Online-Journals.org

iJEP International Journal of Engineering Pedagogy

iJEP | eISSN: 2192-4880 | Vol. 16 No. 3 (2026) | OPEN ACCESS

https://doi.org/10.3991/ijep.v16i3.56431

PAPER

Exploring Vietnamese University Students' Attitudes toward AI Tools in Education: An ABC Model Approach

Pham Duc Thuan (✉)

Hoa Lu University,
Ninh Binh Province, Viet Nam

pdthuan@hluv.edu.vn

ABSTRACT

This study explores Vietnamese university students' attitudes toward the use of artificial intelligence (AI) tools in learning, guided by the ABC model of attitude, which encompasses affective, behavioral, and cognitive components. A total of 313 students participated in the study, completing a 12-item questionnaire that assessed their attitudes toward AI tools. The findings revealed that students generally held highly positive attitudes, with the affective component scoring the highest, indicating strong emotional receptiveness. Significant and strong correlations were found among the three attitude components, validating the ABC model's interrelated framework. Gender and year-level analyses showed that male students and senior-year students reported higher behavioral and cognitive engagement than their counterparts, although emotional responses were consistent across genders. Interestingly, the duration of AI tool use did not significantly impact attitudes, suggesting that factors beyond exposure time may shape perceptions. This study contributes to the growing literature by offering nuanced insights into how demographic variables influence AI adoption in education. It also highlights the need for inclusive strategies to deepen not only emotional acceptance but also meaningful engagement and understanding of AI tools in higher education contexts.

KEYWORDS

artificial intelligence (AI) tools, attitudes, affective, behavioral, cognitive

1 INTRODUCTION

The rapid advancement of artificial intelligence (AI) has led to its transformative integration across multiple sectors, particularly in higher education, where it is reshaping learning systems and redefining pedagogical paradigms [1]. AI tools, including chatbots, adaptive learning platforms, and language processing applications, have revolutionized how students engage with content, access knowledge, and develop new skills, reflecting broader systemic shifts in educational design and digital transformation [2]. Recent research highlights the growing prevalence and influence of AI-powered tools such as ChatGPT and other generative

Thuan, P. D. (2026). Exploring Vietnamese University Students' Attitudes toward AI Tools in Education: An ABC Model Approach. *International Journal of Engineering Pedagogy (iJEP)*, 16(3), pp. 97–113. https://doi.org/10.3991/ijep.v16i3.56431

Article submitted 2025-05-07. Revision uploaded 2026-03-05. Final acceptance 2026-03-05.

AI models, which offer learners interactive, personalized, and efficient support for academic tasks [3], [4]. The potential of AI to enhance self-directed learning, automate routine processes, and provide real-time feedback has been especially impactful in language learning and technical education contexts [5], [6], [7]. As AI becomes increasingly embedded in higher education, universities are adopting these technologies not only to enhance pedagogical practices but also to prepare students for digitally mediated learning environments and evolving academic expectations. Recent studies further highlight that students' perceptions and attitudes toward AI—including ethical considerations and responsible use—play a crucial role in shaping how these technologies are adopted and integrated into educational contexts [8], [9].

Despite these promising developments, the effective implementation of AI tools requires a nuanced understanding of students' attitudes and acceptance levels. Prior studies have shown that students' engagement with AI can vary significantly based on perceptions of usefulness, ease of use, trust, and perceived risks [10], [11]. While students generally recognize the benefits of AI in enhancing their learning experiences [12], concerns about data privacy, over-reliance, and ethical implications also shape their attitudes [13], [14]. Thus, gaining a comprehensive understanding of these attitudes is essential for educators and policymakers aiming to maximize the educational value of AI while addressing potential challenges.

To systematically explore students' attitudes, this study adopts the ABC model of attitude proposed by Ostrom [15] as its theoretical framework. The ABC model defines attitude as a multidimensional construct consisting of three interrelated components: affective, behavioral, and cognitive. This model has been widely utilized in educational and psychological research to assess how individuals perceive and interact with new technologies [16], [17]. In the context of AI tools, the ABC model allows for a more holistic measurement of attitudes by capturing not only students' cognitive evaluations of AI's usefulness and risks but also their emotional responses and behavioral intentions regarding its use [18], [19].

Building on the growing body of research into educational AI, this study seeks to deepen understanding of 313 Vietnamese university students' attitudes toward AI tools used in learning by employing the ABC model of attitude as a guiding framework. Specifically, it aims to answer five key research questions: (1) What are students' general attitudes towards AI tools used in learning? (2) What are the relationships between the affective, behavioral, and cognitive components of these attitudes? (3) Are there significant differences in attitudes based on gender? (4) Are there significant differences in attitudes based on the duration of AI tool use? and (5) Are there significant differences in attitudes based on year level? By addressing these questions, the study not only maps the current landscape of student perceptions but also explores the underlying dynamics and demographic factors that shape these attitudes. The significance of this study lies in its potential to inform educators, administrators, and policymakers about students' readiness and concerns regarding AI integration, enabling more targeted strategies for implementing AI tools effectively and equitably in higher education. Furthermore, by adopting the multidimensional ABC model, this study contributes a nuanced perspective to the literature, highlighting the complex interplay between students' feelings, beliefs, and behaviors in response to AI-driven educational environments.

2 LITERATURE REVIEW

2.1 Students' general attitudes toward the use of AI tools in educational settings

A significant body of research has explored students' general attitudes toward the use of AI tools in educational settings. These studies consistently indicate a predominantly positive reception of AI as a valuable aid in enhancing learning outcomes, engagement, and efficiency. It is reported that students perceive AI tools, particularly ChatGPT, as supportive of their academic work, fostering greater access to knowledge and learning personalization [3], [20]. In the context of language learning, AI tools have also been positively received, with students valuing their accessibility and the immediate feedback they provide during learning activities [8], [21]. Research further suggests that attitudes toward AI may vary across academic disciplines. Comparative studies have shown that students from different fields tend to demonstrate overall favorable perceptions of AI tools, although their levels of enthusiasm and patterns of use may differ [22]. Moreover, recent research has emphasized that although students generally express positive attitudes toward AI tools, ethical considerations—such as academic integrity, fairness, and responsible use—significantly shape their cognitive evaluations and overall acceptance of AI in education [23]. Notably, it is illustrated that AI tools are particularly welcomed for language practice and skill development in English-as-a-foreign-language (EFL) learning [24]. Similarly, recent research examining graduate students' experiences with ChatGPT during thesis writing reported overwhelmingly positive perceptions regarding efficiency, idea generation, and writing support, while also noting emerging concerns about dependency and originality [25]. Collectively, these findings suggest a consistent pattern: students generally view AI as a valuable educational resource while simultaneously expressing caution regarding ethical concerns, potential limitations, and the long-term implications of AI-supported learning [2], [9].

2.2 Relationship of attitude components

Only a subset of studies has examined the intricate relationship among the affective, behavioral, and cognitive components of students' attitudes toward AI tools, reflecting the ABC model of attitude formation. Research has shown that although students often demonstrate a strong cognitive awareness of the benefits of AI technologies, their affective responses—such as comfort, trust, and confidence—may vary considerably and consequently influence behavioral intentions toward AI use [16]. Empirical findings further indicate that positive cognitive perceptions of AI tools are strongly associated with their actual use in educational contexts, particularly in language learning environments [17]. Other studies modeling students' perceptions of AI-assisted language learning have revealed significant relationships among cognitive beliefs about usefulness, affective satisfaction, and behavioral engagement with AI tools [5]. Additionally, research has highlighted that factors such as AI literacy and students' interest in technology can influence both emotional responses and practical engagement with AI systems, reinforcing the interconnected nature of the ABC components [12]. Cross-cultural investigations also suggest that while students from different educational contexts may share similar cognitive evaluations of AI technologies, variations in affective responses can lead to different behavioral outcomes [8]. It is shown that these studies underscore

the importance of a multidimensional approach to understanding students' attitudes, suggesting that effective AI integration must address not only cognitive comprehension but also emotional and behavioral readiness.

2.3 Differences in attitudes regarding gender

Gender differences in students' attitudes toward AI tools have been a recurrent focus, with mixed findings across contexts. Several studies report statistically significant differences, suggesting that gender can influence perceptions and acceptance levels of AI in education. Some studies suggest that male students tend to demonstrate greater confidence and a stronger willingness to engage with AI technologies than their female counterparts [22], [26]. However, other investigations indicate that female students may exhibit comparable or even more positive attitudes toward AI, particularly in certain academic disciplines such as the health sciences [27], [28]. Further evidence suggests that gender differences may manifest more clearly in patterns of AI tool usage rather than in overall attitudes toward the technology [29]. Additionally, research examining AI literacy and interest has shown that although gender-based differences in familiarity with AI may exist, these differences do not necessarily translate into substantial variations in self-efficacy or overall attitudes toward AI tools [12]. These results suggest that while gender can influence certain aspects of AI acceptance—especially confidence and frequency of use—the overall attitude toward AI tools tends to be broadly positive across genders, influenced more strongly by contextual and disciplinary factors [30], [31].

2.4 Differences in attitudes regarding duration of use

A smaller number of studies have focused specifically on how the duration of AI tool usage influences students' attitudes, yet this dimension provides valuable insights into the dynamics of acceptance and satisfaction. Evidence indicates that prolonged use of AI tools can lead to more balanced attitudes: although initial enthusiasm is often strong, students may gradually become more aware of the limitations and challenges associated with AI-supported learning [3], [12]. At the same time, extended exposure to generative AI tools has been associated with deeper integration into students' learning routines and higher levels of satisfaction, suggesting that familiarity may enhance perceptions of usefulness and effectiveness [32]. Long-term users have also been found to develop more realistic expectations of AI tools, combining appreciation of their benefits with a more critical understanding of their constraints [29]. Furthermore, students who consistently used AI tools across multiple semesters reported greater confidence and self-efficacy in applying these technologies to academic tasks [33]. These findings imply that duration of use plays a crucial role in shaping both the stability and evolution of students' attitudes, indicating that sustained engagement is key to fostering both competence and critical awareness in AI-supported learning [34], [35].

2.5 Differences in attitudes regarding year levels

Differences in attitudes based on students' year levels have been less frequently investigated but reveal important insights into the evolving perceptions of AI over

the course of academic progression. Research indicates that senior students often demonstrate more critical perspectives toward AI technologies, possibly due to greater academic experience and increased awareness of potential limitations, whereas first-year students tend to display higher levels of enthusiasm and less skepticism [3]. Similar patterns have been observed in other studies, which report that students' perceptions of AI tools often evolve from relatively uncritical acceptance in earlier years to more nuanced evaluations in later stages of study [8]. Research has also shown that academic seniority may influence not only students' attitudes but also the depth and sophistication of their engagement with AI technologies, with advanced students applying AI tools in more complex ways for academic purposes [36]. However, some studies have reported relatively stable attitudes toward AI tools across year levels, suggesting that contextual factors—such as specific learning needs in language education—may play a more influential role than academic seniority in shaping students' perceptions [19]. These studies suggest that year level can be a meaningful variable, with advanced students often bringing more critical perspectives to AI adoption while newer students embrace AI with greater optimism [37].

3 METHODOLOGY

3.1 Context and participants

This study was conducted at the beginning of the second semester of the 2024–2025 academic year at a university in northern Vietnam. The university's training comes in two main fields: pedagogical and non-pedagogical. The pedagogical training consists of majors in teacher education (preschool, primary, and secondary school). The non-pedagogical training has majors in information technology, tourism, and economics. All curriculums last for four years with two semesters for an academic year.

Table 1 presents a total of 313 university students in the study. Regarding gender, 76 participants (24.3%) were male, and 237 participants (75.7%) were female. In terms of majors, 185 students (59.1%) were enrolled in pedagogical fields, while 128 students (40.9%) were from non-pedagogical fields. Concerning year level, the distribution was as follows: 141 students (45.0%) were in their first year, 65 students (20.8%) were in their second year, 57 students (18.2%) were in their third year, and 50 students (16.0%) were in their fourth year. With respect to the AI tools used for learning, the majority reported using ChatGPT (297 students, 94.9%). Other tools included Gemini (119 students, 38.0%), Copilot (26 students, 8.3%), Grammarly (29 students, 9.2%), and other AI tools (12 students, 3.8%). Regarding the duration of AI tool use, 178 students (56.9%) had used AI tools for less than one year, 104 students (33.2%) had used them for one to two years, and 31 students (9.9%) had used them for more than two years.

Table 1. Demographic information of participants (N = 313)

Category	Subcategory	Frequency	Percent
Gender	Male	76	24.3
	Female	237	75.7
Major	Pedagogical	185	59.1
	Non-pedagogical	128	40.9

(Continued)

Table 1. Demographic information of participants (N = 313) *(Continued)*

Category	Subcategory	Frequency	Percent
Year Level	First year	141	45.0
	Fourth year	50	16.0
	Second year	65	20.8
	Third year	57	18.2
Used AI Tools	ChatGPT	297	94.9
	Gemini	119	38
	Copilot	26	8.3
	Grammarly	29	9.2
	Other	12	3.8
Duration of Use	Less than 1 year	178	56.9
	1–2 years	104	33.2
	More than 2 years	31	9.9

3.2 Data collection

The study utilized a 12-item questionnaire presented in Table 2 that assessed university students' attitudes toward the use of AI tools in learning. It was structured based on three key attitude components: Affective, Behavioral, and Cognitive, with each component assessed through four specific items. For the Affective component, the questionnaire explored students' emotional responses to using AI tools (Items A1, A2, A3, and A4). The Behavioral component focused on students' actual actions related to AI tool usage (Items B1, B2, B3, and B4). Finally, the Cognitive component targeted students' beliefs about the effectiveness and role of AI tools in learning (Items C1, C2, C3, and C4).

Table 2. The questionnaire items of attitude components

Components	Items
Affective	A1: I am excited about using AI tools to support my learning.
	A2: I feel more confident in my learning process with the support of AI tools.
	A3: I feel happy that using AI tools can make my learning easy.
	A4: I feel AI tools provide a more fun and engaging learning experience than traditional methods.
Behavioral	B1: I regularly use AI tools to aid my learning.
	B2: I actively seek out new AI tools to enhance my learning efficiency.
	B3: I recommend and encourage my friends to use AI tools in their studies.
	B4: I tend to use AI tools a lot when doing homework.
Cognitive	C1: I believe AI tools help me improve my learning skills.
	C2: I believe that AI tools provide accurate and reliable information to support learning.
	C3: I think AI tools save me time in my studies.
	C4: I believe that AI tools can replace some of the roles of instructors in supporting learning.

The questionnaire was built using the web-based platform Google Forms. All items employed a 5-point Likert scale that spans from 1 (Strongly Disagree) to 5 (Strongly Agree). The link to the questionnaire was sent to the students via social media groups. The administration of the questionnaire was conducted in the first two weeks of the semester. The introduction section of the questionnaire explicitly stated the students' voluntary participation, along with the research purpose and plan. And after one week, the questionnaire automatically ceased accepting responses. As a result, 313 students responded to the questionnaire.

To assess the internal consistency reliability of the questionnaire, Cronbach's alpha coefficients were calculated for each of the three attitude components: affective, behavioral, and cognitive. Each component consisted of four items. The results, presented in Table 3, indicated a high level of internal consistency across all components. The Affective component achieved a Cronbach's alpha of 0.904, suggesting excellent reliability. The Behavioral component demonstrated an even slightly higher reliability with a Cronbach's alpha of 0.914, also falling within the excellent range. Meanwhile, the Cognitive component yielded a Cronbach's alpha of 0.886, indicating good reliability. Overall, the high Cronbach's alpha values (all above 0.85) confirm that the items within each attitude component are highly consistent in measuring the underlying constructs, ensuring the reliability of the questionnaire employed in this study.

Table 3. Cronbach's alpha of attitude components

Components	Number of Items	Cronbach's Alpha
Affective	4	0.904
Behavioral	4	0.914
Cognitive	4	0.886

3.3 Data analysis

This study employed SPSS version 20 software to assess students' attitudes, examine differences in attitudes based on factors such as gender, year levels, and duration of use, and analyze the relationships among the components of attitude. Descriptive statistics summarized and characterized the general attitudes of participants regarding affective, behavioral, and cognitive components. This method employs measures like means and standard deviations to summarize the central tendencies and variability within the dataset. Independent sample t-tests were utilized to examine differences in attitudes towards gender (male and female). A one-way ANOVA was utilized to analyze variations in student attitudes according to year levels (first year, second year, third year, and fourth year) and duration of use (less than one year, 1–2 years, and more than two years). Correlation analysis was performed to evaluate the strength and direction of relationships among the components of attitude: affective, behavioral, and cognitive.

The integration of these analytical techniques facilitates a thorough analysis of the data. Descriptive statistics provide foundational insights into participant sentiments, t-tests assess differences across demographic groups, and correlation and regression analyses evaluate relationships and predictive strength among attitude factors. Additionally, one-way ANOVA examines attitude variations across groups based on year levels and duration of use. This multi-method approach offers strong evidence for understanding participants' acceptance and utilization of AI tools in learning.

4 RESULTS

4.1 Students' general attitudes toward AI tools used in learning

Table 4 presents the descriptive statistics regarding students' attitudes across three components: affective, behavioral, and cognitive. The mean score for the affective component is 4.2644 with a standard deviation of .995, indicating a high level of positive feelings and emotional responses towards the use of AI tools in learning. The behavioral component has a mean of 3.9545 and a standard deviation of .895, also categorized at a high level, suggesting that students demonstrate a strong tendency to engage actively with AI tools in their learning processes. Similarly, the cognitive component records a mean of 3.9153 with a standard deviation of .960, classified as high, reflecting that students possess positive beliefs and favorable perceptions about the usefulness and effectiveness of AI tools in education.

Table 4. Students' attitudes

Components	Mean	Std. Dev.	Level
Affective	4.2644	.913	High
Behavioral	3.9545	.895	High
Cognitive	3.9153	.960	High

The findings reveal that among the three components, the affective domain scores the highest mean, indicating that students' emotional attachment and enthusiasm toward AI tools are stronger compared to their actual behaviors and cognitive evaluations. The high scores across all three dimensions suggest an overall strong acceptance and positive attitude towards AI tools, which can serve as a critical motivating factor in promoting the adoption and integration of AI technologies in academic settings. However, the slightly lower means in the behavioral and cognitive components imply that while students feel positively about AI tools, their actual usage behaviors and deeper understanding might not be as strongly developed as their emotional reactions.

4.2 Relationships between affective, behavioral, and cognitive

Table 5 displays the Pearson correlation coefficients among the three components of students' attitudes—affective, behavioral, and cognitive. All correlations are statistically significant at the $p < .01$ level, as indicated by the double asterisks (**). The correlation between the affective and behavioral components is $r = .704$, suggesting a strong and positive relationship. This implies that students who have more positive emotional responses toward AI tools also tend to demonstrate stronger behavioral engagement with these tools. Similarly, the correlation between affective and cognitive components is $r = .703$, indicating that students with favorable feelings toward AI tools are also likely to hold positive beliefs and perceptions about their usefulness and value in learning. The strongest correlation observed is between the behavioral and cognitive components, with a coefficient of $r = .845$. This very strong and positive relationship suggests that students who actively engage with AI tools are also those who cognitively understand and appreciate their benefits in the

learning process. These findings collectively highlight the interdependence among the three components of attitude based on the ABC model–affective, behavioral, and cognitive. The significant and high correlations indicate a well-aligned and consistent attitude structure among the students: positive feelings are associated with both increased use and greater cognitive endorsement of AI tools in education.

Table 5. Pearson's correlation matrix for attitude components

	Affective	Behavioral	Cognitive
Affective	1		
Behavioral	.704**	1	
Cognitive	.703**	.845**	1

Note: **Correlation is significant at the 0.01 level (2-tailed).

4.3 Differences in attitude components based on gender

Table 6 presents the results of the Independent Samples T-Test examining gender differences in students' attitudes towards the use of AI tools across three attitude constructs: Affective, Behavioral, and Cognitive. For the Affective component, the mean score for male students was 4.3191 (SD = 0.91887), and for female students was 4.2468 (SD = 0.76589). The p-value was 0.497, indicating that the difference between males and females was statistically insignificant. In terms of the Behavioral component, male students had a mean score of 4.3454 (SD = 0.86888), whereas female students had a lower mean of 3.8291 (SD = 0.94797). The p-value was 0.000, suggesting a statistically significant difference between genders. For the Cognitive component, male students' mean score was 4.3059 (SD = 0.83526), higher than the female students' mean of 3.7901 (SD = 0.91595). The p-value again was 0.000, indicating a statistically significant difference between genders.

Table 6. Independent sample t-test results on gender

Constructs	Gender	N	Mean	Std. Dev.	P-value	Difference
Affective	Male	76	4.3191	.91887	.497	Insignificant
	Female	237	4.2468	.76589	.537	
Behavioral	Male	76	4.3454	.86888	.000	Significant
	Female	237	3.8291	.94797	.000	
Cognitive	Male	76	4.3059	.83526	.000	Significant
	Female	237	3.7901	.91595	.000	

The results of the Independent Samples T-Test indicated that gender differences were observed in two of the three attitude components. For the affective component, although male students (M = 4.3191, SD = 0.91887) had a slightly higher mean than female students (M = 4.2468, SD = 0.76589), the difference was not statistically significant (p = 0.497). This suggests that both male and female students shared similar positive emotional responses toward using AI tools in their learning, feeling equally excited, confident, and happy about their integration into the learning process. In contrast, significant gender differences were found in the behavioral and

cognitive components. For the behavioral component, male students (M = 4.3454, SD = 0.86888) reported a significantly higher level of engagement with AI tools compared to female students (M = 3.8291, SD = 0.94797), with a p-value of 0.000. This finding implies that male students were more active in using AI tools, seeking new AI resources, recommending them to peers, and utilizing them frequently in academic tasks. Similarly, in the cognitive component, male students (M = 4.3059, SD = 0.83526) also showed a significantly stronger belief in the benefits of AI tools than female students (M = 3.7901, SD = 0.91595), again with a p-value of 0.000. This result indicates that males perceived AI tools as more effective in improving learning skills, providing accurate and reliable information, saving study time, and even replacing some instructional roles.

4.4 Differences in students' attitudes based on duration of use

A one-way ANOVA was conducted to examine whether there were significant differences in students' attitudes toward AI tools in learning based on their duration of use. Descriptive statistics in Table 7 indicated that students who had used AI tools for less than one year (n = 178) reported a mean attitude score of 3.9911 (SD = .83307). Those who had used AI tools for 1–2 years (n = 104) had a slightly higher mean of 4.1338 (SD = .77710), while students with more than two years of experience (n = 31) had a mean score of 4.0538 (SD = .86483). The overall mean attitude score among all 313 participants was 4.0447 (SD = .81810), suggesting generally positive perceptions across the sample regardless of use duration.

Table 7. Descriptive statistics for attitude scores by duration of use

Duration of Use	N	Mean	Std. Dev.
Less than 1 year	178	3.9911	.83307
1–2 years	104	4.1338	.77710
More than 2 years	31	4.0538	.86483
Total	313	4.0447	.81810

Table 8. One-way ANOVA summary table for differences in attitude scores by duration of use

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.340	2	.670	1.001	.369
Within Groups	207.479	310	.669		
Total	208.818	312			

Despite these small differences in mean scores, the ANOVA results presented in Table 8 showed that the variation in students' attitudes was not statistically significant, F (2, 310) = 1.001, p = .369. This finding indicates that the duration of AI tool use did not have a meaningful impact on students' attitudes toward using AI in learning. In other words, whether students had used AI tools for a short or extended period, their perceptions remained relatively consistent. This suggests that factors other than time—such as tool quality, user experience, or instructional support—may play a more critical role in shaping students' attitudes toward AI tools. Because the

ANOVA did not yield a significant result, no post hoc tests were necessary to explore pairwise differences.

4.5 Differences in students' attitudes based on year levels

Descriptive statistics in Table 9 show a progressive increase in mean attitude scores from first to fourth year. Specifically, first-year students (n = 141) reported the lowest mean score of 3.8227 (SD = 0.87723), followed by second-year students (n = 65) with a mean of 4.0551 (SD = 0.77172). Third-year students (n = 57) had a higher mean score of 4.2427 (SD = 0.72088), while fourth-year students (n = 50) reported the highest mean of 4.4317 (SD = 0.59230). These descriptive results suggest a potential upward trend in students' attitudes toward AI tools as they progress through their academic years.

To determine whether these differences were statistically significant, the results of the one-way ANOVA are presented in Table 10. The analysis revealed a significant effect of year level on attitude scores, $F(3, 309) = 8.941$, $p < .001$, indicating that at least one group's mean score significantly differed from the others. Given the significance of the ANOVA test, a Tukey HSD post hoc comparison was conducted to identify where the specific differences occurred (refer to Table 11).

Table 9. Descriptive statistics for attitude scores by year level

Year Level	N	Mean	Std. Dev.
First year	141	3.8227	.87723
Second year	65	4.0551	.77172
Third year	57	4.2427	.72088
Fourth year	50	4.4317	.59230
Total	313	4.0447	.81810

Table 10. One-way ANOVA summary table for differences in attitude scores by year level

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16.678	3	5.559	8.941	.000
Within Groups	192.140	309	.622		
Total	208.818	312			

Table 11. Tukey HSD post hoc comparisons for attitude scores by year level

Comparison	Mean Difference	Sig.
First year vs Third year	–.42000*	.004
First year vs Fourth year	–.60897*	.000
Second year vs Fourth year	–.37654*	.022

Note: *The mean difference is significant at the 0.05 level.

The post hoc results indicate that the attitude scores of first-year students were significantly lower than those of third-year students (mean difference = –0.42000, p = .004) and fourth-year students (mean difference = –0.60897, p < .001). Additionally, second-year students' scores were significantly lower than those of fourth-year students (mean difference = –0.37654, p = .022). These findings suggest that students in higher academic years tend to have more favorable attitudes toward the use of AI tools in learning compared to those in lower years, especially first-year students.

5 DISCUSSION

This study set out to explore university students' attitudes toward AI tools in learning through the lens of the ABC model of attitude—affective, behavioral, and cognitive components—addressing five key research questions. The findings offer valuable insights and reveal patterns that align with, and in some cases extend, prior research.

First, regarding students' general attitudes, the results demonstrated high mean scores across all components, with the affective domain (M = 4.26) slightly outperforming the behavioral (M = 3.95) and cognitive (M = 3.91) components. This suggests that while students feel positively inclined toward AI tools—expressing excitement, confidence, and satisfaction—their actual engagement and deeper cognitive endorsement are marginally less pronounced. These findings corroborate earlier work reporting high levels of positive affective responses toward AI tools, particularly in EFL learning contexts [8], [21]. However, the present study also reveals a slight discrepancy between students' positive feelings and their actual behavioral engagement, suggesting that enthusiasm toward AI technologies does not always translate into consistent usage patterns [16]. Furthermore, ethical awareness plays a crucial role in shaping students' cognitive engagement with AI tools. As highlighted in [9], students' attitudes toward AI are not solely determined by perceived usefulness but are also influenced by concerns regarding academic honesty, transparency, and responsible usage. In contexts where AI tools such as ChatGPT are widely adopted, the integration of ethical literacy becomes essential to ensure that positive emotional acceptance translates into academically responsible behavior.

Second, the relationships among the attitude components were found to be strongly positive and statistically significant, with the highest correlation between behavioral and cognitive components (r = .845). This supports the theoretical underpinnings of Ostrom's [15] ABC model, which posits that these components are interlinked. The finding is also consistent with previous research demonstrating strong interconnections among the cognitive, affective, and behavioral components of attitudes toward AI-supported learning [5], [17]. In particular, earlier studies have reported that cognitive beliefs about the usefulness of AI tools are closely associated with students' actual engagement and behavioral use of these technologies. These findings suggest that improving students' understanding of the benefits and functions of AI tools may enhance both their active engagement and their emotional satisfaction with AI-supported learning environments. The results also support the argument that effective integration of AI in education requires a holistic approach that addresses not only students' knowledge and skills but also their emotional comfort and behavioral confidence when using AI technologies [18].

Third, the analysis of gender differences yielded nuanced insights. While no significant difference was observed in the affective component—suggesting

comparable emotional reactions between male and female students—significant differences were present in both behavioral and cognitive domains, with males reporting higher scores. This pattern is consistent with previous research suggesting that male students often demonstrate greater confidence and stronger beliefs regarding the usefulness of AI technologies [22], [26]. However, other studies indicate that contextual factors—such as disciplinary background and cultural environment—may influence or moderate these gender-related patterns in attitudes toward AI tools [27]. Within the Vietnamese context examined in the present study, the observed differences may reflect variations in students' perceptions of technological readiness and self-efficacy when engaging with AI technologies. These findings highlight the importance of providing inclusive training opportunities and institutional support mechanisms that encourage female students to strengthen their engagement and confidence in using AI tools for learning [30].

Fourth, concerning differences based on duration of use, the study found no statistically significant variation in attitudes, even though mean scores indicated slightly more favorable attitudes among those with 1–2 years of experience. This contrasts with previous research suggesting that prolonged exposure to AI tools often results in more refined and balanced attitudes, as initial enthusiasm may gradually give way to more critical and reflective evaluations of these technologies [3], [29]. The lack of significant difference in this study may be attributable to the relatively short exposure time among the majority of respondents (over 56% had used AI tools for less than one year), as well as the homogeneity of AI tool types (predominantly ChatGPT). It is also noteworthy that nearly all participants in the present study reported using ChatGPT, suggesting a concentration around a single AI tool. Similar patterns of reliance on ChatGPT in higher education contexts have been documented in [25]. Such dominance may limit the diversity of AI experiences and influence students' cognitive and behavioral evaluations, potentially explaining the homogeneity observed across duration-of-use groups. This finding suggests that factors beyond the mere duration of AI tool use—such as the diversity of AI applications and the extent of user training—may play a more decisive role in shaping students' attitudes toward AI technologies [35].

Finally, differences in attitudes based on year level were significant, revealing a clear upward trend: senior students (third and fourth years) expressed markedly more positive attitudes than first-year students. These findings align with research reporting that students' attitudes toward AI tools tend to develop and become more positive as they progress through their academic programs [3], [36]. This gradual increase in positivity may be attributed to rising academic demands, the need to complete more complex tasks that benefit from AI support, and greater exposure to AI-enhanced learning environments. Growing familiarity with AI tools may also allow students to gain deeper insights into their practical utility in academic work [19]. However, some research has reported relatively stable attitudes toward AI across year levels, suggesting that institutional context and curricular design may moderate these patterns [37]. The present findings emphasize the importance of introducing AI literacy early and providing continuous support throughout the academic journey to ensure all students maximize the benefits of AI tools.

Overall, the findings provide empirical support for the applicability of the ABC model in understanding students' attitudes toward AI tools in higher education. They also highlight the importance of considering demographic and contextual factors when designing strategies for the effective integration of AI technologies in university learning environments.

6 CONCLUSION

This study examined university students' attitudes toward the use of AI tools in learning through the framework of the ABC model of attitude, encompassing affective, behavioral, and cognitive components. The findings indicate that students generally hold positive attitudes toward AI tools, with affective responses being particularly strong. Significant correlations among the three components further support the interrelated structure proposed by the ABC model, highlighting the close relationship between students' emotions, beliefs, and behaviors regarding AI-supported learning.

The analysis also revealed meaningful demographic patterns. Male students and students in higher academic years demonstrated stronger behavioral engagement and cognitive endorsement of AI tools than their counterparts, while emotional responses were relatively consistent across genders. In contrast, the duration of AI tool use did not significantly influence attitudes, suggesting that factors such as training, diversity of AI applications, and learning context may play a more critical role than mere exposure time.

These findings offer useful implications for educators and policymakers seeking to integrate AI technologies effectively in higher education. Institutions should provide structured guidance and inclusive training opportunities that strengthen not only students' positive perceptions of AI but also their deeper understanding and responsible use of these tools. However, the study is limited by its reliance on self-reported data and a single-institution sample. Future research could adopt longitudinal designs, include multiple universities, and incorporate qualitative approaches to gain deeper insights into students' evolving engagement with AI-supported learning.

7 REFERENCES

[1] M. Imran, N. Almusharraf, M. S. Abdellatif, and M. Y. Abbasova, "Artificial intelligence in higher education: Enhancing learning systems and transforming educational paradigms," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 18, no. 18, pp. 34–48, 2024. https://doi.org/10.3991/ijim.v18i18.49143

[2] F. Gjermeni, F. Prodani, and E. Zeqo, "Role of AI in education: A review," *International Journal of Engineering Pedagogy (iJEP)*, vol. 15, no. 4, pp. 127–142, 2025. https://doi.org/10.3991/ijep.v15i4.54055

[3] M. Abdaljaleel *et al.*, "A multinational study on the factors influencing university students' attitudes and usage of ChatGPT," *Scientific Reports*, vol. 14, no. 1, p. 1983, 2024. https://doi.org/10.1038/s41598-024-52549-8

[4] M. Z. U. Haq, G. Cao, and R. M. Y. Abukhait, "Examining students' attitudes and intentions towards using ChatGPT in higher education," *British Journal of Educational Technology*, vol. 56, no. 6, pp. 2428–2452, 2025. https://doi.org/10.1111/bjet.13582

[5] X. An, C. S. Chai, Y. Li, Y. Zhou, and B. Yang, "Modeling students' perceptions of artificial intelligence assisted language learning," *Computer Assisted Language Learning*, vol. 38, nos. 5–6, pp. 987–1008, 2025. https://doi.org/10.1080/09588221.2023.2246519

[6] D. T. Pham and T. H. H. Nguyen, "Students' perspectives on application of AI-powered technology in learning English pronunciation: A case of Reading Progress," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 14, no. 1, pp. 731–731, 2024. https://doi.org/10.11591/ijere.v14i1.31381

[7] J.-B. Son, N. K. Ružić, and A. Philpott, "Artificial intelligence technologies and applications for language learning and teaching," *Journal of China Computer-Assisted Language Learning*, 2023. https://doi.org/10.1515/jccall-2023-0015

[8] D. Ma, H. Akram, and H. Chen, "Artificial intelligence in higher education: A cross-cultural examination of students' behavioral intentions and attitudes," *The International Review of Research in Open and Distributed Learning*, vol. 25, no. 3, pp. 134–157, 2024. https://doi.org/10.19173/irrodl.v25i3.7703

[9] G. Asiksoy, "An investigation of university students' attitudes towards artificial intelligence ethics," *International Journal of Engineering Pedagogy (iJEP)*, vol. 14, no. 8, pp. 153–169, 2024. https://doi.org/10.3991/ijep.v14i8.50769

[10] M. Abuzar, Mahmudulhassan, and Muthoifin, "University students' trust in AI: Examining reliance and strategies for critical engagement," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 19, no. 7, pp. 70–82, 2025. https://doi.org/10.3991/ijim.v19i07.52875

[11] G. Baca and G. Zhushi, "Assessing attitudes and impact of AI integration in higher education," *Higher Education, Skills and Work-Based Learning*, vol. 15, no. 2, pp. 369–383, 2025. https://doi.org/10.1108/HESWBL-02-2024-0065

[12] A. Bewersdorff, M. Hornberger, C. Nerdel, and D. Schiff, "AI advocates and cautious critics: How AI attitudes, AI interest, Use of AI, and AI literacy build university students' AI self-efficacy," *Computers and Education: Artificial Intelligence*, vol. 8, no. 2025, p. 100340, 2024. https://doi.org/10.1016/j.caeai.2024.100340

[13] A. Saklaki and A. Gardikiotis, "Exploring Greek students' attitudes toward artificial intelligence: Relationships with AI ethics, media, and digital literacy," *Societies*, vol. 14, no. 12, p. 248, 2024. https://doi.org/10.3390/soc14120248

[14] V. Okulich-Kazarin, A. Artyukhov, Ł. Skowron, N. Artyukhova, and T. Wołowiec, "Will AI become a threat to higher education sustainability? A study of students' views," *Sustainability*, vol. 16, no. 11, p. 4596, 2024. https://doi.org/10.3390/su16114596

[15] T. M. Ostrom, "The relationship between the affective, behavioral, and cognitive components of attitude," *Journal of Experimental Social Psychology*, vol. 5, no. 1, pp. 12–30, 1969. https://doi.org/10.1016/0022-1031(69)90003-1

[16] A. Katsantonis and I. G. Katsantonis, "University students' attitudes toward artificial intelligence: An exploratory study of the cognitive, emotional, and behavioural dimensions of AI attitudes," *Education Sciences*, vol. 14, no. 9, pp. 988–988, 2024. https://doi.org/10.3390/educsci14090988

[17] S. Kearney, S. Gallagher, and B. Tangney, "ETAS: An instrument for measuring attitudes towards learning English with technology," *Technology, Pedagogy and Education*, vol. 29, no. 4, pp. 445–461, 2020. https://doi.org/10.1080/1475939X.2020.1764381

[18] R. Maier, Ș. C. Ghiocanu, A. Costin, and I. Simion, "Students' attitude towards artificial intelligence and its predictive factors," *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, vol. 16, no. 1 Sup1, pp. 264–264, 2025. https://doi.org/10.70594/brain/16.S1/22

[19] L. A. T. Nguyen and A. Habók, "Adaptation and validation of a computer-assisted language learning attitude questionnaire in a Vietnamese EFL context: A comparison between online and paper modes of administration," *Heliyon*, vol. 8, no. 6, pp. 1–11, 2022. https://doi.org/10.1016/j.heliyon.2022.e09743

[20] A. O. Ajlouni, F. A.-A. Wahba, and Abdallah, "Students' attitudes towards using ChatGPT as a learning tool: The case of the university of Jordan," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 17, no. 18, pp. 99–117, 2023. https://doi.org/10.3991/ijim.v17i18.41753

[21] V. Rosmayanti, "Students attitudes toward the use of artificial intelligence tools in English language learning," *Linguistics and ELT Journal*, vol. 12, no. 2, pp. 285–295, 2024. https://doi.org/10.31764/leltj.v12i2.28840

[22] C. Almaraz-López, F. Almaraz-Menéndez, and C. López-Esteban, "Comparative study of the attitudes and perceptions of university students in business administration and Management and in education toward artificial intelligence," *Education Sciences*, vol. 13, no. 6, pp. 1–14, 2023. https://doi.org/10.3390/educsci13060609

[23] A. Fošner, "University students' attitudes and perceptions towards AI tools: Implications for sustainable educational practices," *Sustainability*, vol. 16, no. 19, pp. 8668–8668, 2024. https://doi.org/10.3390/su16198668

[24] T. X. Nguyen, "English majors' perceptions of AI tool application in English language learning at tertiary level in Vietnam," *Journal of Knowledge Learning and Science Technology*, vol. 3, no. 1, pp. 179–193, 2024. https://doi.org/10.60087/jklst.vol3.n1.p193

[25] L. M. Rababah, M. A. Rababah, and N. N. Al-Khawaldeh, "Graduate students' ChatGPT experience and perspectives during thesis writing," *International Journal of Engineering Pedagogy (iJEP)*, vol. 14, no. 3, pp. 22–35, 2024. https://doi.org/10.3991/ijep.v14i3.48395

[26] S. Adžić, T. Savić Tot, V. Vuković, P. Radanov, and J. Avakumović, "Understanding student attitudes toward GenAI tools: A comparative study of Serbia and Austria," *International Journal of Cognitive Research in Science, Engineering and Education*, vol. 12, no. 3, pp. 583–611, 2024. https://doi.org/10.23947/2334-8496-2024-12-3-583-611

[27] F. Alwadani *et al.*, "Attitude and understanding of artificial intelligence among Saudi medical students: An online cross-sectional study," *Journal of Multidisciplinary Healthcare*, vol. 17, no. 2024, pp. 1887–1899, 2024. https://doi.org/10.2147/JMDH.S455260

[28] S. Kim and Y.-J. Lee, "Investigation into the influence of socio-cultural factors on attitudes toward artificial intelligence," *Education and Information Technologies*, vol. 29, no. 8, pp. 9907–9935, 2023. https://doi.org/10.1007/s10639-023-12172-y

[29] C. Stöhr, A. W. Ou, and H. Malmström, "Perceptions and usage of AI chatbots among students in higher education across genders, academic levels and fields of study," *Computers and Education: Artificial Intelligence*, vol. 7, no. 2024, pp. 1–12, 2024. https://doi.org/10.1016/j.caeai.2024.100259

[30] K. B. Hajam and S. Gahir, "Unveiling the attitudes of university students toward artificial intelligence," *Journal of Educational Technology Systems*, vol. 52, no. 3, pp. 335–345, 2024. https://doi.org/10.1177/00472395231225920

[31] S. A. Kharroubi, I. Tannir, R. A. E. Hassan, and R. Ballout, "Knowledge, attitude, and practices toward artificial intelligence among university students in Lebanon," *Education Sciences*, vol. 14, no. 8, pp. 1–12, 2024. https://doi.org/10.3390/educsci14080863

[32] M. M. Fakhri, A. S. Ahmar, A. Isma, R. Rosidah, and D. Fadhilatunisa, "Exploring generative AI tools frequency: Impacts on attitude, satisfaction, and competency in achieving higher education learning goals," *EduLine: Journal of Education and Learning Innovation*, vol. 4, no. 1, pp. 196–208, 2024. https://doi.org/10.35877/454RI.eduline2592

[33] M. Turós, R. Nagy, and Z. Szűts, "What percentage of secondary school students do their homework with the help of artificial intelligence? – A survey of attitudes towards artificial intelligence," *Computers and Education: Artificial Intelligence*, vol. 8, p. 100394, 2025. https://doi.org/10.1016/j.caeai.2025.100394

[34] Y. Xie, W. Lin, and X. Yu, "How artificial intelligence has influenced students' learning: A survey exploring attitudes towards tool usage," in *Proceeding of the 2024 International Conference on Artificial Intelligence and Future Education*, New York, NY, USA: ACM, 2024, pp. 260–267. https://doi.org/10.1145/3708394.3708439

[35] N. Timilsena and S. B. Ghimire, "Factors influencing students' attitude towards using chatgpt for educational and learning purpose," *APJAET – Journal ay Asia Pacific Journal of Advanced Education and Technology*, vol. 3, no. 4, pp. 1–16, 2024. https://doi.org/10.54476/apjaet/26057

[36] S. Lien, E. W. Skogli, J. Y. Abamosa, S. Glomdal, and P. Filkuková, "Experience and attitudes toward the use of artificial intelligence in higher education," *Uniped*, vol. 48, no. 1, pp. 1–14, 2025. https://doi.org/10.18261/uniped.48.1.1

[37] D. Dobrovská, D. Vaněček, and Y. I. Yorulmaz, "Students' attitudes towards AI in teaching and learning," *International Journal of Engineering Pedagogy (iJEP)*, vol. 14, no. 8, pp. 88–106, 2024. https://doi.org/10.3991/ijep.v14i8.52731

8 AUTHOR

Pham Duc Thuan is a Senior English Lecturer at the Department of Foreign Languages and Information Technology, Hoa Lu University, Viet Nam. He received his Ph.D. in English language teaching methodology from the University of Languages and International Studies, Vietnam National University, Hanoi, in 2022. He is interested in TESOL, learner autonomy, professional development, CALL, and MALL (E-mail: pdthuan@hluv.edu.vn).