M. A. D., Cortés, C. H., & Reyes, J. de J. A. (2025). Aceptación y adopción de ChatGPT en la educación superior: Una revisión sistemática. *Revista Digital de Investigación en Docencia Universitaria*, 19(2), e2119–e2119. (International). <https://doi.org/10.19083/ridu.2025.2119>
27. Ringle, C. M., Wende, S., & Becker, J.-M. (2015). *SmartPLS 3*. Bönningstedt.
28. Sabran, M. S. M., Salleh, M. A. M., & Ahmad, Z. (2025). Pengaruh Penerimaan dan Penggunaan Aplikasi ChatGPT dalam Kalangan Pelajar Universiti Kebangsaan Malaysia. *Jurnal Komunikasi: Malaysian Journal of Communication*, 41(3). <http://ejournal.ukm.my/mjc/article/view/84175>
29. Saharah, M. A. (2025). Analisis Penerimaan Penggunaan Google Gemini Di Kalangan Mahasiswa: Pendekatan Model Technology Acceptance Model (Tam) Dan Unified Theory Of Acceptance And Use Of Technology (Utaut) [PhD Thesis, UNAMA]. <https://repository.unama.ac.id/5316/>
30. Venkatesh, V., & Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions. *Decision Sciences*, 39(2), 273–315. <https://doi.org/10.1111/j.1540-5915.2008.00192.x>
31. Yang, F. (2026). ChatGPT Acceptance and Use in Higher Education: Evidence from a Systematic Review Using the Technology Acceptance Model. *TechTrends*, 70(2), 466–483. <https://doi.org/10.1007/s11528-026-01166-5>
32. Yuli Bangun, N., Sujadi, I., Kurniawati, I., Andriatna, R., & Wulandari, A. N. (2025). The emergent role of artificial intelligence in Mathematics education: Examining students' acceptance and perception. *Journal of Educational Management and Instruction (JEMIN)*, 5(2), 249–264.
33. Zou, M., & Huang, L. (2023). Frontiers | To use or not to use? Understanding doctoral students' acceptance of ChatGPT in writing through technology acceptance model. *Frontiers in Psychology*, 14, 1259531.