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Student Perceptions of Generative AI (GenAI) Use in Academic Writing: A Case Study of an EAP Module at XJTLU

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Abstract: This research employed a case study design to explore students' perceptions of Generative AI (GenAI) use in academic writing. Participants were 33 first-year undergraduates enrolled in an EAP module at a Sino-British university. Data were collected via an online survey and semi-structured interviews. Findings indicated generally positive attitudes toward AI-enabled writing tools, with students acknowledging their benefits in improving writing quality and streamlining processes. However, participants demonstrated critical awareness of risks, such as GenAI over-reliance and the potential erosion of core academic skills. Adoption of GenAI was widespread, with a clear preference for locally accessible tools like Doubao, favored for its affordability and accessibility. Students held nuanced stance across studied dimensions: they strongly endorsed GenAI's utility and efficiency, yet expressed considerable ethical concerns. Lower ratings for quality and reliability, along with concerns about cognitive impact, suggested an underlying skepticism shaping their pragmatic adoption. No significant differences in perception were found based on gender or academic background. In response to students' expressed needs for support, this study proposes an integrated framework encompassing pedagogical, operational, and ethical dimensions through which teachers, academic staff, and policymakers can collaborate. The findings suggest that the central challenge for higher education lies not in whether to prohibit or promote GenAI, but in cultivating AI-literate learners who can harness technological affordances while safeguarding the critical thinking and ethical judgment essential to meaningful education.

Keywords: Generative AI (GenAI), academic writing, student perception, higher education

1. Introduction

Writing is widely regarded as an act of thinking—a cognitive process that transform ideas into communication through words (Strongman, 2013). In academic contexts, this demands precision in word choice, clarity in organization, and rigor in argumentation to convey complex ideas effectively (Strongman, 2013). For many students, particularly those learning English as a second or foreign language, mastering academic writing in English presents distinct challenges. These include grammatical conventions, lexical choice, stylistic precision, and structural coherence. Without proficiency in these areas, even grammatically sound writing may lack logical progression and fail to meet the rigorous coherence standards expected in academic writing. Mastering these elements ensures that arguments are logically structured, stylistically polished, and academically persuasive—qualities vital for success in English-medium higher education.

To address these challenges, Generative AI (GenAI) tools have emerged as promising resources that can help students refine their writing skills and streamline the writing process. GenAI, a subfield of artificial intelligence (AI), specializes in developing models that can produce a wide range of material, including text, code, images, videos, and audios (Nguyen, 2025). By leveraging machine-learning techniques and training on vast datasets, GenAI models can produce highly human-like outputs. The rapid proliferation of GenAI tools has profoundly reshaped the landscape of higher education across the globe, transforming pedagogy, assessment, and academic integrity policies. This transformation is particularly salient in academic writing, where these tools are redefining conventional processes such as

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drafting, idea development, revising, and editing. With platforms like ChatGPT and Deepseek, students can generate, refine, and evaluate written work effortlessly, sparking burgeoning discussions about academic integrity, pedagogical adaptation, and assessment redesign (Cotton et al., 2023; Kasneci et al., 2023). While some educators praise GenAI for aiding ideation, drafting, language refinement, and personalized feedback, others warn of plagiarism, reduced critical thinking, over-reliance on technology, and widening educational inequities. (Cotton et al., 2023; Mogavi et al., 2024; Rudolph et al., 2023; Sullivan et al., 2023).

Given these competing views, understanding student attitudes toward GenAI in academic writing—especially in English for Academic Purposes (EAP) contexts—is crucial for achieving balanced, effective, and responsible AI integration in higher education. This study, therefore, seeks to investigate student perceptions and experiences of using GenAI tools for academic writing in an EAP module at Xi'an Jiaotong-Liverpool University (XJTLU). By analyzing survey and interview data from students who study at one of the EAP modules, this paper addresses key questions below:

RQ1: How do EAP students perceive the benefits, challenges, and practical applications of GenAI tools in academic writing tasks?

RQ2: How do students perceive GenAI's influence in academic writing across six key dimensions: utility and efficiency, quality and reliability, confidence and competence, interaction dynamics, cognitive impact, and ethical concerns?

RQ3: What forms of training or support are necessary for students to use GenAI effectively and responsibly in academic writing?

2. Literature Review

2.1 Gen AI's impact on writing in higher education

Digital technologies have given students unprecedented access to diverse language resources and personalized learning platforms, supporting more self-directed learning (Law, 2024). The rapid adoption of GenAI by university students represents an even more profound transformation. In a 2023 poll of 1000 U.S. university students, nearly one-third (30%) reported using essay-generating models, particularly ChatGPT, for written assignments (Intelligent.com, 2023). This trend appears to be accelerating, as a more recent survey found that 82% of U.S. university students use GenAI for coursework and study tasks (Studiosity, 2025). Students increasingly turn to these tools for help—whether to spark inspiration, organize ideas, refine content, or navigate demanding academic workloads. For non-native English speakers in particular, such technologies offer a crucial advantage by lowering the barrier to effective written communication. Unlike conventional digital resources, GenAI offers far more than vocabulary and grammar checks. It can replicate human-like texts with remarkable accuracy, coherence, complexity, and diversity, almost instantaneously. As a result, learners can seamlessly integrate high-quality translations, advanced vocabulary, rephrased sentences, or even full essays into their work with minimal effort—a practice that risks bypassing the cognitive engagement required for genuine learning (Alharbi, 2023). While GenAI tools offer unprecedented convenience and accessibility, they also raise concerns regarding authenticity, originality, attribution, and erosion of essential skill development.

As GenAI becomes more prevalent in academic writing, educators should remain cognizant of associated ethical challenges and threats to academic integrity (Law, 2024). Central among these is AI-giarism—a novel form of academic violation defined as the unethical or unacknowledged use of AI in generating and editing academic writing (Chan, 2023a; Drisko, 2025). This breach typically takes two forms: using AI-repurposed ideas from human-authored work without credit, or directly copying AI-generated content without acknowledgment (Chan, 2023b). In either case, users fail to provide proper attribution, be it a human author or an AI tool. An example of this academic misconduct is the submission of AI-enabled "ghostwritten" papers (Drisko, 2025). In this deceptive practice, students copy AI-produced text privately and present it as their own work, falsely claiming credit for effort they did not perform. The consequences of such misuse, however, extend far beyond a simple breach of academic integrity. Chan (2023a) argues that such unethical authorship acts shift essential learning processes away from meaningful engagement—acquiring, applying, and critiquing knowledge—toward superficially generating outputs that may lack accuracy, depth and reliability. This displacement not only undermines academic integrity but also diverts students from the fundamental purpose of education: the development of creativity, originality, and critical thinking. Moreover, the accessibility and user-friendliness of these tools have led to a surge in AI-facilitated

academic misconduct, as students tend to take mental shortcuts or 'mentally' outsource their thinking to machines (Zhai, 2022; Zhai, Wibowo, & Li, 2024). It is highly likely that their brain will be enslaved or even rot through the long-time overuse of GenAI.

2.2 Student perceptions of GenAI in academic writing

Given GenAI's growing impact on academic writing, a significant body of research has emerged to explore student perceptions of these tools, particularly ChatGPT. Many studies report favorable views, highlighting ChatGPT's role in supporting and scaffolding various stages of the writing process. For instance, Yang's (2024) study on Chinese EFL learners and Mahapatra's (2024) research with Indian ESL students both found that ChatGPT provides tailored feedback that significantly enhances writing proficiency and performance. Similarly, research involving Korean EFL university students revealed that, with effective prompt engineering, ChatGPT contributed to higher writing scores in both structural and linguistic dimensions compared to peer feedback, while also alleviating anxiety related to English writing (Mun, 2024).

However, this optimism is confronted with pressing concerns and widespread skepticism. One study, for instance, noted that ChatGPT fail to help L2 learners produce longer or more lexically diverse texts and raised issues related to over-reliance and occasional inaccuracies (Mun, 2024). Tarchi et al. (2025) also challenged the overly positive narrative, finding that Italian university students using ChatGPT for source-based writing often engaged with it superficially for lexical support, which in turn reduced their critical engagement with original source materials. This suggests the educational value of GenAI is not inherent but rather contingent on deliberate implementation. Supporting this, Nguyen, Ngoc, and Dan (2024) found that while Vietnamese students appreciated ChatGPT for brainstorming, they remained cautious about its effectiveness for plagiarism management. Their study identified a negative correlation between perception and practice: as students' awareness of the tool's limitations grew, their reliance on it decreased, indicating a shift toward more critical and selective pattern of use.

Collectively, these studies suggest that while students embrace GenAI as a powerful tool for maximizing efficiency, refining expressions, and producing polished writing, they are also actively navigating its limitations and ethical complexities. This underscores the need for pedagogical strategies and institutional policies that guide students in using GenAI critically, effectively, and responsibly as a supplement, not a substitute, for their own intellectual work.

3. Methodology

This study employed a mixed-methods design. The quantitative phase consisted of an online survey with primarily closed-ended questions, organized into three sections: (1) demographic information, (2) awareness and use of GenAI tools, and (3) perceptions of GenAI's role in academic writing. To complement the survey, semi-structured interviews were conducted with volunteer participants to gain deeper insight into students' experiences and attitudes toward GenAI in academic writing.

3.1 Participants

The study participants were first-year Chinese undergraduates enrolled in EAP039, a foundation-level EAP module at XJTLU. Out of 34 students, 33 completed the survey, yielding a 97% response rate. Eight volunteers took part in follow-up semi-structured interviews, which aimed to capture richer qualitative perspectives.

3.2 Online survey

An online questionnaire was carried out in Week 10 of Semester 2 of the 2024–2025 academic year. Prior to accessing the 42-item questionnaire, participants viewed a brief introduction outlining the study's purpose and procedures, followed by an informed consent form, which they were required to read and approve electronically. The survey took approximately 18 minutes to complete.

The survey comprised three sections. Section 1 collected demographic information, including gender, study discipline, and familiarity with GenAI tools. Section 2 assessed students' general awareness and frequency of GenAI use in academic writing. Section 3 employed a 5-point Likert scale to measure students' perceptions of GenAI across six dimensions.

3.3 Interviews

Following analysis of the survey data, semi-structured interviews were conducted with eight participants—three female and five male—from both STEM and non-STEM disciplines to obtain deeper qualitative insights. Each interview was carried out in the participant's preferred language (Chinese) and lasted approximately 15 minutes. The interviews explored four key areas related to GenAI: benefits, challenges, usage patterns, and support needs. All interviews were audio-recorded with consent, then transcribed and anonymized for analysis.

3.4 Data analysis

Quantitative data were analyzed using IBM SPSS Statistics (Version 29). First, descriptive statistics summarized demographic characteristics and general response patterns. Next, the internal consistency of scaled items was assessed using Cronbach's alpha, and relationships between key variables were examined via correlation analysis. For hypothesis, appropriate parametric tests (e.g., t-test, ANOVA) were selected based on data distribution. A significance level of *p* < .05 will be applied, and effect sizes will be reported alongside *p*-values.

Regarding qualitative data, interview responses were analyzed through thematic analysis. Following Creswell and Poth's (2018) recommendation to use multiple sources for depth and validity, the researcher applied Braun and Clarke's (2006) six-step framework: (1) reviewed transcripts, (2) generated initial codes, (3) grouped codes into themes, (4) reviewed and refined themes, (5) defined themes, and (6) presented the analysis.

4. Results

4.1 Demographic information

Section 1 of the survey gathered demographic profile from participants. Responses were received from 33 of the 34 invited students, consisting of 23 male (69.7%) and 10 female (30.3%) participants. Details are presented in Table 1.

An analysis of academic disciplines revealed a significant predominance of students in STEM programs (60.61%) compared to non-STEM programs (39.39%). This substantial preference suggests that STEM fields hold greater appeal for this cohort, a trend potentially influenced by stronger perceived employment prospects and industry demand.

The survey also demonstrated substantial familiarity with GenAI tools among participants. A significant majority of respondents (75.76%, n=25) reported being familiar with these technologies. More specifically, 18.18% (n=6) indicated a high level of familiarity and 57.58% (n=19) possessed some familiarity. Notably, none of the respondents indicated being completely unfamiliar with GenAI, suggesting a widespread awareness of this emerging technology within the surveyed group.

Table 1 Demographic Information

Characteristic	N	%
Gender		
Male	23	69.7
Female	10	30.3
Major		
STEM	20	60.61
Non-STEM	13	39.33
Familiarity with GenAI		
Very familiar	6	18.18
Somewhat familiar	19	57.58
Slightly familiar	8	24.24
Not familiar at all	0	0

4.2 Students' general awareness and usage

Section 2 of the survey included nine questions on students' awareness and use of GenAI in academic writing. Results showed widespread adoption, along with insights into platform choice, usage frequency and patterns, key motivations, and perceived benefits and concerns.

A striking 93.94% of respondents reported using GenAI tools to assist with academic writing, underscoring their significant role in academic practices. Clear platform preferences emerged (see Figure 1). Doubao was the predominant choice (90.32%), followed by DeepSeek (80.65%), Kimi (32.26%), ChatGPT (25.81%), and XIPU AI (12.9%), an in-house AI system. This preference hierarchy highlights Doubao's dominance among the surveyed population, which is likely attributable to its localized features, user accessibility, free availability, and perceived effectiveness in academic contexts.

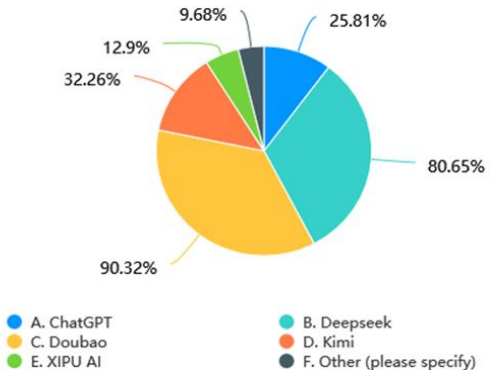

Figure 1 GenAI Tool(s) Usage

Over the past six months (January to June 2025), GenAI tools have become substantially integrated into respondents' academic writing workflows. More than half (54.84%) reported using these tools occasionally, while over a quarter indicated frequent use, selecting either "often" (16.13%) or "very often"

(9.68%). Notably, no respondent reported never using GenAI tools in their writing process, highlighting their near-ubiquitous presence in academic settings. For a detailed breakdown, refer to Figure 2.

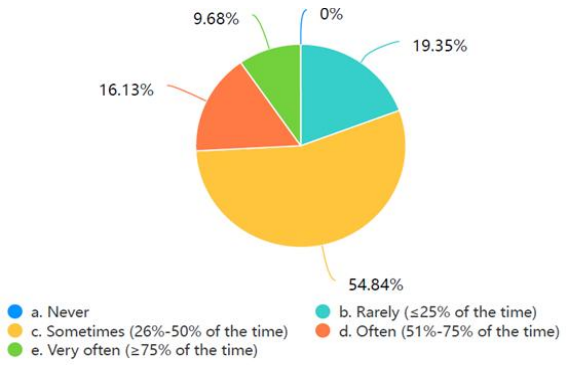

Figure 2 Frequency of GenAI Usage in Academic Writing

The adoption of GenAI tools varied across different stages of the writing process. Adoption was most pronounced in the pre-writing phase, with 83.87% of respondents leveraging GenAI primarily for brainstorming, discovering relevant sources, and creating outlines. The drafting stage ranked second (64.52%), where GenAI assisted in summarizing lengthy materials, translating texts, and overcoming writer's block. During revision, over half of the respondents (54.84%) utilized GenAI to refine their work, seeking help with grammar, clarity, coherence, text polishing, and references formatting.

When asked about their primary reason for using GenAI, the most common response was writing assistance (38.71%). This overarching category included support with drafting, editing, and ideation, indicating that students primarily value GenAI as a tool to facilitate the core processes of writing. Other notable reasons included research support (25.81%) and language improvement (22.58%), with a small portion citing time management (12.90%). These reasons align closely with students' stated motivations, the leading ones being improving writing quality (32.26%) and enhancing work efficiency (29.03%). Together, these patterns demonstrate that students strategically employ GenAI tools to address key academic challenges, valuing them most for writing guidance, research scaffolding, linguistic support, and time saving.

Among the most favored features, vocabulary enhancement as well as summarizing and paraphrasing were identified as the most helpful (61.29% respectively). These were closely followed by grammar and spelling checking, along with feature to improve structure and organization (58.06% each). Features supporting citation and reference, and those aiding source selection and understanding were the next most popular, each at 54.84%. A full breakdown of these preferences is provided in Figure 3.

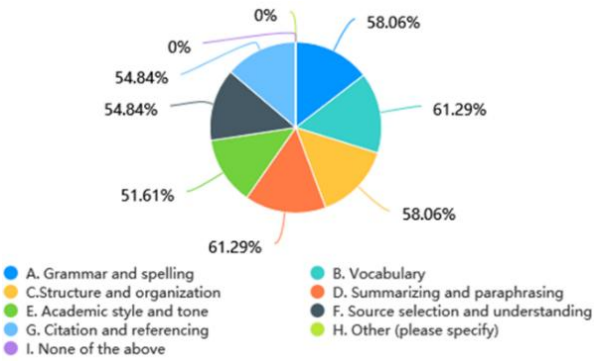

Figure 3 GenAI's Most Favored Features

Despite the widespread adoption and perceived benefits, nearly two thirds of respondents (64.52%) expressed a primary concern about over-reliance on GenAI in academic writing. Some of them worried about a potential loss of creativity and critical thinking in their writing process and had doubts regarding the accuracy of AI-generated content (12.90% each). These concerns are directly reflected in how users prefer to receive writing feedback. Rather than depending solely on AI, a large majority (64.52%) preferred a combined approach that integrates human feedback, GenAI tools, and other automated tools (e.g., Grammarly). This indicates a desire to balance technological assistance with critical human oversight to ensure comprehensive and trustworthy input.

Overall, the survey from Section 2 reveals considerable adoption of GenAI tools (93.94%) among students for academic writing, with strong preferences for specific platforms such as Doubao. These smart tools are most heavily used during the pre-writing (83.87%) and drafting stages (64.52%). Students highly value AI writing tools for enhancing vocabulary and for summarizing and paraphrasing (61.29% each), as well as for checking grammar and spelling and for improving structure and organization (58.06% respectively). These features are seen as key to boosting both the quality and efficiency of their writing. However, despite these perceived benefits, a significant majority of students (64.52%) express unease about the potential for over-dependence on GenAI. In response to this concern, many of them (64.52%) advocate for a hybrid feedback model that combines human oversight with AI-enabled and other

automated tools.

4.3 Students' perceptions of GenAI

Section 3 of the survey employed a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) across 30 questions, systematically organized into six thematic categories with five questions each. This structured approach ensured comprehensive coverage of key dimensions while maintaining balanced representation across all measured constructs.

4.3.1 Descriptive analysis

As shown in Table 2 below, the respondents represented diversity and representativeness across all 30 items of the survey questions. Their overall perception, measured on a 5-point Likert scale, exceed the neutral midpoint (M = 3.64, SD = 0.85), indicating a moderately positive perception toward the use of GenAI in academic writing. Response patterns revealed significant variation in consensus across topics. Standard deviations for all items ranged from 0.63 to 1.12.

Table 2 Descriptive Analysis for All Items

Descriptive Statistics

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Std. Deviation
Theme A Utility & Efficiency	Q13	-	-	6(18.2%)	20(60.6%)	7(21.2%)	4.0303	.63663
	Q14	1(3%)	-	6(18.2%)	19(57.6%)	7(21.2%)	3.9394	.82687
	Q15	1(3%)	1(3%)	15(45.5%)	10(30.3%)	6(18.2%)	3.5758	.93643
	Q16	-	1(3%)	8(24.2%)	20(60.6%)	4(12.1%)	3.8182	.68258
	Q17	-	2(6.1%)	8(24.2%)	16(48.5%)	7(21.2%)	3.8485	.83371
Theme B Quality & Reliability	Q18	-	6(18.2%)	13(39.4%)	12(36.4%)	2(6.1%)	3.3030	.84723
	Q19	-	2(6.1%)	11(33.3%)	17(51.5%)	3(9.1%)	3.6364	.74239
	Q20	4(12.1%)	5(15.2%)	11(33.3%)	11(33.3%)	2(6.1%)	3.0606	1.11634
	Q21	1(3%)	7(21.2%)	16(48.5%)	8(24.2%)	1(3%)	3.0303	.84723
	Q22	-	-	11(33.3%)	16(48.5%)	6(18.2%)	3.8485	.71244
Theme C Confidence & Competence	Q23	-	8(24.2%)	15(45.5%)	9(27.3%)	1(3%)	3.0909	.80482
	Q24	-	4(12.1%)	10(30.3%)	17(51.5%)	2(6.1%)	3.5152	.79535
	Q25	-	2(6.1%)	11(33.3%)	18(54.5%)	2(6.1%)	3.6061	.70442
	Q26	-	-	8(24.2%)	19(57.6%)	6(18.2%)	3.9394	.65857
	Q27	-	5(15.2%)	14(42.4%)	12(36.4%)	2(6.1%)	3.3333	.81650
Theme D Interaction with GenAI	Q28	-	-	8(24.2%)	20(60.6%)	5(15.2%)	3.9091	.63066
	Q29	-	-	9(27.3%)	15(45.5%)	9(27.3%)	4.0000	.75000
	Q30	-	5(15.2%)	14(42.4%)	9(27.3%)	5(15.2%)	3.4242	.93643
	Q31	-	2(6.1%)	8(24.2%)	17(51.5%)	6(18.2%)	3.8182	.80834
	Q32	-	2(6.1%)	8(24.2%)	17(51.5%)	6(18.2%)	3.8182	.80834
Theme E Impact on Cognition	Q33	-	8(24.2%)	14(42.4%)	10(30.3%)	1(3%)	3.1212	.81997
	Q34	1(3%)	1(3%)	11(33.3%)	17(51.5%)	3(9.1%)	3.6061	.82687
	Q35	1(3%)	1(3%)	10(30.3%)	14(42.4%)	7(21.2%)	3.7576	.93643
	Q36	1(3%)	4(12.1%)	14(42.4%)	9(27.3%)	5(15.2%)	3.3939	.99810
	Q37	-	4(12.1%)	11(33.3%)	14(42.4%)	4(12.1%)	3.5455	.86930
Theme F Concerns about GenAI	Q38	1(3%)	1(3%)	8(24.2%)	9(27.3%)	14(42.4%)	4.0303	1.04537
	Q39	-	7(21.2%)	8(24.2%)	12(36.4%)	6(18.2%)	3.5152	1.03444
	Q40	1(3%)	1(3%)	9(27.3%)	11(33.3%)	11(33.3%)	3.9091	1.01130
	Q41	1(3%)	1(3%)	7(21.2%)	10(30.3%)	14(42.4%)	4.0606	1.02894
	Q42	1(3%)	1(3%)	13(36.4%)	5(15.2%)	13(36.4%)	3.8485	1.09320
	Valid N (listwise)						3.64	0.85

The 30 survey items in Section 3 were then categorized into six distinct themes for analysis: (A) Utility & Efficiency, (B) Quality & Reliability, (C) Confidence & Competence, (D) Interaction with GenAI, (E) Impact on Cognition, and (F) Concerns about GenAI. Refer to Table 3 for details.

The most polarized responses emerged in **Theme F** (Concerns about GenAI), which had the highest overall mean score (M=3.87, SD=0.74). Despite this strong average, responses to specific items were sharply divided. For instance, regarding the statement that "GenAI tools lead to an increased risk of plagiarism/academic dishonesty" (Q38), 42.4% of respondents strongly agreed, while 3% strongly disagreed. This suggests that although a majority express concern about academic dishonesty, a notable minority believes ethical outcomes depend primarily on how the tools are used. **Theme A** (Utility & Efficiency) followed closely (M=3.84, SD=0.61), reflecting generally positive perceptions of GenAI's practical value. This was strongly influenced by items such as Q13 (M=4.03, SD=0.64), where 81.8% of students either agreed or strongly agreed that GenAI improves efficiency in academic writing. **Theme D** (Interaction with GenAI) also garnered a relatively high mean score (M=3.79, SD =

0.52), suggesting favorable experiences or attitudes towards engaging with the technology.

Conversely, more critical perspectives emerged around output and cognitive impact. **Theme B** (Quality & Reliability) yielded the lowest mean score (M=3.38, SD=0.58), and **Theme E** (Impact on Cognition) scored comparatively low (M=3.48, SD=0.52). These results point to more reserved or ambivalent views on the dependability of GenAI outputs and its effects on thinking processes, respectively. **Theme C** (Confidence & Competence), positioned in the middle of the mean scores (M=3.50, SD=0.57), reflecting a measured and somewhat tentative stance toward participants own ability and self-assurance in using GenAI tools. The results suggest a user population that is in the process of developing both proficiency and comfort with AI adoption.

Table 3 Descriptive Analysis for Six Themes

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
A. Utility & Efficiency	33	2.40	5.00	3.8424	.60778
B. Quality & Reliability	33	2.20	5.00	3.3758	.58258
C. Confidence & Competence	33	2.20	5.00	3.4970	.57254
D. Interaction with GenAI	33	2.80	5.00	3.7939	.52078
E. Impact on Cognition	33	2.40	4.40	3.4848	.52209
F. Concerns about GenAI	33	1.80	5.00	3.8727	.73793

4.3.2 Reliability analysis

As illustrated in Figure 4, the 30-item measure assessing students' perceptions of GenAI use demonstrated high internal consistency (Cronbach's α = .84) based on the responses of 33 participants. The total scale yielded a mean score of 109.33 (SD = 10.96).

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.842	.863	30

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
109.3333	120.042	10.95635	30

Figure 4 Output for the Reliability

4.3.3 Analysis of differences

To examine whether there were significant gender differences in the perceptions of GenAI use, an independent samples *t*-test was conducted between male (N=23) and female participants (N=10) in the survey. Levene's test for equality of variances was non-significant (F=1.687, p=0.204 > α=0.05), indicating homogeneity of variances between the two groups. Results using the equal variances assumed condition revealed no statistically significant difference between male (M=3.72, SD=0.38) and female (M=3.48, SD=0.27) participants, t(31)=1.80, p=.082, 95% CI [-0.03, 0.51]. The mean difference of 0.24 (male > female) did not reach statistical significance at α=.05 (two-tailed). Details are provided in Figure 5.

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Score	Male	23	3.7174	.38269	.07980
	Female	10	3.4767	.26715	.08448

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
Score	Equal variances assumed	1.687	.204	1.800	31	.041	.082	.24072	.13374	-.03203	.51348
	Equal variances not assumed			2.071	24.308	.025	.049	.24072	.11621	.00104	.48041

Figure 5 Output for the Dependent-sample T Test for Gender Difference

The descriptive statistics and one-way ANOVA results comparing scores between STEM (n=20) and Non-STEM (n=13) participants revealed no significant differences between groups (refer to Figure 6). The mean score for the STEM group was 3.65 (SD=0.36, 95% CI [3.49, 3.82]), while the Non-STEM group had a nearly identical mean of 3.63 (SD=0.39, 95% CI [3.39, 3.87]). The assumption of homogeneity of variances was met, as assessed by Levene's test (F=0.125, p=0.726).

The ANOVA results indicated no statistically significant effect of group membership on scores (F (1, 31) =0.029, p=0.866), with a negligible effect sizes (η^2=0.001, 95% CI [0.000, 0.093]). These findings suggest that academic background (STEM vs. Non-STEM) did not significantly influence scores in this sample.

Descriptives

Score

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
STEM	20	3.6533	.35761	.07996	3.4860	3.8207	3.03	4.33
Non-STEM	13	3.6308	.39098	.10844	3.3945	3.8670	2.90	4.10
Total	33	3.6444	.36521	.06358	3.5149	3.7739	2.90	4.33

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Score	Based on Mean	.125	1	31	.726
	Based on Median	.082	1	31	.777
	Based on Median and with adjusted df	.082	1	30.552	.777
	Based on trimmed mean	.108	1	31	.745

ANOVA

Score

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.004	1	.004	.029	.866
Within Groups	4.264	31	.138		
Total	4.268	32			

ANOVA Effect Sizes[a,b]

		Point Estimate	95% Confidence Interval	
			Lower	Upper
Score	Eta-squared	.001	.000	.093
	Epsilon-squared	-.031	-.032	.064
	Omega-squared Fixed-effect	-.030	-.031	.062
	Omega-squared Random-effect	-.030	-.031	.062

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.
b. Negative but less biased estimates are retained, not rounded to zero.

Figure 6 Output for the One-way ANOVA for Discipline Difference

4.4 Findings from the qualitative data

Semi-structured interviews were conducted with eight students (anonymized as A–G) to explore their perceptions of GenAI in academic writing in greater depth. Using six open-ended questions, the interviews were recorded, transcribed verbatim, and analyzed thematically to identify key patterns and themes.

Q1. What challenges do you face when completing academic writing?

Based on students' responses, four key challenges emerged. The most common, reported by 75% of participants, involved source-related difficulties. Student A, B, D, F, G, and H struggled to find "*related or credible materials*", with student H specifically noting the time-consuming nature of locating "*authentic, topic-relevant*" references. A related sub-theme was paraphrasing (Student B, D, F, H), which requires deep text understanding along with strong linguistic competence to accurately and authentically convey the original meaning.

The second challenge, language-related difficulties, was experienced by 62.5% of students. Issues included correcting grammar errors (Student B and G), using appropriate academic vocabulary (Student G and H), constructing "*complex sentences*" (Student E), and maintaining cohesion and logical flow in academic writing (Student E and G).

Next, half of the participants faced challenges with topic development. Student A, C, and F explicitly stated having "*no idea what to write*" or "*how to develop ideas*". Student A and C also mentioned experiencing "*limited perspectives*", highlighting their difficulties with brainstorming and conceptualizing original arguments.

Finally, a small number of students encountered teamwork problems during collaborative writing assignments. Student D and F reported interpersonal issues such as "*personality clashes*", differences in "*communication style*", as well as the necessity to "compromise" when reconciling conflicting ideas with their peers.

Q2. For which of these challenges have you tried using GenAI tools?

Students primarily utilized GenAI tools for **drafting and brainstorming**, such as expanding ideas, creating basic structures, paraphrasing, improving sentence flow, and identifying research topics (Student A, B, E, G, H). It was also commonly employed for **language support**, including finding synonyms, correcting grammar, enhancing academic tone, and suggesting transitions (Student B, D, E, G).

A recurring concern, however, was the **unreliability of AI-generated sourcing and referencing**. Multiple students (A, C, D, H) reported fabricated URLs, irrelevant sources, or entirely fake references, leading to frustration and necessitating manual verification—a process Student D found counterproductive. Consequently, students emphasized the necessity of **human verification and refinement**, noting that AI output often lacked nuance, creativity, or authenticity (Student F, G), exhibited unnatural or mechanical language (E, F, G), and sometimes produced overly complex vocabulary (E).

Therefore, they universally viewed AI as a tool for "rough processing", requiring critical human oversight, substantial editing, and final refinement to ensure quality, avoid plagiarism, and maintain academic integrity (Student A-H). While some students (C, F) perceived **quality variance between different tools** (e.g., ChatGPT vs. DeepSeek), all agreed that AI outputs remain distinct from authentic human writing.

Q3. How has using GenAI tools changed your academic writing process?

The student responses collectively indicate that GenAI tools have substantially transformed their academic writing process. **Efficiency and time-saving** emerged as the most prominent benefits,

emphasized by all participants. Tasks that previously took weeks could now be completed in days or hours. This efficiency stems from AI's ability to **generate ideas and broaden perspectives** (Student A, B, D, F, H), helping students overcome writer's block and explore diverse perspectives; and from its role in **providing scaffolding or model** (Student B, C, H), such as outlines, frameworks, templates, or placeholders that accelerate workflow.

Beyond efficiency, the writing process itself has shifted. Students frequently use GenAI for ongoing **feedback and refinement** (B, C, D, E, H), leveraging it to enhance expression diversity, grammar accuracy, logic coherence, and academic register. While some students (A, C) reported increased confidence from higher-quality output, others noted a more **critical and integrated approach** (F, G, H), treating GenAI outputs as references rather than definitive solutions. This required careful **verification of information** (G) and **critical revision** (D, F, G) to ensure alignment with writing purpose and academic integrity. Concerns about **over-reliance,** unintended **content alteration** (D), and the **iterative time cost** of refining AI suggestions (G) were also acknowledged.

Overall, GenAI tools were seen as valuable for streamlining workflows and providing scaffolding and feedback in academic writing, though their outputs require careful evaluation and personal refinement to meet academic standards.

Q4. Can you describe a time you hesitated to use GenAI for academic writing?

Students consistently reported hesitating to use GenAI due to concerns about **academic integrity** and **potential misconduct**. This hesitation stemmed from the fear of AI-generated content being flagged by detection tools (Student A, C, G) and of crossing the line into plagiarism (Student A, C). Many emphasized the importance of maintaining primary authorship (Student C, F, G), and felt GenAI should serve only as a supplementary tool for tasks like drafting or structuring (Student B, F, G).

Accuracy issues were also frequently cited, including fabricating references (Student C, E, F, H), unverified or misaligned content (Student B, D, E, F), irrelevant examples (Student C), and occasional bias (Student B). To mitigate these risks, students adopted various strategies: extensive editing (Student A), manual verification of sources (Student C, E, H), careful prompting (Student C), and restricting GenAI to specific tasks like summarizing sources (Student G). Some also turned to unconventional methods to navigate system constraints. For instance, Student A used tools like "BadStudent.ai" to evade AI detectors, while Student G switched between various platforms for improved responses. However, the reliability of these approaches remained questioned.

Q5. At which stage of writing do you find GenAI most or least helpful? Why?

Students held varied views on AI's usefulness across writing stages. In **pre-writing**, several students (Student A, B, D, F, and H) found it **most helpful** for efficiently generating diverse ideas, stretching mental bandwidth, accelerating workflow, and saving time. Others (Student C, E) considered it **least helpful,** citing **generic or unhelpful output**, with Student C explicitly avoiding AI entirely at this stage.

Regarding **drafting**, some students (Student A, D, G, H) valued GenAI for overcoming writer's block, organizing thoughts, and structuring content, particularly when articulating preliminary ideas. Others (Student B, C, and F) saw it as **least helpful**, raising concerns about **mechanical text** lacking human nuance **and increased AI detection risks** (Student B); **fabricated evidence or citations** (Student F); and **"academic garbage"** from over-reliance that stifles original thought (Student C).

In revising, many (Student B, C, E, F, and G) considered GenAI **most helpful** for **correcting basic errors and refining sentence structure or logical flow**. This was especially true for students with lower language proficiency (Student E) or for tedious tasks like adjusting language style and formatting (Student C). However, some students expressed different opinions: **unreliable or informal language** without precise instructions (Student A), **potential inaccuracies or plagiarism risks** (Student D), and **limited effectiveness in non-English contexts** (Student H). A recurring theme was the **importance of maintaining human authorship over core ideas and arguments** (Student C, D, F, G), advocating for GenAI's strategic use in mechanical or preparatory tasks rather than as a replacement for genuine intellectual engagement.

Q6. Do you believe training or support would help you use GenAI more effectively?

Students consistently voiced strong support for targeted GenAI training, with particular focus on prompt engineering—the ability to craft precise instructions to yield accurate outputs. Many expressed frustration with ineffective prompting practices and emphasized that mastering this "*art*" (Student A) or "*calibration*" (Student E) is essential for effective GenAI use.

Alongside this core skill, several students (B, D, G) called for more practical, discipline-specific training, noting that existing courses tend to focus on theoretical or ethical dimensions. Some advocated for differentiated learning paths to accommodate varying backgrounds. For example, Student D proposed advanced technical tracks for IT students while discipline-specific applications for humanities, business, and social science students. Student B also implied unique challenges non-programmers face, such as interpreting garbled code outputs.

Furthermore, training should address critical evaluation skills to assess AI outputs for accuracy and reliability (Student F, H), and educate users on the distinct capabilities of different GenAI tools (Student G). A notable secondary theme involved concerns about cognitive dependency, with calls for training to frame GenAI as a supplementary aid rather than a replacement for human thought and effort (Student E, H). Overall, students desire structured, practical guidance that balances technical skills with ethical awareness to maximize GenAI's potential without undermining independent learning.

5. Discussion

The discussion synthesizes the key findings to address the three research questions, exploring the perceived benefits, challenges, and practical applications of these emerging tools (**RQ1**), their influence across six key dimensions (**RQ2**), and the identified needs for future training and support (**RQ3**).

5.1 Perceived benefits, challenges & practical applications

Students generally view GenAI tools as valuable support for academic writing, acknowledging their potential to improve writing quality and facilitate writing process. They employ GenAI tools for a range of purposes, from basic corrections to more advanced skill development. These include fixing grammar and spelling mistakes, refining word choices, articulating ideas more effectively through source integration and summarization, improving the overall coherence and cohesion of their work, and elevating the academic tone (Alharbi, 2023; Mahapatra, 2024; Su et al., 2023; Yan, 2023; Yang, 2024). This pattern suggests that students regard GenAI as a versatile toolkit for navigating the entire writing process, strategically utilizing it to develop both foundational linguistic skills and advanced research capabilities, ultimately enhancing the quality of their academic writing.

Yet, students demonstrate critical awareness of significant challenges, with over-reliance identified as a primary concern, alongside fears about diminished creativity and factual inaccuracy. These concerns align with emerging research indicating that heavy dependence on GenAI may lead to "cognitive atrophy", gradually degrading essential skills such as critical thinking, creativity, and problem-solving (Gerlich, 2025; Grassini, 2023; Habib et al., 2024; Kosmyna et al., 2025). Excessive reliance may also foster passive learning and diminish intellectual inquiry, where students accept AI outputs without sufficient scrutiny (Grassini, 2023; Schei et al., 2024), bypassing the deeper cognitive engagement necessary for genuine understanding and innovation. Another concern is that GenAI outputs can be inaccurate or unreliable—a phenomenon often referred to as "hallucination". As Lingard (2023) notes, evaluating the accuracy of responses from tools like ChatGPT itself requires domain-specific knowledge. When students uncritically outsource their academic work to GenAI and submit generated text verbatim without validation or reflection, they risk producing what is known as "AI slop". This term describes low-quality, low-effort content created by AI, which edges users closer to deepfakes and inauthentic information (Thorp, 2026). Such digital dreck could erode the essential value of higher education by fostering a passive engagement with knowledge, compromising academic integrity, and hindering the development of the intellectual discernment essential for navigating an increasingly complex information landscape.

The findings indicate that the use of GenAI tools in academic writing has become pervasive among university students. Among the Chinese students surveyed, Doubao was the most preferred tool, surpassing international flagship platforms like ChatGPT. This preference reflects a distinctive trend in China, where local advanced technology giants have caught up with their Western counterparts, such as OpenAI, over the past two years. For higher education institutions, the central question is no longer whether to ban these tools, but how to foster a productive and responsible partnership with AI (Halaweh, 2023; Mun, 2024). This calls for clear pedagogical frameworks that reposition GenAI from a potential shortcut to a strategic toolkit—one that supports critical thinking, enhances creativity, and improves learning outcomes (Chan, 2023c).

5.2 The multidimensional impact of GenAI

This study reveals students' complex and nuanced stance toward GenAI in academic contexts. Across six dimensions of academic writing, students

value utility and efficiency but worry about over-reliance and academic integrity. Lower ratings for quality and reliability, and cognitive impact suggest underlying skepticism. No significant differences by gender or academic background were found.

High scores for Utility & Efficiency (Theme A) and Interaction with GenAI (Theme D) align closely with the prevailing narrative of GenAI as a transformative productivity tool (Khalifa & Albadawy, 2024; Noy & Zhang, 2023). For students, adopting GenAI is often a pragmatic choice—driven by immediate convenience, efficiency gains, and the pursuit of better academic outcomes—rather than confidence in the superior quality of AI-generated content or its long-term skill development. Moreover, GenAI enables accessible, learner-friendly interaction anytime, anywhere—an advantage traditional education cannot match.

Despite widespread practical adoption, significant concerns remain. The theme of Concerns about GenAI (Theme F) underscores pervasive anxiety over academic ethics. This tension indicates that students are not uncritical users but are grappling with the moral dilemmas of tools they find useful. As Stockwell (2024) mentions, the wholesale adoption of GenAI-curated contents can cause users' long-lasting insecurity and even psychological anxiety. This unease is further reflected in lower ratings for Quality & Reliability (Theme B) and Impact on Cognition (Theme E), which point to a foundational skepticism. While GenAI can accelerate efficiency, such gains may sometimes come at the cost of quality and reliability. More importantly, if students consistently rely on GenAI to perform the "heavy lifting" of writing, they may fail to build their own "intellectual muscles" over time. This heavy reliance on instant solutions risks jeopardizing their fundamental cognitive development: the ability to formulate ideas, organize thoughts, consider multiple perspectives, and support arguments.

5.3 The path forward

Effectively integrating GenAI into academic routines requires a comprehensive, student-centered framework developed through cross-campus stakeholder engagement. Such a framework must address pedagogical, operational, and ethical dimensions (Chan, 2023c). An AI Ecological Education Policy Framework—grounded in foundational skills, comprehensive AI literacy, differentiated pathways, and supportive policies—can guide ethical and effective student GenAI use while mitigating future burdens and costs.

5.3.1 The pedagogical dimension

The pedagogical dimension focuses on how students learn to use GenAI effectively within their academic contexts. Proficiency in prompting is essential, enabling students to move beyond simple queries to crafting precise, context-aware instructions that yield accurate, substantive outputs (Ding et al., 2023; Walter, 2024). As Cain (2023) notes, prompt engineering serves as a "steering mechanism," allowing users to guide AI toward optimal results. Students' self-reported frustration with ineffective prompting practices underscores a critical gap between casual use and strategic engagement—one that explicit pedagogical intervention can bridge. With this proficiency, learners gain precise control over response specificity, tone, style, and perspective.

Beyond prompting mechanics, students need comprehensive AI literacy—the skills to assess AI critically, interact with it productively, and utilize it across academic, professional, and personal contexts (Long & Magerko, 2020). This involves grasping AI's fundamental capabilities and limitations while developing the critical ability to evaluate outputs, protect privacy, identify potential bias, verify sources, and interact effectively across diverse settings (Chan & Colloton, 2024; Mills et al., 2024). Students increasingly recognize that while AI tools offer unique functionalities, all remain prone to inaccuracies, hallucinations, and biases that demand ongoing human oversight.

Teachers play a pivotal role in scaffolding this learning. Rather than assuming digital nativeness equates to AI proficiency, teachers must intentionally embed prompt engineering and AI literacy instruction within course curricula. This could include demonstrating high-quality prompting, creating structured practice opportunities, encouraging students to build customizable prompt libraries tailored to disciplinary contexts, and engaging them in more complex tasks. Instead of adding standalone modules to overcrowded curricula, GenAI competencies should be woven into disciplinary learning (Lo, 2025). This integrated approach allows students to build on foundational concepts introduced early in their programs and engage with more complex applications in advanced courses.

5.3.2 The operational dimension

The operational dimension addresses the practical implementation of training and support structures that make AI literacy accessible and relevant to all students. Academic staff—including curriculum developers, learning designers, and academic support units—must take the lead. A key

finding with direct implications for institutional operations is students' call for differentiated training pathways, offering a clear blueprint for designing a targeted, effective support ecosystem. This aligns with frameworks advocating for contextualized AI education responsive to varied academic backgrounds and trajectories (Chan & Colloton, 2024).

Implementing differentiated pathways requires mapping GenAI applications across disciplines. Humanities students might focus on GenAI as a research assistant for literature reviews, source synthesis, and stylistic analysis. Business students might explore GenAI for market analysis, case study development, and strategic simulation. Social science students could examine GenAI's role in qualitative data analysis and survey development. IT students, would benefit from deeper engagement with model architectures, fine-tuning, and ethical AI development. This differentiated approach honors students' varied starting points while building toward sophisticated, context-aware AI integration.

The operational dimension also encompasses the resources, platforms, and support systems that enable this training. Institutions and academic staff must ensure equitable access to GenAI tools and learning opportunities, actively bridging digital divides to prevent technological transformation from exacerbating existing inequalities.

5.3.3 The ethical dimension

The ethical dimension focuses on the values, principles, and guidelines governing appropriate AI use while safeguarding higher education's core priorities. This dimension falls primarily to policy-makers and institutional leaders, who set the overarching tone, values, and rules for the academic community.

Preserving learner agency and cognitive skills requires actively mitigating over-reliance on GenAI. Students should be consistently guided to view GenAI as an intellectual springboard—one that augments, rather than replaces, human critical thinking and independent effort. Research supports these concerns: heavy AI dependence can diminish motivation and engagement, encourage passive solution-seeking over deep learning (Krullaars et al., 2023), impair critical evaluation abilities (Passi & Vorvoreanu, 2022), and increase risks of misinterpretation and research misconduct (Xie et al., 2021).

To navigate an AI-integrated future, institutions must adopt clear policies and structured ethical guidelines that preserve learner agency and core cognitive skills while equipping students with adaptable competencies for lifelong learning (UNESCO, 2024). Policymakers bear responsibility for ensuring these guidelines become operational rather than merely aspirational. Central to this effort is fostering student discernment—the ability to determine whether, when, and how to use AI tools appropriately within a human-centered approach to problem-solving (UNESCO, 2024). To support the development of such discernment, teachers, academic staff, and policymakers can collaborate in creating coherent, scaffolded opportunities for students to practice these skills across disciplines and learning contexts, thereby helping them maintain their own intellectual agency.

5.4 Limitation and future work

This study has several limitations. First, the findings are based on a small sample of 33 participants with no control group, which restricts generalizability and causal inference. Second, the sample consisted only first-year undergraduate students. As newcomers to higher education, their experiences may not reflect those of the wider student population, nor capture the diversity of perspectives across different academic stages. Moreover, given their limited exposure to AI, participants may lack the curricular knowledge, practical experience, and critical frameworks for engaging with GenAI that more senior students—particularly those in technical or AI-related fields—might possess. These factors constrain both the generalizability and depth of the findings.

Future research should address these limitations by expanding the participant sample. While this research focused exclusively on first-year EAP students with lower language proficiency, subsequent studies could investigate the writing development of students in Years 2 through 4 to explore how the use and perception of GenAI evolve over time. A comparative analysis between STEM and non-STEM majors would also yield valuable insights, potentially revealing how disciplinary differences shape students' writing strategies and challenges, thereby enabling more tailored and effective EAP instruction.

6. Conclusion

This study explores first-year EAP students' perceptions of using GenAI tools in academic writing, shedding light on how these emerging technologies shape university learning experiences. Guided by three research questions, it contributes to the literature on GenAI in higher education and offers

implications for pedagogy, operation, policy, and future research. The findings suggest that higher education's central challenge lies not in prohibiting or simply adopting GenAI, but in cultivating AI-literate learners who balance technological use with critical thinking and ethical judgment.

Conflict of Interest

The author declares that she has no conflicts of interest to this work.

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