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Tóm tắt

Nghiên cứu này khám phá nhận thức của sinh viên đại học tại Thành phố Hồ Chí Minh về năng lực và khuynh hướng tư duy phản biện (TDPB) trong bối cảnh học ngôn ngữ có sự hỗ trợ của trí tuệ nhân tạo (AI). Thông qua phương pháp hỗn hợp hai bước tuần tự, nghiên cứu thực hiện khảo sát 185 sinh viên khối ngành kinh tế và phỏng vấn sâu sáu cá nhân dựa trên khung lý thuyết của Facione. Kết quả định lượng chỉ ra mối tương quan thuận mạnh mẽ giữa kỹ năng và khuynh hướng TDPB (r=0.86). Đáng chú ý, tần suất yêu cầu AI giải thích là yếu tố dự báo quan trọng cho sự phát triển TDPB, trong khi tổng tần suất sử dụng AI nói chung không có ý

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nghĩa thống kê. Dữ liệu định tính cho thấy sinh viên chủ động sử dụng AI như một "cộng sự trong đối thoại Socratic" để học tập có hướng dẫn thay vì chỉ thụ động tiếp nhận thông tin. Các kỹ thuật như kiểm chứng nguồn chéo và tự nghiên cứu độc lập được áp dụng nhằm duy trì sự tự chủ trí tuệ và giảm thiểu rủi ro thụ động nhận thức. Nghiên cứu kết luận rằng chất lượng tương tác và chiều sâu trong việc đặt câu hỏi đóng vai trò quyết định đến hiệu quả phát triển TDPB hơn là tần suất sử dụng công nghệ. Đồng thời, kỹ năng TDPB có xu hướng cải thiện theo năm học nhờ sự trưởng thành trong học thuật và tích lũy kinh nghiệm xử lý các nhiệm vụ phức tạp.

Từ khoá: tư duy phản biện, học ngôn ngữ, AI, Facione framework, Việt Nam

EXPLORING UNIVERSITY STUDENT'S PERCEIVED CRITICAL THINKING COMPETENCE AND DISPOSITION IN AI-ENGAGED LANGUAGE LEARNING

Abstract

This study explores university students' perceptions of critical thinking (CT) competence and dispositions in AI-engaged language learning in Ho Chi Minh City. Using a sequential mixed-methods approach, the research surveyed 185 business students and conducted semi-structured interviews with six participants based on the Facione framework. Quantitative results reveal a strong positive correlation between CT skills and dispositions ($r = 0.86$). Notably, the frequency of seeking AI explanations serves as a significant predictor for CT development, whereas general AI usage frequency lacks statistical significance. Qualitative findings indicate that students proactively employ AI as a "Socratic partner" for guided learning rather than passive answer-seeking. Strategies such as cross-source verification and independent research are utilized to maintain intellectual autonomy and mitigate cognitive passivity. The study concludes that the quality of interaction and depth of inquiry are more vital for CT growth than the mere quantity of technology use. Additionally, academic seniority significantly predicts higher CT skills through progressive exposure to complex academic tasks.

Keywords: critical thinking, language learning, AI, Facione framework, Vietnam

1. Introduction

In the current digital information age, Large Language Models (LLMs) (e.g. ChatGPT, Google Gemini etc.) have become central to language education. These tools offer advanced

comprehension and self-learning capabilities (Stryker & Kavlakoglu, 2024), providing significant classroom benefits while also introducing risks to cognitive motivation if misused (Guo et al., 2025). Within this landscape, critical thinking (CT) serves as a vital cognitive ability involving both skills and dispositions (Facione, 1989). As Vietnam shifts toward a knowledge-based economy during the Fourth Industrial Revolution, CT has become a core requirement for the 21st-century workforce. It is a transferable capacity that allows students to interpret information and make reasoned judgments in complex settings, a priority shared by most academic leaders and modern employers (Liu, Frankel, & Roohr, 2014).

In university language learning, the role of CT is particularly essential. Students are expected to move beyond simple comprehension to analyse arguments, evaluate sources, and reflect deeply on ideas. Research indicates that AI-assisted tools can significantly improve the organization and depth of student writing (Yin & Dou, 2025). However, the potential for technology to deteriorate cognitive ability makes the role of teacher guidance and appropriate frameworks indispensable (Guo et al., 2025). Investigating how students perceive their own CT competence is a necessary step in this process, as these perceptions directly shape learner confidence, agency, and engagement. Ultimately, a student's self-perception determines whether they engage with AI critically and strategically or fall into a pattern of passive dependence.

This study explores how university students in Ho Chi Minh City perceive their CT skills and dispositions in AI-supported language learning by addressing the following research questions:

RQ 1: How do university students assess their own CT skills and dispositions when learning a foreign language with AI support?

RQ 2: What factors influence these perceptions (such as experience with AI tools, technological literacy, or academic seniority)?

RQ 3: What AI-engaged learning activities do students perceive as effective in fostering their critical thinking?

RQ 4: What critical thinking abilities do students perceive to be developed through AI-engaged language learning, and how do they explain these perceptions?

2. Literature review

2.1. Critical thinking in higher education

While the conceptualization of CT remains multifaceted, contemporary scholarship increasingly converges on a bipartite model that distinguishes between cognitive ability and affective inclination (Facione, 1989). Central to this discourse is the Facione-Delphi framework, which defines CT as a dual-dimensional construct comprising Critical Thinking Competence (CTC) and Critical Thinking Disposition (CTD). CTC represents the cognitive dimension, encompassing six core skills: interpretation, analysis, evaluation, inference, explanation, and self-regulation (Facione, 1989). These skills allow individuals to move beyond mere information processing toward a metacognitive monitoring of their own reasoning. However, cognitive proficiency is viewed as insufficient without CTD, which is the "consistent internal motivation" and habit of mind required to deploy these skills in complex, real-world scenarios (Facione et al., 1995). This dispositional dimension is characterized by seven attributes: truth-seeking, open-mindedness, analyticity, systematicity, inquisitiveness, CT self-confidence, and cognitive maturity. By integrating these interdependent dimensions, the Facione framework offers a robust, task-based taxonomy that facilitates the objective measurement of CT attributes, particularly in academic contexts where the transition from theoretical reasoning to practical application is critical.

CT is widely recognized as a foundational 21st-century competency, essential for navigating the complexities of modern society and ensuring professional employability (D'Northwood & Rattray, 2024; Luk & Lin, 2015). In higher education, CT facilitates advanced cognitive functioning, self-regulated learning, and informed civic participation (Gómez et al., 2025; Saldıray & Doğanay, 2024; Van Damme et al., 2023). Within the specific domain of English as a Foreign Language (EFL), CT serves as a catalyst for shifting learners from rote memorization toward inquisitive analysis and sophisticated argumentative reasoning (Liang & Fung, 2021; Norris & Ennis, 1989). By integrating CT, students enhance their communicative proficiency and develop the research-based decision-making skills required in the global labor market (Poštič et al., 2023). Despite these benefits, the literature underscores significant institutional barriers, ranging from test-oriented assessments to rigid curricular specifications, that continue to impede students' CT performance in university settings (Irfan et al., 2025; Soufi & See, 2019).

2.2. AI in language learning and CT development

The integration of Generative Artificial Intelligence (GenAI) into higher education has established a pedagogical paradox, functioning simultaneously as a transformative scaffolding tool and a potential catalyst for cognitive atrophy. In the domain of EFL, GenAI significantly enhances pedagogical efficiency and learner motivation by providing personalized autonomous learning support (AlTwijri & Alghizzi, 2024; Li et al., 2024). From a socio-constructivist perspective, these tools act as a "more knowledgeable other," automating mechanical linguistic tasks to liberate cognitive bandwidth for higher-order reasoning and metacognitive reflection (Darwin et al., 2024; Liu & Wang, 2024). However, a significant scholarly tension exists regarding the "cognitive offloading" phenomenon; over-reliance on AI-generated outputs may lead to a critical thinking deficit, where students bypass the rigorous analytical synthesis required for independent ideation (Derakhshan & Taghizadeh, 2025; Moppett, 2025). This dichotomy is particularly pronounced in the Vietnamese context, where a perceptual gap persists between faculty concerns over academic integrity and student pragmatic adoption of AI for workload management (Ngo Cong-Liem et al., 2024; Pham & Dang, 2025).

2.3. Critical thinking skills and dispositions in foreign language learning using AI

Existing research suggests that the relationship between AI use and critical thinking in language learning is complex and conditional. On the one hand, AI can support critical thinking by providing explanations, alternative viewpoints, feedback, and opportunities for iterative questioning. These affordances may help learners develop skills such as analysis, evaluation, inference, and self-regulation, which are central to the Facione framework (Facione, 1989, 2011). In EFL contexts, AI-supported learning has also been associated with improved writing performance, feedback engagement, and learner autonomy (Teng, 2024; Yin & Dou, 2025). For example, when students ask AI to explain a concept step by step, compare arguments, challenge their ideas, or identify weaknesses in their writing, they may engage in more reflective and analytical thinking. This aligns with studies showing that AI tools can support higher-order thinking when they are used as scaffolds for inquiry rather than as substitutes for student reasoning (Darwin et al., 2024; Liu & Wang, 2024).

On the other hand, AI may undermine critical thinking when students use it passively as a solution provider. Scholars have warned that excessive reliance on AI-generated answers may encourage cognitive offloading, reduce cognitive effort, and weaken students' independent reasoning (Gerlich, 2025; Jose et al., 2025; Lee et al., 2025). This concern is particularly relevant in foreign language learning, where learners may rely on AI not only for ideas but also

for linguistic expression. If students accept AI output without verification, they may bypass important processes such as evaluating evidence, identifying assumptions, and constructing arguments independently. Therefore, the same technology can either support or constrain critical thinking, depending on how learners engage with it.

A key gap in the literature is that many studies examine AI use in language learning through broad outcomes such as motivation, writing improvement, academic performance, or technology acceptance (AlTwijri & Alghizzi, 2024; Cung et al., 2025; Ninghardjanti et al., 2025). Fewer studies have systematically investigated how students perceive both dimensions of critical thinking: their cognitive skills and their dispositions to use those skills. This distinction is important because critical thinking requires not only the ability to analyze, evaluate, and infer but also the willingness to seek truth, remain open-minded, and regulate one's own judgment (Facione et al., 1995; Halpern, 1998). Students may possess certain reasoning abilities but may not consistently apply them, especially when AI provides fast and fluent responses.

Another gap concerns the quality of AI engagement. Current discussions often ask whether AI is beneficial or harmful, but this binary framing overlooks the different ways students interact with AI. General frequency of AI use may not explain critical thinking development as clearly as specific forms of engagement, such as asking for explanations, fact-checking responses, using AI as a debate partner, requesting alternative perspectives, or revising one's own work after receiving feedback. This distinction is supported by recent studies suggesting that the pedagogical value of AI depends on whether learners use it for active inquiry, metacognitive reflection, and source evaluation rather than passive answer-seeking (Derakhshan & Taghizadeh, 2025; Guo et al., 2025; Moppett, 2025).

In addition, limited empirical evidence is available from Vietnamese higher education, particularly among university students learning foreign languages in business-oriented academic contexts. Existing Vietnamese studies have examined AI use in ESP writing, academic integrity, and general language learning perceptions (Dang, 2025; Ngo et al., 2024; Nguyễn, 2025; Pham & Dang, 2025; Tran et al., 2025). However, there remains a need for research that connects AI-engaged language learning with both critical thinking skills and dispositions through a theoretically grounded framework. Investigating this issue in Vietnam can provide empirical evidence for understanding how students in EFL contexts perceive AI as a tool for reasoning, inquiry, and self-regulated learning.

Based on these gaps, the present study explores university students' perceived critical thinking competence and dispositions in AI-engaged foreign language learning. Specifically, it examines how students assess their own critical thinking skills and dispositions, what factors influence these perceptions, which AI-engaged activities are perceived as useful for critical thinking development, and which critical thinking abilities students believe are most developed through AI interaction. This focus allows the study to move beyond the question of whether AI is used and toward a more pedagogically meaningful question: under what conditions AI use may support or constrain critical thinking in foreign language learning.

3. Methods

3.1. Research design

This study employed a sequential mixed-methods approach, prioritizing quantitative data collection followed by qualitative investigation. The initial quantitative phase utilized a survey to assess perceptions and gather data from a large sample, which was then complemented by a qualitative phase involving semi-structured interviews to gain deeper contextual understanding and elaborate on the survey findings.

3.2. Quantitative data collection

3.2.1. Sample and participants

The target population for this research consisted of undergraduate students specializing in Business and Economics at various higher education institutions in Ho Chi Minh City, Vietnam. This demographic was selected due to the high integration of AI tools and the emphasis on analytical reasoning within these academic disciplines.

Data collection was conducted via Google Forms, with invitations distributed through official university student email addresses and academic social media groups. While the study initially aimed for a minimum threshold of 150 participants to ensure statistical power, the final validated sample size reached 185 respondents (N = 185). This sample size provides sufficient granularity for performing multiple regression and correlation analyses within the Facione framework.

3.2.2. Instruments

Data were collected using a structured questionnaire covering AI usage patterns, EFL/ESL learning experience, and perceived critical thinking. The critical thinking section was adapted

from Facione's (1989) Delphi Consensus Model and measured two constructs: Critical Thinking Skills (CTS) and Critical Thinking Dispositions (CTD). CTS included 23 items across six sub-dimensions: interpretation, analysis, evaluation, inference, explanation, and self-regulation. CTD included 19 items across seven dispositions: inquisitiveness, systematicity, analyticity, truth-seeking, open-mindedness, self-confidence, and cognitive maturity.

All critical thinking and attitude-based items were measured on a 6-point Likert scale, ranging from Strongly Disagree to Strongly Agree, to reduce neutral responses. Additional items measured students' general AI usage frequency and frequency of seeking AI explanations, which were treated as independent variables in the analysis.

3.3. Qualitative data collection

3.3.1. Participants and selection

Following the data collection procedure, a smaller group of participants was selected for the qualitative phase on a voluntary basis. Purposive sampling was used to identify six (06) interviewees who could offer rich, relevant insights into the phenomena explored in the quantitative phase. The interviewees were also drawn from the business student population in HCMC, with varying degrees of academic aptitude, English proficiency, and AI usage frequency in order to maintain consistency with the study's focus.

While quantitative research requires large samples for statistical analysis, qualitative research in a sequential explanatory design prioritizes the quality and depth of the gathered information rather than quantity. Therefore, a sample size of six interviewees is justified based on the two methodological criteria, namely theme saturation and variation. Regarding the former, methodological studies indicate that approximately 80-90% of core themes can be identified within 6 to 12 qualitative interviews, particularly when the sample is purposive and the research objective is relatively narrow (Wutich et al., 2024). As for the former, this approach intentionally selects diverse participants to reflect a broad spectrum of perspectives. In this study, the six participants are selected from the survey pool to represent different profiles based on the previous quantitative findings:

1. Participant A: High CT competence and disposition, High linguistic level (C1).
2. Participant B: High CT competence, low CT disposition (efficient but skeptical user).
3. Participant C: low CT competence, high CT disposition (struggling but motivated).
4. Participant D: Freshman (1st year) to capture initial academic maturity.

5. Participant E: Senior (3rd/4th year) to capture advanced academic maturity.
6. Participant F: Student representing an intermediate linguistic level (B1/B2) with high AI reliance.

3.3.2. Procedure and Instrument

Following a rigorous pragmatic approach, the researcher acts as an active listener and a "Socratic provocateur". Interviewers aim to move beyond social desirability bias, in which students might report what they think is the "correct" way to use AI, toward a true account of their cognitive habits.

Data were collected through semi-structured interviews. This approach utilized a set of pre-determined core questions grounded on Facione framework to ensure consistency across interviews, while also allowing flexibility for the interviewer to probe for deeper understanding, explore emerging themes, and follow up on participant responses.

The interviews were conducted in Vietnamese and in a one-on-one setting and were audio-recorded (with the participants' explicit consent) and later transcribed verbatim to facilitate detailed thematic analysis. Each interview lasted approximately 25 to 40 minutes. The subsequent transcription and analysis were also translated into English to ensure ease of approach for the reader.

3.4. Data analysis

3.4.1. Quantitative data analysis

The data were analyzed using both descriptive and inferential statistics via Stata 17. The analysis process included:

1. Reliability Testing: Utilizing Cronbach's Alpha (alpha) to ensure the internal consistency of the measurement scales.
2. Correlation Analysis: To understand the strength and direction of the relationship between independent and dependent variables.
3. Multiple Regression Analysis: To investigate whether predictor variables (AI Usage, AI Explanation-seeking, and Seniority) significantly predicted overall critical thinking proficiency.

3.4.2. Qualitative data analysis

The transcribed interview data will be analyzed using thematic analysis based on Braun and Clarke's six-phase framework (Braun and Clarke, 2006). The process will involve

familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and finally, producing the report. This rigorous process will ensure that the identified themes accurately reflect the depth and context of the participants' experiences and perceptions, providing complementary insights to the quantitative findings.

4. Result and discussion

4.1. Perceived CTS and CTD in AI-engaged language learning and the affecting factors

4.1.1. Demographic profile and AI usage pattern

Table 1: Demographics Statistics

Information	Category	Frequency
Year of Study (%)	1	8.11
	2	63.78
	3	15.14
	4	11.89
	Postgraduate	1.08
AI Usage Frequency (%)	Never	0
	3-4 times/month	28.65
	3-4 times/week	6.49
	Everyday	25.95
	For all questions	38.92
AI Explanation Frequency (%)	Never	3.24
	Rarely	4.32
	Occasionally	15.14
	Usually	25.95
	Always	35.14

Source: Authors' compilation (2026)

Table 1 data indicates that the survey participants were distributed across various academic levels and exhibited distinct AI engagement patterns. Students from multiple academic years participated in the survey, with the highest representation from second year students (63.78 percent) and the lowest from postgraduate students (1.08 percent). First year students also had a relatively low participation rate (8.11 percent) compared to those in their third year (15.14 percent) or fourth year (11.89 percent). Regarding AI usage frequency, the largest proportion of respondents (38.92 percent) reported using the technology for all questions, followed by those who utilized it 3 to 4 times per month (28.65 percent). Students who engaged with AI every day made up 25.95 percent of the sample, while those using it 3 to 4 times per week represented the smallest group among active users (6.49 percent). Notably, zero percent of respondents reported never using AI tools. In terms of instructional support, the highest representation came from students who always sought AI explanations (35.14 percent), while those who usually did so accounted for 25.95 percent. Students who never or rarely utilized AI for explanations had the lowest participation rates at 3.24 percent and 4.32 percent respectively. The remaining group, consisting of students who occasionally sought explanations, stood at 15.14 percent.

4.1.2. Descriptive Statistics and Reliability Analysis

Data in Table 2 regarding the Facione subscales indicates that the constructs for Critical Thinking Skills and Critical Thinking Dispositions both achieved an overall Cronbach alpha of 0.94, demonstrating excellent internal consistency. Within the Critical Thinking Skills subscales, the highest mean value pertains to Self Regulation (M = 4.69), followed by Evaluation (M = 4.61) and Inference (M = 4.56). The Explanation subscale represented the lowest mean score in this category at 4.42.

Among the Critical Thinking Dispositions, the largest proportion of high scores was found in the Inquisitiveness subscale (M = 4.89), with Open mindedness also showing a high mean of 4.84. In contrast, the Self confidence subscale made up the smallest group with a mean of 4.43. Other dispositions such as Maturity (M = 4.80), Analyticity (M = 4.75), and Truth Seeking (M = 4.73) were relatively evenly distributed.

The standard deviation values for all subscales remained consistently below 1.0, ranging from 0.050 to 0.071. This low variability indicates a convergence of responses and suggests consistency in the participants' evaluations of these constructs. While most subscales showed

strong reliability, the Systematicity subscale was notable for having the lowest Cronbach alpha at 0.67. This figure suggests that items within this specific subscale were slightly less unified in their focus compared to the other measured components.

Table 2: Descriptive Statistics for Facione Subscales

Facione Construct	**Mean (*M*)**	**St. Dev (*SD*)**	**Cronbach's Alpha (*alpha*)**
Critical Thinking Skills (CTS)	4.55	0.050	0.94
Interpretation	4.53	0.057	0.86
Analysis	4.45	0.066	0.80
Evaluation	4.61	0.067	0.82
Inference	4.56	0.064	0.82
Explanation	4.42	0.070	0.86
Self-regulation	4.69	0.061	0.83
Critical Thinking Dispositions (CTD)	4.72	0.052	0.94
Inquisitiveness	4.89	0.070	0.79
Systematicity	4.56	0.071	0.67
Analyticity	4.75	0.067	0.85
Truth-Seeking	4.73	0.060	0.73
Open-mindedness	4.84	0.063	0.78
Self-confidence	4.43	0.068	0.84
Maturity	4.80	0.06	0.85

Source: Authors' compilation (2026)

4.1.3. Correlation between Skills and Dispositions

Table 3's data indicate a significant correlation between Critical Thinking Skills (CTS) and Critical Thinking Dispositions (CTD) at the $p < 0.001$ level. Data in Table 3 shows a very

strong positive correlation between these two primary constructs (r = 0.86), as per established statistical reporting standards. This significant relationship reveals that students who demonstrate higher proficiency in cognitive skills also tend to possess a stronger habitual inclination toward analytical thinking. The high correlation coefficient suggests a strong convergence between a student's actual ability to think critically and their internal drive to apply those skills within their academic environment.

Table 3: Correlation Results

	Skills (CTS)	**Dispositions (CTD)**
Skills (CTS)	1.00	
Dispositions (CTD)	0.86	1.00
	<.001	

Source: Authors' compilation (2026)

4.1.4. Predictive Factors of Critical Thinking Skills

Table 4's data indicates the results of a multiple regression analysis investigating the predictive impact of independent variables on Critical Thinking Skills. Data in Table 4.1 shows that two of the independent variables, AI Explanation Frequency and Year of Study, have a statistically significant impact on the dependent variable ($p < 0.05$). Specifically, Critical Thinking Skills are most significantly influenced by the frequency with which students seek explanations from AI (regression coefficient $B = 0.254$, $p < 0.001$), followed by their Year of Study ($B = 0.120$, $p = 0.029$).

Interestingly, AI Usage Frequency does not have predictive significance for Critical Thinking Skills ($B = 0.017$, $p = 0.647$). This suggests that while simply using AI tools does not necessarily enhance these skills, engaging with the reasoning or explanations provided by AI may have a more substantial impact. The model results showed no multi-collinearity, as all VIF values were equal to 1.000, which is well below the common threshold of 2.0. The overall model was statistically significant ($F(3, 181) = 11.23$, $p < 0.001$) and accounted for 15.7 percent of the variance in Critical Thinking Skills ($R^2 = 0.157$).

Table 4: Regression Results for Critical Thinking Skills

Predictor variable	Coefficient (B)	Std. Err.	t	|P|>t	VIF
Constant	3.435	0.245	14.01	<0.001	-
AI Explanation Frequency	0.254	0.047	5.39	<0.001	1.000
AI Usage Frequency	0.017	0.037	0.46	0.647	1.000
Year of Study	0.120	0.055	2.20	0.029	1.000
R^2=0.157; F(3, 181)=11.23, p<0.001					

Source: Authors' Compilation (2026)

Table 5's data further indicates that AI Explanation Frequency has a statistically significant impact on the dependent variable ($p < 0.05$) Critical Thinking Dispositions (regression coefficient $B = 0.274$, $p < 0.001$).

In this case however, AI Usage Frequency ($B = -0.019$, $p = 0.630$) and Year of Study ($B = 0.065$, $p = 0.257$) do not have predictive significance for Critical Thinking Dispositions. These results suggest that while an advanced year of study may predict a student's critical thinking skills, it does not necessarily predict their internal disposition or drive to think critically. The model results showed no multi-collinearity, with all VIF values equal to 1.000. The overall model was statistically significant ($F(3, 181) = 10.70$, $p < 0.001$) and accounted for 15.1 percent of the variance in Critical Thinking Dispositions ($R^2 = 0.151$).

Table 5: Regression Results for Critical Thinking Dispositions

Predictor variable	Coefficient (B)	Std. Err.	t	|P|>t	VIF
Constant	3.810	0.257	14.82	<0.001	-
AI Explanation Frequency	0.274	0.049	5.54	<0.001	1.000
AI Usage Frequency	-0.019	0.039	-0.48	0.630	1.000
Year of Study	0.065	0.057	1.14	0.257	1.000

R^2=0.151; F(3, 181)=10.70; p<0.001

Source: Authors' Compilation (2026)

4.1.5. Discussion

The regression analysis yielded three primary findings regarding Critical Thinking Skills and Dispositions:

For RQ1, AI Explanation Frequency serves as the strongest and most significant predictor, where every one unit increase in asking for explanations corresponds to a 0.25-point increase in the overall CTS score (B = 0.254, p < 0.001) and a 0.27 increase in CTD score (B = 0.274, p < 0.001). Interestingly, the total frequency of General AI Usage was not significant (B = 0.017, p = 0.647), which suggests that simply using AI tools more often does not contribute to critical thinking competencies. Instead, the depth of cognitive inquiry through explanations appears to be the primary determining factor.

For RQ2, the student Year of Study significantly predicts higher scores (B = 0.120, p = 0.029), highlighting a natural progression of critical thinking abilities over the course of higher education

4.2. CT development through AI-engaged interactions in language learning

4.2.1. Result

The thematic analysis from collected qualitative data identified four main themes, illustrating a shift from passive consumption to strategic, critical interaction:

1. Intentional AI assistance in learning
2. Concerns of AI tools
3. Fact-checking as critical practice
4. Growth in critical thinking

Table 1: Coding & Thematic analysis of Qualitative data

Theme	Sub-theme
Theme 1: Intentional AI assistance in learning	Guided learning over direct answers
	Fallback to independent research
	Self-produced work first

Theme 2: Concerns of AI tools	Over-reliance leading to lazy thinking
	Deliberate limits on use
Theme 3: Fact-checking as critical practice	Awareness of hallucinations
	Cross-reference habits
	Source-grounded tools preference
Theme 4: Growth in critical thinking	Sharpened analysis and evaluation skills
	Rising intellectual curiosity

Source: Authors' compilation (2026)

For RQ3, the qualitative data shows students across all six interviews preferred using AI as a guide rather than an answer machine, opting for step-by-step explanations so they could "figure out the rest myself" (Interviewee 1), or treating direct answers as "just a result" disconnected from real learning (Interviewee 6). When AI repeatedly failed to help them reach an understanding, most fell back on Google or switched tools entirely, and one student consistently completing her own writing first before asking AI to critique it. Having encountered AI errors or fabricated sources firsthand, several students developed active verification habits. These ranges from cross-referencing against Google, querying other AI tools, or switching to source-grounded AI platforms like NotebookLM precisely because it shows where answers come from. This behavior was specific and deliberate rather than general skepticism.

Regarding RQ4, Critical Thinking Competence development was conditional rather than automatic. Analysis and evaluation were the skills most cited as developing through AI interaction, driven by the need to scrutinize outputs that could be wrong. All participants expressed concern that habitual AI use erodes independent thinking. Interviewee 5 explicitly noted that over-reliance on instantaneous AI answers leave students "inflexible" while Interviewee 6 consider that it "bypasses the stages needed for actual learning." One student additionally cited environmental cost as a reason to limit use, though most others set limits implicitly through their practices rather than as a stated policy. Critical Thinking Disposition saw varied shifts among participants. Although Curiosity increased for some (e.g., Interviewee 6 described knowing more as revealing "a drop of water in the ocean"), Interviewee 2 reported no change, and one participant noted that without background knowledge, AI dependency

could make thinking worse rather than better. A single senior student framed her motivation not as curiosity but professional responsibility, a finding too isolated to generalize but analytically significant.

4.2.2. Discussion

In response to RQ3, qualitative data shows that learners are not passive recipients of AI outputs. They are aware of the benefits and cognitive risks involved with using these tools and most are proactively employing personal strategies - including iterative Socratic prompting, grounding measures, and manual research - to counteract these effects. The qualitative results confirmed trends aligning with quantitative results. Employing a guidance-based engagement method enhances CTS and CTD, while engagement aiming to obtain direct answers yields little to no perceived to CTS and CTD, regardless of engagement frequency.

Regarding RQ4, the thematic analysis illustrates that the relationship between the usage of AI tools and critical thinking development is not straightforwardly positive or negative and is contingent upon the learner's engagement quality rather than the frequency. Although AI interactions have a positive influence on some CTS and CTD aspects in students, these attributes generally rise as they get exposed to more information through their educational institute's curriculum. Through the inclusion of an isolated case of Interviewee 6, this analysis highlights the need to include more extensive background information to ensure that changes to Critical Thinking Disposition are not solely and incorrectly attributed to AI usage.

5. Conclusion

To conclude, the research suggests that for business students in Ho Chi Minh City, the quality of AI engagement, rather than its frequency, is the primary driver of critical thinking. Quantitative results revealed a strong positive relationship between critical thinking skills and dispositions, suggesting that students who report stronger cognitive abilities also tend to show stronger habits of inquiry, open-mindedness, and reflective judgment. Regression results further indicated that asking AI for explanations significantly predicted both critical thinking skills and dispositions, whereas general AI usage frequency was not statistically significant. Year of study predicted critical thinking skills but not dispositions, implying that academic experience may strengthen students' reasoning abilities without necessarily changing their willingness to think critically. Qualitative findings supported these patterns by showing that

students used AI productively when they treated it as a guide, a source of explanation, or a tool for checking and refining ideas. However, they also recognized the risks of over-reliance, misinformation, and cognitive passivity. Overall, the study suggests that AI can support critical thinking in foreign language learning when students engage with it actively, critically, and reflectively rather than using it merely to obtain ready-made answers.

Ultimately, AI should be viewed as a Vygotskian scaffold that supports both linguistic and intellectual growth. This necessitates a shift in pedagogy away from monitoring usage frequency or academic integrity toward fostering active, source-grounded engagement. Educators must provide scaffolding that accounts for both linguistic and disciplinary readiness, positioning AI as a tool for deeper thinking rather than a shortcut for passive output.

The research faces three primary limitations: first, the use of convenience sampling among business students in Ho Chi Minh City restricts the findings' generalizability to other regions or academic disciplines. Second, the reliance on self-reported data introduces potential social desirability bias, where students may over-report their skills to align with perceived standards rather than their actual performance. Finally, the technical complexity of the critical thinking framework used during interviews may have led to a "demand effect" or hindered participants' ability to fully articulate their experiences. Consequently, these findings represent valuable student perceptions but may not perfectly mirror objective cognitive proficiency across a broader population.

Further research on this topic is recommended to utilise more objective and standardised CT assessment frameworks rather than collecting mere self-reported anecdotes to better solidify measurements of CT competence. As this study implemented a cross-sectional design, another aspect that future research could improve upon is to explore the impact of AI integration on CT dispositions and competence through longitudinal approaches in order to evaluate the long-term risks and implications in academic reasoning. Lastly, further research can expand on this study by obtaining a more comprehensive profile of the research subjects by accounting for educational, geographical, and socio-economic circumstances to lessen the locality of the result and further explore the influence of factors such as academic performance and regional educational policies on AI-integrated CT development.

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