DLSU Research Congress 2025
De La Salle University, Manila, Philippines
June 26 to 28, 2025

GenAI in learning: How students' self-efficacy, access, attitude, and social influence affect their intent to adopt the technology

Violeta C. Valladolid[1*] and Rene S. Valladolid[2]
[1]*De La Salle University*
[2]*De La Salle- College of Saint Benilde*
[*]*Corresponding Author:* violeta.valladolid@dlsu.edu.ph

Abstract

The success of integration of AI-based technology in learning depends largely on different factors. However, studies showed conflicting effects of these factors on AI adoption. There are also limited studies on students' uptake on GenAI usage, especially in the Philippine setting. Likewise, most studies on AI adoption focused on teachers and other professionals in business and industry. This study aimed to (1) determine students' self-efficacy, access, attitude, and social influence related to GenAI, and their intent to adopt the tools, (2) significant differences in the identified factors based on gender and academic discipline, and (3) significant factors influencing students' intent to adopt GenAI. The study involved 876 college students who responded to the online survey. Results indicate that students are highly aware of the different GenAI tools, have access to different GenAI resources, believe that GenAI tools bring about benefits as well threats/risks, and are moderately influenced by their teachers and peers to use GenAI. They are ambivalent as to their intent to adopt the technology in the future. The findings highlight the need for interventions of HEIs, particularly through development of comprehensive ethics policy frameworks that include guidelines on AI use, review of curriculum to include GenAI tools, conduct of training programs to teacher and students, and putting up of technological infrastructure to ensure easy access to variety of GenAI tools, not only those that are free to use and but also those that are tailored-fit to academic context.

Keywords: Generative Artificial Intelligence; GenAI adoption; technological self-efficacy; GenAI benefits and Threats; UTAUT

1. INTRODUCTION

The integration of technology, particularly artificial intelligence (AI) in teaching and learning has increased tremendously in the past years, leading to quick information access to both teachers and students. These technologies are rapidly evolving in complexity and usage. However, their true impact on education needs to be explored more. What is known is that they are opening up a world of possibilities, while also generating significant concerns about their threats and challenges.

AI users hold predominantly favorable yet cautious perspective on the use of AI technology in education. For example, Hong Kong university students recognized its potential for personalized learning support, writing and brainstorming assistance, and research and analysis capabilities, but at the same time expressing concerns about accuracy, privacy, and ethical implications and its impact on students' personal development, career prospects, and values (Chan & Hu, 2023). Filipino students strongly believed that while AI is easy to use and helpful in their learning, they were also

concerned about incorrect or biased information, and its impact on critical thinking skills and potential for student cheating (Villarino, 2024). Filipino instructors and administrators collectively acknowledged AI as a transformative tool to enhance teaching, streamline administrative tasks, and boost research productivity, however, they also cited concerns about students' cheating, data fabrication, and potential decline in creativity and critical thinking (Giray et. al, 2024). Generally, the benefits of AI in education are related to subject content delivery, evaluation and assessment, use of LMS, educational policy making, and students' learning support while the threats/risks include issues on security and privacy of data, ethical use, academic integrity (e.g., plagiarism and cheating), equity and fairness, and decline in students' writing and critical thinking skills, among others (Rahiman & Kodikal, 2023; Saputra et al., 2023; Chan & Hu, 2023; Ifenthaler et al., 2024; Kumar, 2023).

One of the most utilized EdTech tools by teachers and students are the generative AI (GenAI) tools. GenAI is a subset of AI that utilizes machine learning models to create new, original content, such as images, text, or music, rather than analyzing and interpreting existing data. They are used for enhancing students' learning experience through its ability to respond to user prompts to generate highly original outputs (Chan & Hu, 2023). Some of the prominent GenAI tools used in schools include ChatGPT, Gemini, Grammarly, and CANVA.

The success of integration of AI-based technology in learning depends largely on the different factors and these include students' technological self-efficacy, readiness and acceptance, social influence, facilitating conditions, and expectancy value/perceived usefulness (Davis, 1989; Wang et al., 2023; Bui et al., 2025). Students' personal and academic factors also influence their attitude with and utilization of AI, such as age, academic development, and field of study (Asirit & Hua, 2023; Wang et al., 2023). However, studies showed conflicting effects of gender and academic programs on AI attitude and adoption (Yilmaz et al., 2023; Timilsena & Ghimire, 2024; Iddrisu et al., 2025; Solorzano et al., 2024; Wang et al., 2023).

Nevertheless, understanding gender and program disparities in AI's adoption is crucial especially that a lot of efforts are ongoing in promoting equity and inclusivity in AI-driven learning environments. Parity remains a significant challenge especially in educational contexts and identifying this underscores the need for targeted efforts to promote equal opportunity in AI education (Adewale et al., 2024). Furthermore, understanding students' intent to adopt the technology aligns with global efforts to foster a technologically advanced educational landscape as well as to ensure that users adhere to ethical considerations when employing the technology (Changalima et al., 2024).

This study was conducted since not too many studies were conducted on students' uptake on the usage of GenAI in education. Most studies on AI adoption were focused on teachers and other professionals in business and industry (Alkanaan, 2022; Lada et al, 2023; Poba-Nzaou & Tchibozo, 2022). Furthermore, there is a dearth of studies on students' readiness of GenAI utilization in the Philippine setting. There is a need to study the future implementation of AI technology in the Philippines due to its concerns related to digital divide, internet connectivity issues, and generalized device scarcity in the country (Villarino, 2024).

1.1 Research Framework

This study was anchored on the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh, et al. (2003). The UTAUT suggests that the perceived likelihood of adopting the technology is dependent on the direct effect of four key constructs, namely effort expectancy, performance expectancy, social influence, and facilitating conditions. Effort expectancy is the degree of ease associated with the use of the system, while performance expectancy is the degree to which an individual believes that using the system will help him/her to attain gains in his/her performance. Social influence is the degree to which an individual is influenced by his/her significant others' use and perception while facilitating conditions is defined as the degree to which an individual believes that an organization's technical infrastructure exists to support the use of the system. For this study, effort

expectancy is measured by the degree of students' technological self-efficacy (Self-Eff); performance expectancy by the perceived benefits of the tools (PerBen); social influence by the teachers' and peers' influence (SocInf); and facilitating conditions by access to resources (AccRes).

However, UTAUT model overlooks the crucial role of ethical concerns in the adoption of GenAI. This study addressed this gap by integrating ethical and academic integrity concerns into the model. The inclusion of ethical factors is relevant in the current context since considerations of threats/risks are increasingly important in the implementation of AI in educational setting (Acosta-Enriquez, et al., 2025). Furthermore, studies have shown that students' perception of risks also influences AI adoption (Musyaffi et al., 2024).

For this study, it was hypothesized that students who have better GenAI skill and confidence (Self-Eff), more access to resources (AccRes), greater recognition of its usefulness (PerBen) and threats/risks (PerThr), and stronger social influence (SocInf) are more like to accept and use the GenAI in their learning (Int-Adopt). [Figure 1]

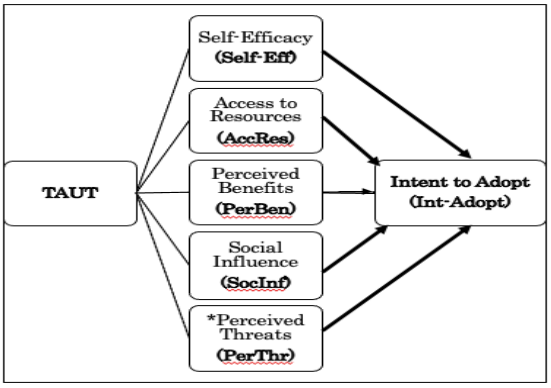

Figure 1: Research Framework

1.2 Research Objectives

This study aimed to determine the different factors affecting college students' willingness to adopt GenAI in their learning process. Specifically, it sought to answer the following questions:

1. What is the level of college students' self-efficacy, access, attitude (i.e., perceived benefits and threats), social influence, and intent to adopt GenAI technology?
2. Are there significant differences in the above factors based on gender and academic discipline?
3. Which of the above factors influence students' intention to adopt GenAI in their learning?

2. METHOD

The study involved 876 randomly selected college students enrolled across various academic disciplines in one HEI who responded to the online survey. There were more female than male and non-binary respondents (58.56% vs. 36.76% and 4.68%). They came from the ABM- (8.97%%), HUMMS- (16.34%), and STEM- (29.94%) related courses. More than one-third of them (34.74%) checked Others. It made use of survey form grounded on UTAUT Model (TAM) and adapted from instruments used in previously published research on the utilization of AI tools in education (Musyaffi et al., 2024; Wu et al., 2022). The forms consisted of items relevant to the identified factors. They were administered to students through Google form. Data were analyzed using descriptive statistics, t-test, correlation, and regression analysis.

3. RESULTS

3.1 Students' Level of Awareness & Usage

Generally, students are aware (83%) and have used (88%) different GenAI tools for their learning activities. Only 14% of them have not tried using any of them. They use GenAI tools for academic and personal purposes for at least once a week (70% and 50%, respectively). This indicates high familiarity and usage of these tools among college students.

GPT emerged as the most utilized Gen AI tool (70%). This aligns with the previous findings that showed high popularity of large language models in education (Limna, et al., 2023; Villarino,

2024). Other GenAI tools used include Grammarly (37%), Quilbot (26%), Gemini (13%) and Canva (12%). They use the tools as natural language processing chatbot (60%), and for messaging (64%), assessment (49%), academic research (48%), and plagiarism check (44%). A few others use these tools as virtual assistant (28%), writing assistant (32%), speech translator (19.3%), and content creator (13.8%).

3.2 Students' GenAI Self-Efficacy, Access, Attitude & Social Influences

Information about students' self-efficacy, access, attitude, and social influence with regards to GenAI is vital in understanding the current landscape of AI integration in higher education.

Technological self-efficacy among college students is high (*M=4.10)*. They indicated that they are aware of the different GenAI tools and understand their basic concepts and applications to a great extent. They can also easily learn new tools, explain the pros and cons of using them, and integrate them with traditional learning methodologies to effectively enhance their learning. Students also concur that they have access to resources, such as GenAI software and applications, training and technical support, internet connection, and instructional materials (*M = 3.70)*.

Students' attitude towards GenAI tools was measured in terms of their perception of the benefits and threats/risks associated with these tools.

Students agree to a great extent that the use of GenAI are valuable to students' learning (*M= 3.54)*. In particular, they believe that GenAI tools can enhance the quality of education, help students to become more effective students, develop their knowledge and skills, and make their academic life easier. However, they only moderately agree that GenAI can support the development of students' critical- and problem-solving skills,

While students perceive GenAI providing positive effects, they also recognize the threats and risks of being reliant to GenAI (*M=4.01)*. They agree that GenAI may result to more students' cheating and dependence on the technology. They are also highly concerned about the privacy and security issues, ethical implications, and the lack of reliability of GenAI tools used for assessment.

Social influence on the use of GenAI is not very much apparent among the students (*M=2.70)*. They moderately agree that they use GenAI due to expectations and encouragement of their teachers and peers, and to social media influences.

As for students' intentions to adopt GenAI, they seem to be ambivalent regarding their intent to adopt GenAI in the future (*M=3.44)*. While they agree that they are willing to start or continue learning how to use other GenAI tools and do more research on AIGen tools, they are undecided on whether they will integrate more/new GenAI tools in their learning activities in the future. They also moderately agree that they will not feel anxious to use GenAI as this will have no bad impact on their learning and academic achievement. [Table 1]

3.3. Significant Differences by Gender and Academic Discipline

Students' level of technological self-efficacy, access to resources, and perceived benefits of GenAI showed no significant differences by gender. However, male and female students' perception of GenAI's threats (t-test=-3.17; p<.01), social influence (t-test=4.10; p<.001), and intent to adopt (t-test=2.16; p<.05) are significantly different. While female students believed that GenAI will bring about threats more than the males (*Ms* = 20.80 vs. 19.78), male students on the other hand, are more influenced by their teachers and peers (*M*= 15.37 vs. 13.52) and are more likely to use GenAI in their learning (*M*= 17.67 vs. 16.84) than the female students. [Table 2]

On the other hand, disparities were observed in these factors when students were compared based on academic discipline [Table 3]. Pairwise comparison showed significant differences between two or more disciplines in the following factors:

Disciplines w/ Higher Scores	**vs. Disciplines w/ Lower Scores**			
	ABM	HUMMS	STEM	OTHERS
ABM				PerBen SocInf Int-Adopt
HUMMS	Self-Eff AccRes PerBen PerThr SocInf		AccRes PerThr SocInf	Self-Eff AccRes PerBen PerThr SocInf Int-Adopt
STEM				Self-Eff AccRes PerBen SocInf Int-Adopt

3.4 Factors Influencing Students' Intention to Adopt GenAI

Results of regression analysis showed that the utility of the predicted model was significant [F(5,776) = 482.85, p<.000). Three independent variables significantly predicted the intent to adopt GenAI, explaining 76% of the variance in the dependent variable. The results showed that self-efficacy, perceived benefits, and social influence are significant predictors of intent to adopt GenAI (ß=0.22, t=5.61, p<.000; ß=0.47, t=17.14, p<.000; ß=0.29, t=14.33, p<.000; respectively). [Table 4]

4. CONCLUSION

The integration of GenAI in higher education is increasingly recognized as a transformative force with the potential to enhance academic outcomes. However, the extent of students' familiarity and usage of these tools as well as the factors influencing students' adoption of these tools in their educational pursuits in the Philippine setting remain underexplored. This study addressed this gap by examining the level of students' awareness and use of GenAI tools as well as the relationships between students' self-efficacy, access, attitude, social influence, and their intent to adopt the technology.

The analysis of AI tools awareness and usage among students revealed several insightful trends. Majority of students reported familiarity with AI chatbots, such as ChatGPT, indicating a widespread awareness and use of conversational GenAI. This high level of familiarity of conversational chatbot underscores the need to integrate them in everyday academic and personal tasks (Sova et al., 2024). However, it seems that students' GenAI awareness and usage is limited since as shown by the study, GenAI tools used by students are limited to Grammarly, Quilbot, Gemini, and Canva – all of which are available for free to the public. This finding calls for a need for students to be exposed to diverse GenAI tools that can be used for academic purposes, such as those for research, content creation, data analysis, and other tools that are tailored-fit to their different academic discipline.

Significant gender differences were found in perceived threats, social influence, and intent to adopt, with female students believing that GenAI will bring about threats more than the males, and male students being more influenced by their teachers and peers and more likely to use GenAI in their learning. Past findings on gender gaps in generative AI are nearly universal. For example, synthesizing data from 18 studies covering more than 140,000 individuals worldwide, Otis, et al., (2025) found that women use generative AI less than men and that the gender gap holds across nearly all regions, sectors, and occupations. The same result was found in other studies wherein men use GenAI tools significantly more than women (Mogelvang et al., 2024; Aldosoro et al., 2024; Otis et al., 2025). But what really brings about gender differences needs further investigation. While users' knowledge about GenAI was found by some studies as the most important driver of the gap (e.g., Aldosoro et al., 2024), this is not true for this study since the results showed no disparity in the extent of familiarity and self-efficacy between male and female students with regards to the different GenAI tools.

This study showed disparities in different factors by academic disciplines. Just like the study by Qu, et al. (2024) among Singaporean students, substantial disciplinary disparities were found in the level of engagement of students with GenAI. Compared to pure fields, applied fields (both hard and soft) consistently exhibit higher levels of GenAI

knowledge and utilization intentions. In this study, however, academic disciplines were categorized differently, and results showed that students from HUMMS-related courses (e.g., multidisciplinary studies and consular diplomatic affairs, which are applied courses) were found to have higher scores in almost all four factors as compared to ABM- (i.e., business courses), STEM-related (e.g., game development and computer applications) courses, and those from other fields. It is best that for future research to refrain from using the "Others" category and to include a more detailed categorization of courses.

This study confirmed the significant influences of examined factors in the students' intentions to use GenAi in their learning – findings that are consistent with the past studies. In this study, perceived benefits, technological self-efficacy, and social influence stand out as critical factors in driving adoption of GenAI tools.

The perceived benefits emerged as the highest predictor of intent to adopt GenAI, indicating that students' assessment of the usefulness of GenAI motivates students' future utilization of this technology in their learning. This finding is consistent with the results of previous studies that showed perceived usefulness or performance expectancy positively influences students' acceptance and adoption of the technology (Musyaffi et al., 2024; Jonathan, 2024; Sova et al., 2024; Almogren et al., 2024; Jdaitawi et al., 2024). This indicates that students are more likely to accept and adopt GenAI if they perceive them to be useful in achieving their educational goals.

Social influence, which represents perceived pressure from the significant others to use the technology, is the second highest significant factor in Filipino students' intent to adopt the technology, supporting previous studies (Jdaitawi et al., 2024; Changalima et. al., 2024; Acosta-Enriquez, 2025). This suggests that in the Philippine academic context, institutional and peer pressure plays a modest role in affecting students' intent to adopt the technology.

Technological self-efficacy, which reflects awareness and ease of use was also found to be one critical factor in influencing intent to adopt GenAI. This finding also supports previous studies that showed perceived ease of use positively predicts intention to adopt GenAI (Almogren et al., 2004; Jdaitawi et al., 2024). This implies that students are more likely to use GenAI if they perceived that they have the efficacy to use the technology.

However, access to resources and perceived threats have no significant effects on students' intent to use GenAI. This is in sharp contrast from previous studies which showed access to be a key predictor (Altememy et al., 2023; Strzelecki & ElArabawy, 2024; Selwyn, 2009; Warchaueur et al., 2010). This result may be due to the lack of GenAI resources in schools as well as to easy access to free AI tools. Likewise, perceived threats did not emerge as a significant antecedent of intent to use the tools, which is inconsistent with results of Acosta-Enriquez, et al. (2025) that showed perceived ethical concerns key drivers in the adoption of AI models in academic settings. This non-significant findings on perceived threat only shows that students do not consider GenAI's ethical and academic honesty issues as reasons for using GenAI tools.

The findings of this study suggest a need for several specific interventions for higher education institutions. Institutions should develop comprehensive ethics-first policy frameworks that include clear guidelines on AI use in different academic contexts (Song et al., 2024; Acosta-Enriquez et al., 2024). The proliferation of use of AI tools among students is expected to increase plagiarism and academic dishonest. This concern has driven UNESCO to call on governments to implement appropriate regulations and teacher training to ensure a human-centered approach to using Generative AI in education. It has published the first-ever global Guidance on Generative AI in Education and Research to regulate the use of GenAI tools, including mandating the protection of data privacy and setting an age limit for the independent conversations with GenAI platforms (UNESCO, 2023).

It is also important for educational institutions to consider a review of their curriculum to include GenAI tools, provision of training sessions to both teacher and students to develop their technology skills and knowledge for smooth integration of these tools in the teaching/learning activities, and putting in place of technological infrastructure to ensure that teacher and students have easy access to variety of GenAI tools, not only those that are free to use and but also those are tailored-fit to the academic context.

GenAIs are here to stay, and more tools are expected to be introduced in the market. Thus, it is important for educational institutions to require teachers and students alike to be receptive of their benefits while also being mindful of its risks and to observe responsible use of generative AI in all aspects of their academic endeavors.

Limitation of the Study:

The reliance on self-reported data is one limitation of the study that may result to social desirability bias. Other data collection methods should be considered in future research. The findings and conclusions are not intended to represent universal GenAI adoption patterns in the Philippine education setting due to the limited sample but rather to provide a foundation for further research in academic and other contexts. Future studies should incorporate a broader demographical scope to enhance the external validity of the findings.

5. ACKNOWLEDGMENT

The authors are grateful to their colleagues and students who participated in the study.

Table 1: Students' GenAI Self-Efficacy, Access, Perceived Benefits and Threats, Social Influences and Intent to Adopt

Factors	Mean	SD	VI
Self-Eff	4.10	1.14	High
AccRes	3.70	1.22	High
Attitude			
-PerBen	3.54	1.30	High
-PerThr	4.01	1.08	High
SocInf	2.70	1.55	Mod
Int-Adopt	3.44	1.34	Mod

Table 2: Test of Significant Differences by Gender

Factors	Male N=322		Female N=513		t-value
	Mean	SD	Mean	SD	
Self-Eff	20.28	4.53	20.63	4.23	-1.14
AccRes	18.33	5.09	18.67	5.17	-0.92
PerBen	18.01	5.60	17.49	6.03	1.26
PerThr	19.78	4.93	20.80	4.29	-3.17*
SocInf	15.37	5.66	13.52	6.18	4.10*
Int-Adopt	17.76	5.72	16.84	6.11	2.16*

**Means are based on total scores*

Table 3: Test of Significant Differences (ANOVA) by Discipline

Source of Variation	SS	df	MS	F
Self-Efficacy				
Between Groups	541.23	3	180.41	9.76***
Within Groups	16089.24	870	18.49	
Total	16630.47	873		
Access to Resources				
Between Groups	1049.80	3	349.93	13.83***
Within Groups	22044.68	871	25.31	
Total	23094.48	874		
Attitude (Benefits)				
Between Groups	1392.86	3	464.29	14.08***
Within Groups	28713.28	871	32.97	
Total	30106.14	874		
Attitude (Threats)				
Between Groups	323.74	3	107.91	5.21***
Within Groups	18050.41	871	20.72	
Total	18374.15	874		
Social Influences				
Between Groups	983.90	3	327.97	8.67***
Within Groups	29432.28	778	37.83	
Total	30416.18	781		
Intention to Use				
Source of Variation	*SS*	*df*	*MS*	*F*
Between Groups	1304.21	3	434.74	12.62***
Within Groups	30011.10	871	34.46	
Total	31315.31	874		

Table 4: Regression Analysis Results

	Coeff	SE	t value
Intercept	-0.39	0.55	-0.72*
Self-Eff	0.22	0.04	5.61*
AccRes	0.05	0.04	1.28
PerBen	0.47	0.03	17.14*
PerThr	0.01	0.03	0.33
SocInf	0.29	0.02	14.33*

* $p \leq 0.0001$

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