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Determinants of Google's Gemini AI Chatbot Adoption Among Higher Education Students in Bangkok, Thailand

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Abstract

This study aims to examine the determinants influencing the intention to use the AI chatbot, like Gemini, among higher education students in Bangkok, Thailand. The research focuses on the perceptions and attitudes of Thai higher education students towards Gemini, evaluating factors such as perceived usefulness, perceived ease of use, attitude towards Gemini, privacy and security concerns, and facilitating conditions. A quantitative research approach was employed, collecting data from 385 students through online closed-ended questionnaires designed with a five-point Likert Scale. The data were analyzed using descriptive statistics to outline respondent characteristics and inferential statistics to test hypotheses and ascertain relationships between variables. The findings revealed that perceived usefulness and facilitating conditions are significant positive predictors of the intention to use Gemini, while privacy and security concerns also show an unexpectedly positive influence. Conversely, perceived ease of use and attitude towards Gemini do not significantly impact usage intentions. The study underscores the importance of demonstrating practical benefits and providing adequate support to enhance AI chatbot adoption in educational settings, while effectively addressing privacy and security concerns to further encourage usage. These insights offer valuable guidance for educators, policymakers, and technology developers aiming to integrate AI tools like Gemini into higher education.

Introduction

The emergence of artificial intelligence (AI) has catalyzed transformative changes across numerous sectors, including education. AI chatbots, in particular, have demonstrated significant potential in enhancing learning experiences, streamlining administrative tasks, and providing personalized assistance to students (Igbokwe, 2023; Kamalov et al., 2023). In the context of higher education, the integration of AI tools offers numerous benefits. AI chatbots can provide immediate feedback, facilitate access to educational resources, and offer personalized learning experiences, thereby enhancing students' academic performance and overall learning experience. However, the successful implementation and widespread adoption of such technology depend on several factors, including the compatibility of the tool with existing educational practices, the efficiency of the tool in delivering accurate and timely responses, and the overall satisfaction of users. One such AI chatbot, Google's Gemini (formerly Bard), has been increasingly adopted in higher education institutions. Gemini has shown promise in addressing the diverse needs of higher education students. It provides a platform for students to engage in interactive learning, seek assistance with academic queries, and receive prompt support for administrative processes (Labadze et al., 2023; Perera & Lankathilake, 2023; Imran & Almusharraf, 2024; Wong, 2024).

Despite these benefits, the acceptance and intention to use Gemini may be contingent upon students' perceptions of its usefulness and ease of use, as suggested by the Technology Acceptance Model (TAM), as well as their attitude towards Gemini, privacy and security concerns, and facilitating conditions. Therefore, understanding these perceptions and identifying the factors that influence them are crucial for the successful deployment of Gemini in educational settings. Hence, the primary aim is to identify and analyze the factors influencing the intentions to use Gemini, providing insights for enhancing AI integration in educational settings. The primary research question guiding this study is: "What factors impact the intention to use generative AI technology, such as Gemini, among higher education students in Bangkok, Thailand?" This study specifically focuses on higher education students in Bangkok, Thailand, a region that has experienced rapid growth in the adoption of digital technologies in education. The choice of this locale is driven by the need to understand the unique cultural, social, and technological contexts that may influence students' acceptance of AI tools. Bangkok, being a major educational hub in Thailand, provides a diverse student population and a dynamic educational environment, making it an ideal setting for this research. By identifying the factors that influence the intention to use Gemini among higher education students, this research aims to provide valuable insights for educators, policymakers, and technology developers to enhance the deployment and utilization of AI chatbots in higher education.

Research Objective

This study aims to examine the determinants influencing the intention to use AI chatbots, such as Google's Gemini, among higher education students in Bangkok, Thailand. The research focuses on the perceptions and attitudes of these students toward Gemini, evaluating factors such as perceived usefulness, perceived ease of use, attitudes toward Gemini, privacy and security concerns, and facilitating conditions.

Literature Review

The integration of AI in educational settings has significantly transformed traditional learning paradigms. AI chatbots, in particular, have emerged as powerful tools for enhancing educational experiences, offering personalized support, and automating administrative tasks (Chen et al., 2020; Kamalov et al., 2023). This literature review examines the existing body of research on the factors influencing the intention to use AI chatbots in higher education, with a specific focus on Gemini. The study employs perceived usefulness and perceived ease of use of the Technology Acceptance Model (TAM), attitude towards Gemini, privacy and security concerns, and facilitating conditions as its conceptual framework and presents several hypotheses based on this model.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a well-established postmodern framework that explains how individuals adopt and use new technologies (Rad et al., 2022). The TAM, developed by Davis (1989), posits that perceived usefulness and perceived ease of use are primary determinants of technology acceptance. Perceived usefulness is defined as the degree to which an individual believes that using a particular system will enhance their performance, while perceived ease of use refers to the degree to which an individual believes that using the system will be free of effort. These constructs have been extensively validated in various contexts, including educational technology (Granić & Marangunić, 2019).

Yalcin and Kutlu (2019) investigate students' acceptance and intention to use Learning Management Systems (LMSs) in Turkish universities through an extended TAM. The findings indicate that the intention to use an LMS is influenced by perceived usefulness, perceived ease of use, and social norm. Additionally, perceived usefulness is affected by perceived ease of use, social norm, and user interface design, while perceived ease of use is influenced by user interface design and computer self-efficacy. Furthermore, Rafique et al. (2020) explore the acceptance of a mobile library application using an evolved model based on the TAM. The study's results reveal that perceived usefulness and perceived ease of use are direct and significant predictors of the intention to use the mobile library application.

Perceived Usefulness

Perceived usefulness is a cornerstone of the TAM and has been widely recognized as a significant predictor of technology acceptance (Davis, 1989). In the context of AI chatbots in education, perceived usefulness refers to the degree to which students believe that the chatbot will enhance their academic performance. Several studies have highlighted the positive impact of perceived usefulness on the intention to use educational technologies (Teo, 2011; Al-Emran et al., 2018). Vinitpittayakul (2023) investigated the factors influencing technology acceptance in online learning and concluded that perceived usefulness is among the key determinants affecting technology acceptance in this context. Moreover, Saif et al. (2024) confirmed that the perceived usefulness of Chat-GPT's AI-generated text influences the formation of students' favorable attitudes towards utilizing Chat-GPT, as well as contributing to the reduction of their stress levels. In this study, perceived usefulness significantly affects users' attitudes towards and intentions to use technology, such as Gemini. Thus, we hypothesize that:

H1: Perceived usefulness significantly influences the intention to use Gemini.

Perceived Ease of Use

Perceived ease of use is another fundamental component of the TAM. It represents the user's perception of the effort required to use the technology. Research consistently shows that perceived ease of use significantly affects users' attitudes towards and intentions to use technology (Venkatesh & Davis, 2000; King & He, 2006). Vinitpittayakul (2023) examined the factors that influence technology acceptance in online learning and concluded that perceived ease of use is a significant factor affecting technology acceptance in this domain. Furthermore, Saif et al. (2024) substantiated that the perceived ease of use of ChatGPT's AI-generated text significantly influences students' positive attitudes towards employing ChatGPT. Additionally, it was demonstrated that this ease of use contributes to the alleviation of students' stress levels. In this study, perceived ease of use significantly affects users' attitudes towards and intentions to use technology like Gemini. Hence, we propose that:

H2: Perceived ease of use significantly influences the intention to use Gemini.

Attitude Towards AI Chatbots

Attitude towards technology is a critical factor influencing its acceptance. According to the TAM, attitude mediates the relationship between perceived ease of use, perceived usefulness, and behavioral intention (Fishbein & Ajzen, 1975). Prior studies have shown that a positive attitude towards educational technologies correlates with increased usage intentions (Lai, 2013; Teo & Noyes, 2014). Vinitpittayakul (2023) investigated the factors that influence technology acceptance in online learning and concluded that attitude is a significant factor affecting technology acceptance in this setting. Additionally, Saif et al. (2024) asserted that the development of a positive attitude in students serves as a compelling force that motivates them to engage with ChatGPT through a ubiquitous learning procedure, ultimately leading to enhanced actual usage of ChatGPT. In this study, positive attitudes towards AI chatbots, such as Gemini, can lead to higher acceptance and continued use. Thus, we hypothesize that:

H3: Attitude towards Gemini significantly influences the intention to use Gemini.

Privacy and Security Concerns

Privacy and security concerns are significant barriers to the acceptance of technology, particularly in the context of AI and data-driven applications (Bélanger & Crossler, 2011). Concerns about data privacy and the security of personal information can negatively impact users' willingness to adopt AI tools (Zhou, 2011). Lwin et al. (2007) discovered that concerns about online privacy lead users to employ various tools and techniques to safeguard their privacy and obscure their identities, including the use of false information. They found that the stronger a user's perception of privacy, the more likely they are to recognize the importance of information privacy, devote greater attention to the security and protection of their information, and exercise increased caution during online activities. Arpaci et al. (2015) investigated the impact of security and privacy concerns on the educational use of cloud services and found that these concerns significantly influence students' attitudes towards using cloud services in educational settings. In this study, within the educational domain where personal data is often required, privacy and security concerns can deter students from using AI chatbots like Gemini. Therefore, we hypothesize that:

H4: Privacy and security concerns significantly influence the intention to use Gemini.

Facilitating Conditions

Facilitating conditions refer to the availability of resources and support necessary for using technology (Venkatesh et al., 2003). These conditions can include technical support, infrastructure, and training. The presence of facilitating conditions can significantly enhance the likelihood of technology adoption and continued use (Teo, 2010; Teo, 2011). Khechine et al. (2020) demonstrated that facilitating conditions and intrinsic value are significant predictors of the behavioral intention to use a learning management system that incorporates social media technology. Furthermore, the study found that the facilitating conditions variable alone significantly predicted actual use behavior. Abbad (2021) also confirmed the direct impact of behavioural intentions and facilitating conditions on students' use of Moodle, an e-learning system. In this study, it is posited that adequate support and resources play a crucial role in facilitating the adoption of AI chatbots, such as Gemini, by students. Thus, we propose that:

H5: Facilitating conditions significantly influence the intention to use Gemini.

Empirical Evidence from Educational Technology Studies

Several empirical studies have investigated the factors influencing the acceptance of AI and other digital technologies in education. For instance, Venkatesh et al. (2003) identified perceived usefulness and perceived ease of use as significant predictors of technology acceptance among students. Similarly, Teo (2011) emphasized the importance of facilitating conditions in shaping students' intentions to use educational technologies. Additionally, research on AI chatbots has demonstrated that these tools can enhance learning experiences by providing instant feedback and personalized support (Winkler & Söllner, 2018). However, privacy and security concerns persist, potentially hindering the widespread adoption of such technologies (Lutz, 2019). Thus, balancing the advantages offered by AI chatbots with the concerns surrounding their use is crucial for determining their acceptance among students.

In this study, the researchers examine various factors influencing the adoption of Gemini as a study tool among students in Bangkok, Thailand. Perceived usefulness pertains to the belief that Gemini can enhance academic performance and streamline tasks, thereby establishing its value as an educational aid. Perceived ease of use reflects the notion that Gemini is user-friendly and easy to engage with, increasing the likelihood of its adoption. Attitude plays a crucial role in shaping students' willingness to embrace Gemini as an educational tool. Positive attitudes stem from the belief that Gemini can improve academic performance, simplify tasks, and contribute positively to the learning experience. Conversely, negative attitudes may arise from concerns regarding Gemini's reliability, credibility, or ethical implications. Investigating these attitudes provides valuable insights into students' acceptance or resistance to adopting Gemini. Privacy and security are paramount when students utilize AI tools like Gemini. It is essential to assess students' comfort with sharing academic data with Gemini and to evaluate the safeguards in place for data protection. A robust privacy framework can alleviate concerns and instill trust in Gemini's security. Security encompasses not only data privacy but also the protection of the system against potential threats such as hacking and manipulation. Evaluating measures like encryption, access controls, and system integrity is crucial to instill confidence in Gemini's reliability. Furthermore, the study explores facilitating conditions, which include the resources and knowledge available to individuals

for utilizing Gemini. When individuals have access to ample facilitating conditions, such as abundant resources and knowledge, they are more likely to use Gemini extensively. Lastly, the intention to use Gemini signifies students' motivation and expressed willingness to incorporate it into their academic activities. This intention underscores their readiness to embrace Gemini as a valuable resource in their studies. Figure 1 illustrates the study's conceptual framework.

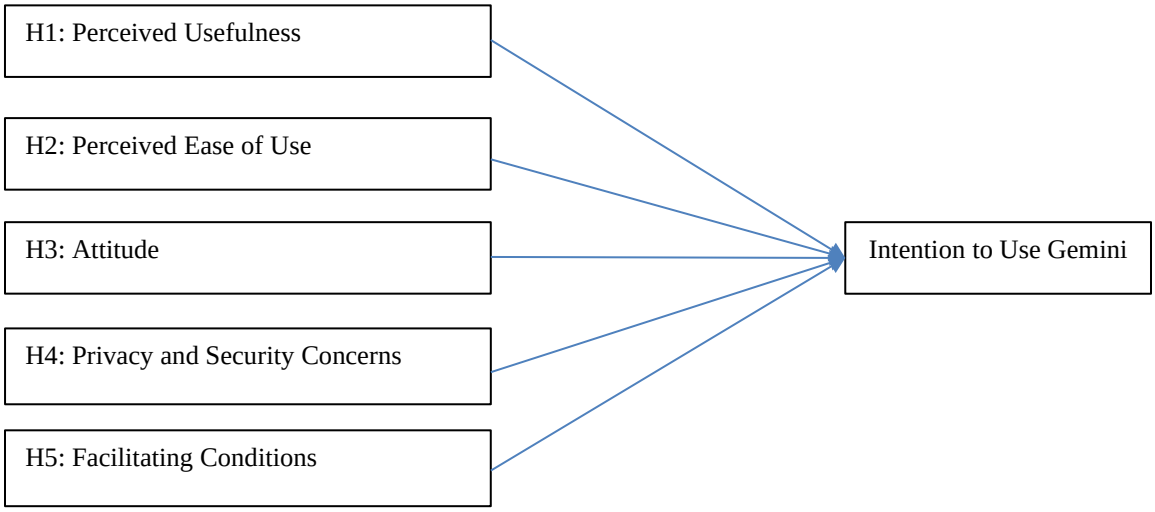

Figure. 1 The Study's Conceptual Framework

This conceptual framework posits that by scrutinizing five specific factors, educators, researchers, and other stakeholders can enhance their understanding and prediction of the intention to use AI technologies, particularly within the context of Google's Gemini. By exploring how these factors influence user adoption in educational settings, stakeholders can identify key variables that affect teachers' and students' readiness and willingness to integrate these technologies into their learning environments. This deeper insight allows for the development of more tailored, effective strategies that not only target but also address the specific needs and expectations of the most likely users, thereby facilitating smoother implementation and greater acceptance of AI tools in educational contexts.

Research Methodology

This study employed a quantitative research approach to investigate the factors influencing the acceptance and continued use of the AI chatbot Gemini among higher education students in Bangkok, Thailand. Quantitative methods were selected for their ability to provide systematic and empirical investigations through statistical techniques. Data were collected using online closed-ended questionnaires featuring a five-point Likert Scale, ranging from 5 (strongly agree) to 1 (strongly disagree). The primary variables evaluated included perceived usefulness, perceived ease of use, attitude towards Gemini, privacy and security concerns, and facilitating conditions. A pre-test with 30 respondents was conducted to refine and validate the questionnaire, ensuring clarity and relevance.

The research instrument was a comprehensive questionnaire carefully structured into six interconnected sections, each designed to probe a specific aspect of the Gemini user experience. These sections encompassed respondent demographics, perceived usefulness, ease of use, overall attitudes towards Gemini, privacy and security concerns, and facilitating conditions for adoption. The finalized questionnaire was developed using Google Forms and disseminated through various online platforms, including social media and educational forums, to maximize reach and ensure a diverse sample. The target population comprised Thai higher education students over 18 years old in Bangkok, Thailand. Due to the unknown total number of students, a non-probability sampling method was employed. The study's sample size was 385 respondents, determined at p = 0.5 through convenience sampling, with a sample error at the 5% confidence level of 95%, as recommended by Namraksa and Kraiwanit (2024). Consequently, the study's respondent pool consisted of 385 individuals.

Data analysis was performed using specialized statistical software, incorporating both descriptive and inferential statistics. Descriptive statistics outlined general respondent characteristics, such as factors associated with Gemini usage, and were presented in frequency tables, percentages, and means. Inferential statistics were employed to test the study's hypotheses and examine relationships between independent variables (perceived usefulness, perceived ease of use, attitude towards Gemini, privacy and security concerns, and facilitating conditions) and the dependent variable (intention to use Gemini). Statistical methods included correlation analysis, regression analysis, and hypothesis testing to ensure robust findings. These analyses provided a comprehensive understanding of the factors influencing the acceptance and continued use of Gemini among higher education students in Bangkok.

Result

In this study, a total of 385 higher education students in Bangkok, Thailand, participated by completing online questionnaires. The collected data were systematically coded and subjected to comprehensive analysis for research purposes.

Table 1. Descriptive Statistics

Hypotheses	N	Mean	Std. Deviation
H1	385	4.560	0.498
H2	385	4.592	0.458
H3	385	4.522	0.430
H4	385	4.503	0.478
H5	385	4.493	0.445

Table 1 presents the descriptive statistics for each of the hypotheses (H1, H2, H3, H4, H5) in the study. A total of 385 participants contributed to the data for each hypothesis. For H1, the mean score was 4.560, with a standard deviation of 0.498, indicating a higher level of variation in the data compared to the other hypotheses. For H2, the mean score was 4.592 with a standard deviation of 0.458, suggesting relatively

lower variability than H1. H3 had a mean score of 4.522 and a standard deviation of 0.430, indicating the least variability among the hypotheses. For H4, the mean score was 4.503 with a standard deviation of 0.478, and for H5, the mean score was 4.493 with a standard deviation of 0.445, both indicating moderate variability. The standard deviation quantifies the extent of variation or dispersion in the data. A higher standard deviation implies greater variability among the responses. Therefore, H1 exhibited the highest variability (0.498), while H3 showed the least (0.430), providing insights into the consistency of participants' responses across different hypotheses.

Table 2. Reliability Statistics

Cronbach's Alpha	N of Hypotheses
0.840	5

Table 2 presents the reliability statistics for the study, as measured by Cronbach's Alpha. A Cronbach's Alpha value of 0.840 indicates a high level of internal consistency among the items corresponding to the five hypotheses (H1, H2, H3, H4, H5) in this study. Generally, values above 0.70 are acceptable, above 0.80 are good, and above 0.90 are excellent. Thus, the obtained value of 0.840 suggests that the survey instrument used is reliable and that the items within each hypothesis consistently measure the same underlying construct. This high reliability score implies that respondents' answers are consistent and well-correlated, enhancing the credibility of the study's findings. It ensures that the conclusions are based on dependable and replicable data. The reliability analysis confirms that the questionnaire used to evaluate the factors influencing the acceptance and continued use of the AI chatbot Gemini among higher education students in Bangkok is robust and reliable. The high Cronbach's Alpha value underscores the internal consistency of the survey items, providing confidence in the study's validity.

Table 3. Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.633[a]	0.400	0.392	0.388

a Predictors: (Constant), H1, H2, H3, H4, H5

Table 3 presents the study's model summary. The model summary reveals the overall strength of the relationship between the independent variables (H1, H2, H3, H4, H5) and the dependent variable (intention to use Gemini). The multiple correlation coefficient (R) of 0.633 indicates a moderate to strong relationship between the predictors and the outcome variable. The coefficient of determination (R^2) is 0.400, signifying that approximately 40% of the variance in the intention to use Gemini is explained by the model. The Adjusted R^2, which adjusts for the number of predictors in the model, is 0.392, indicating a substantial explanatory power while accounting for potential overfitting. The standard error of the estimate (0.388) reflects the average distance that the observed values deviate from the regression line, thus providing an indication of

the model's precision in predicting the dependent variable. These statistics collectively demonstrate that the model possesses a reasonable level of explanatory power and that the independent variables significantly contribute to predicting the intention to use Gemini among higher education students in Bangkok. This underscores the relevance and robustness of the hypothesized factors in understanding students' acceptance and continued use of the Gemini.

Table 4. Coefficients[a]

Model 1	Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	0.939	0.253		3.709	0.001
H1	0.174	0.047	0.174	3.708	0.001
H2	-0.035	0.061	-0.032	-0.578	0.563
H3	0.029	0.060	0.025	0.483	0.629
H4	0.170	0.062	0.163	2.760	0.006
H5	0.463	0.068	0.414	6.802	0.001

a Dependent Variable: Dependent

Table 4 presents the regression coefficients, elucidating the relationships between the independent variables (H1, H2, H3, H4, H5) and the dependent variable (intention to use Gemini). The constant term (0.939) is statistically significant ($p < .001$), indicating that when all predictors are held constant, the baseline intention to use Gemini is 0.939. For H1 (Perceived Usefulness), the unstandardized coefficient is 0.174 ($p < 0.001$), suggesting that a one-unit increase in perceived usefulness is associated with a 0.174 increase in the intention to use Gemini, holding other factors constant. This variable significantly and positively influences the dependent variable. The coefficient for H2 (Perceived Ease of Use) is -0.035 ($p = 0.563$), indicating that perceived ease of use does not have a statistically significant impact on the intention to use Gemini. For H3 (Attitude towards Gemini), the coefficient is 0.029 ($p = 0.629$), showing that attitude towards Gemini does not significantly influence the dependent variable. The coefficient for H4 (Privacy and Security Concerns) is 0.170 ($p = 0.006$), suggesting a significant positive relationship with the intention to use Gemini. This finding is counterintuitive, as higher privacy and security concerns are typically expected to negatively influence usage intentions. Finally, for H5 (Facilitating Conditions), the coefficient is 0.463 ($p < .001$), indicating a significant positive relationship. This suggests that better facilitating conditions greatly enhance the intention to use Gemini.

The analysis revealed that perceived usefulness (H1) and facilitating conditions (H5) are significant positive predictors of the intention to use Gemini. Unexpectedly, privacy and security concerns (H4) also show a significant positive relationship. In contrast, perceived ease of use (H2) and attitude towards Gemini (H3) do not significantly influence the intention to use Gemini in this model.

Discussion

This study examined the determinants influencing the intention to use the AI chatbot, like Gemini, among higher education students in Bangkok, Thailand. The analysis indicates that perceived usefulness and facilitating conditions are significant positive predictors of the intention to use Gemini. Privacy and security concerns also demonstrate a significant relationship. However, perceived ease of use and attitude towards Gemini do not significantly impact the intention to use Gemini in this model.

The adoption of the TAM was pivotal in elucidating the determinants of technology adoption. TAM asserts that perceived usefulness and perceived ease of use are fundamental in shaping users' attitudes and behavioral intentions towards technology. Within the Gemini context, perceived usefulness is conceptualized as the degree to which students believe that the chatbot can augment their academic performance. The findings of this study align with those of Vanduhe et al. (2020), who highlighted the critical role of perceived usefulness in sustaining the intention to use gamified Moodle for training. However, this study reveals that perceived ease of use does not significantly influence the intention to use Gemini. Similarly, Al-Adwan et al. (2023) found that perceived ease of use was not a significant determinant in their investigation of factors affecting higher education students' intentions to adopt metaverse technology, using an extended version of TAM.

In this study, attitudes towards Gemini, a chatbot in educational settings, do not significantly impact the intention to use it, likely because its use is driven more by practical needs than by personal feelings. Users may see Gemini as a necessary tool to aid their learning or administrative tasks, rather than an engaging or enjoyable technology. Thus, even if users are not particularly fond of Gemini, they might still use it if it effectively fulfills its functional purpose. The study's findings diverged from those of Vinitpittayakul (2023), who investigated the factors influencing technology acceptance in online learning and concluded that attitude significantly affects technology acceptance in this context.

Privacy and security concerns are particularly pertinent in the context of AI and digital tools. Students' apprehensions about data privacy and the security of their personal information can significantly influence their willingness to use Gemini. Addressing these concerns is vital for fostering trust and ensuring the successful implementation of the chatbot in educational settings. In alignment with the findings of Arpaci et al. (2015), the impact of security and privacy concerns on the educational use of cloud services significantly influences students' attitudes towards using cloud services in educational settings.

Facilitating conditions, including the availability of resources and support, are essential for the effective adoption of Gemini. These conditions encompass technical support, infrastructure, and training, which can ease the integration process and encourage sustained use. Institutions must ensure that adequate facilitating conditions are in place to support students in using the chatbot effectively. Consistent with the findings of Abbad (2021), it was confirmed that behavioral intentions and facilitating conditions have a direct impact on students' use of Moodle, an e-learning system.

The theoretical framework and methodology employed in this study underscore the importance of understanding the multifaceted factors that influence technology acceptance. By identifying and analyzing these determinants, this research provides valuable insights for educators, policymakers, and technology

developers. These insights can inform strategies to enhance the deployment and utilization of AI tools like Gemini in higher education, ensuring that they meet the needs and expectations of students while addressing potential barriers to adoption. This discussion emphasizes the need for a holistic approach to technology integration in education. It highlights the interplay between various factors that contribute to the acceptance and continued use of AI chatbots, offering a nuanced understanding of the complexities involved. This comprehensive analysis aims to support the effective implementation of Gemini and similar technologies, ultimately enhancing the educational experience for students.

Originality and Body of Knowledge

This study uniquely contributes to the body of knowledge by exploring the determinants of AI chatbot adoption, specifically Google's Gemini, among higher education students in Bangkok, Thailand. While numerous studies have applied the TAM to various technologies, this research stands out by its focus on AI chatbots in an educational context within a specific cultural and regional setting. The unexpected finding that privacy and security concerns positively influence the intention to use Gemini, contrary to traditional expectations, adds a novel dimension to the discourse on technology adoption. By integrating empirical evidence from a diverse sample of 385 students, this study provides robust insights into the practical benefits and support mechanisms essential for AI integration in higher education. This research not only validates existing theoretical frameworks but also highlights the nuanced interplay of factors influencing technology acceptance, offering a comprehensive understanding crucial for educators, policymakers, and technology developers aiming to enhance the deployment and utilization of AI tools in educational settings.

Conclusion

This study highlights the critical factors influencing the acceptance and continued use of the AI chatbot Gemini among higher education students in Bangkok, Thailand. Perceived usefulness and facilitating conditions emerge as significant positive predictors of usage intentions. Privacy and security concerns, although typically seen as barriers, also show a positive influence on the intention to use Gemini, indicating that students may prioritize secure and privacy-respecting technologies. In contrast, perceived ease of use and attitude towards Gemini do not significantly affect usage intentions, suggesting that practical benefits and external support mechanisms play a more crucial role in adoption decisions.

These findings provide actionable insights for educational institutions aiming to integrate AI tools effectively. To enhance the acceptance and continued use of such technologies, institutions should focus on demonstrating the practical benefits of AI chatbots and ensuring robust support systems are in place. Addressing privacy and security concerns proactively can further encourage student engagement with these tools. By understanding and leveraging these determinants, educators, policymakers, and technology developers can better design and implement AI-driven solutions that are perceived as beneficial, well-supported, and secure by the student population. This approach will facilitate smoother integration and promote sustained usage and acceptance of AI technologies in educational settings.

Research Implications

This study advances the understanding of technology acceptance by identifying key factors influencing the adoption of AI chatbots, such as Gemini, among higher education students. Academically, it underscores the significance of perceived usefulness and facilitating conditions in shaping students' usage intentions, while also highlighting the unexpectedly positive role of privacy and security concerns. These findings contribute to the theoretical framework of technology acceptance models by providing empirical evidence that practical benefits and support mechanisms are critical determinants of technology adoption, whereas perceived ease of use and attitudes may be less influential.

Practically, the findings suggest that educational institutions should emphasize the practical benefits of AI technologies, ensuring that students clearly understand how these tools can enhance their academic performance. Providing robust support systems, such as technical assistance and training, is essential to facilitate smooth integration and usage. Furthermore, addressing privacy and security concerns transparently and proactively can build trust and alleviate potential apprehensions, encouraging greater acceptance and engagement with AI chatbots. By focusing on these factors, educators, policymakers, and technology developers can design and implement AI tools that are well-received and effectively utilized, ultimately contributing to a more innovative and supportive learning environment. These insights are crucial for optimizing the adoption and sustained use of AI technologies in educational settings.

Limitations and Future Research

This study is not without limitations. This study is limited by its sample size of 385 students from Bangkok, which may not fully represent the broader population of higher education students. Additionally, the reliance on self-reported data through questionnaires could introduce bias. Future research should expand the sample size and include a more diverse demographic to enhance generalizability. Employing a mixed-methods approach, incorporating qualitative data, and exploring additional variables such as cultural influences and institutional support, would provide a more comprehensive understanding of AI chatbot adoption. Longitudinal studies tracking changes over time are also recommended to assess the long-term effectiveness of interventions aimed at promoting AI chatbot use in educational settings.

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