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Reconsidering Student Agency in the Era of AI Writing Tools: A Quantitative Study from Pakistani Higher Education

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ABSTRACT

This study examines differences in confidence, independence, and authorship among university students based on the level of Artificial Intelligence (AI) tool usage in academic writing. A quantitative cross-sectional survey design was employed with 200 participants, who were categorised as frequent, occasional, or non-users of AI writing tools. Descriptive statistics and one-way analysis of variance (ANOVA) were used to compare the responses between groups. The findings showed that frequent AI users reported significantly higher confidence in completing academic writing tasks than did non-users. Findings regarding independence and authorship were interpreted with caution because of lower internal consistency within the scales; therefore, they were analysed at the item level. Independence showed mixed item-level findings, with significant differences observed for some independence-related items but not others. There were no statistically significant differences in authorship across the AI usage groups, indicating limited evidence of variability in students' perceptions of writing voice and ownership. This study contributes to the ongoing discussion on AI-assisted academic writing in the EFL (English as Foreign Language) context and highlights the significance of guiding students towards the responsible and reflective use of AI in academic writing settings. These findings have implications for post-secondary educators and higher education policymakers.

Keywords: academic writing agency, AI writing tools, authorship, confidence, EFL higher education

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1.0 Introduction

AI has been a significant tool in postsecondary students' academic writing processes in recent years. Tools like ChatGPT, Grammarly, and QuillBot have been utilized in idea generation, content production, grammar improvement, and revision. Studies have shown that AI has immensely influenced the way students write, offering instant feedback and assistance for academic writing activities (Dwivedi et al., 2023; Lund et al., 2025). In the case of EFL learning contexts, empirical evidence shows that AI provides significant scaffolding for academic writing processes through grammatical accuracy, vocabulary growth, and revision, especially for students facing language and cognitive challenges during academic writing (Alkamel & Alwagieh, 2024; Tran, 2025; Wiboolyasarini et al., 2024). Overall, it is clear from these findings that AI has been integrated into various stages of the academic writing process in postsecondary education institutions around the globe, including those in the Global South.

Despite the potential benefits of AI (Artificial Intelligence), concerns remain regarding its relationship with the essential components of writing development. Previous studies highlight the concerns between technological support and over-dependency which shows that students may have increased their confidence while at the same time losing control over decision-making, originality, and critical thinking (Moorhouse et al., 2025). Early findings on the “agency gap” suggest that students’ AI literacy and the frequency with which they rely on AI tools shape their ability to write independently once AI assistance is removed (Jin et al., 2025). The literature on improving writing quality, productivity, and motivation is growing. However, very few studies are looking into Academic Writing Agency (AWAG) as a multidimensional construct that includes confidence, independence, and authorship; furthermore, there are no meaningful comparisons between students using different levels of AI Tools (i.e. Frequent vs. occasional Users) concerning whether reliance on heavy usage of AI Tools weakens or strengthens academic writing agency (AWAG).

In EFL contexts, particularly in Pakistan, students face several overlapping linguistic difficulties, limited access to academic writing training, and rapid adoption of AI technologies. Many EFL learners’ access or utilise AI-assisted tools to support their academic writing (Alghasab, 2025) by aiding the missing elements of grammar, vocabulary, rhetorical structure, developmental ideas, etc. As such, empirical research examining the extent to which these forms of support affect students’ confidence in their academic writing ability, level of ownership of their written output, etc., is lacking.

Institutional policy and instructional practices in Pakistan have developed more slowly than students’ adoption of AI tools, creating an urgent need for evidence-based guidance on how learners engage with AI and how such engagement affects academic writing. Addressing this need, the present study investigates differences in university students’ academic writing-related perceptions, including independence, confidence, and authorship, across varying levels of AI writing tool usage in Pakistani EFL higher education. This study further examined how these perceptions varied among frequent, occasional, and non-users of AI writing tools. This research incorporates new contexts in which the topic has not been thoroughly studied using quantitative methodology, thereby advancing current debates on AI-assisted academic writing, EFL pedagogy, and technology-induced autonomy among EFL learners. It enhances the discussion theoretically by placing the agency of academic writing in the current context of generative AI discourse and identifying responsible uses of AI within classroom curricula in terms of pedagogy.

1.1 Research Objective

To examine differences in university students’ academic writing-related perceptions, particularly independence, confidence, and authorship, across varying levels of AI writing tool usage in Pakistani EFL context.

1.2 Research Question

How do university students’ confidence, independence, and authorship differ across varying levels of AI writing tool usage in the Pakistani EFL context?

1.3 Hypotheses

H1: Writing independence will differ significantly among frequent, occasional, and non-users of AI writing tools.

H2: Students who frequently use AI writing tools will report significantly higher writing confidence than occasional and non-users.

H3: Perceived authorship will differ significantly among frequent, occasional, and non-users of AI writing tools.

2.1 AI Writing Tools and Academic Writing Outcomes in Higher Education

AI writing tools have become increasingly central to university students' academic writing processes. These tools have influenced students' creative processes, drafting, revision, and finalisation of written work. Dwivedi et al. (2023) and Lund et al. (2025) reported that AI writing tools have transformed the way university students write by providing instant linguistic assistance and multiple opportunities for feedback throughout the writing process. Previous studies have also demonstrated that AI tools help EFL students improve writing fluency and accuracy by providing immediate feedback and revision suggestions that enhance their writing skills (Alkamel & Alwagieh, 2024; Tran, 2025; Wiboolyasarin et al., 2024). The increasing use of AI tools in educational settings has enabled students to overcome writing challenges and gain greater control over their language production. Research on technology-mediated writing has likewise shown that online learning platforms and writing modules support students' writing development by providing accessible, interactive, and feedback-rich learning environments (Ramasamy et al., 2025).

EFL-specific studies have also supported this trend. Teng (2024) found that EFL students perceived ChatGPT as a valuable source of support during the revision process. Similarly, Werdiningsih et al. (2024) reported that students found ChatGPT helpful in addressing writing difficulties while expressing concerns about authenticity and the potential for overreliance on AI-generated content. Amani and Bisriyah (2025) further demonstrated that students used AI collaboratively throughout multiple stages of the writing process to develop ideas, improve organisation, and produce more coherent written work. Collectively, these studies indicate that AI writing tools serve as valuable writing partners that influence both the writing process and its outcomes in higher education.

2.2 AI Tools, Confidence, and Self-Regulated Writing

Numerous studies suggest that AI writing tools can support students' writing confidence and self-regulation. Amani and Bisriyah (2025) reported that EFL learners experienced greater writing confidence when using AI to set goals, monitor their progress, and revise their drafts. Research on automated writing evaluation systems has reinforced this finding. DiNçel and Saygi (2024) found that strategic use of Grammarly was associated with increased writing self-efficacy and improvements in self-regulated learning behaviours among Chinese EFL learners. Although Grammarly has been associated with higher writing confidence and motivation, some students also expressed concerns about becoming overly dependent on the application.

Generative AI tools appear to have similar effects on the writing process. Teng (2024) reported that ChatGPT reduced learners' writing anxiety and increased their perceived competence. Likewise, Deep et al. (2025) found that ChatGPT enhanced engagement and writing motivation among higher education ESL students. These findings suggest that AI tools often strengthen learners' writing confidence. However, most existing studies focus exclusively on confidence and do not examine how it interacts with writing independence and authorship, nor do they compare confidence across different levels of AI tool use.

2.3 AI Use, Autonomy, and Academic Writing Agency

A growing body of research has examined how AI tools influence students' autonomy, authorship, and academic writing agency. Kim et al. (2026) showed that learner agency in AI-supported collaborative writing depends largely on the extent to which students actively monitor, evaluate, and revise AI-generated output. Students who critically evaluated AI suggestions exercised greater agency over their writing than those who accepted AI-generated text without substantial revision.

Several studies conducted in EFL contexts have supported these concerns. Werdiningsih et al. (2024) found that although students benefited from AI-generated ideas, they were concerned that excessive reliance on AI reduced their sense of ownership over their writing. Similarly, Teng (2024) reported tensions between AI assistance and independent decision-making during the writing process. Conceptual work has also identified authorship and ownership as central issues in AI-assisted writing. Bozkurt (2024) argued that AI-generated content increasingly blurs the boundaries between human and machine authorship. Likewise, Jin et al. (2025) introduced the concept of an "agency gap," suggesting

that students with lower levels of AI literacy may struggle to write independently when AI support is unavailable.

These findings align with broader discussions of authorial voice in second language writing, in which writers maintain authority over their texts through deliberate rhetorical and linguistic choices (Hyland, 2019). In AI-assisted writing, however, many of these decisions are increasingly negotiated between student writers and AI systems.

2.4 Patterns of AI Use Across Student Groups

Although numerous studies have documented the frequency and purposes of students' AI tool use, relatively few have linked usage patterns to agency-related outcomes. Amani and Bisriyah (2025), for example, identified distinct AI-use profiles among EFL students, ranging from limited use for editing to more extensive use for idea generation and content development. Cui (2025) examined factors influencing students' acceptance and use of AI, including perceived usefulness and writing self-esteem, while Olszak and Krajka (2024) observed that more advanced students employed a wider range of AI-assisted strategies when composing academic texts. Research on Grammarly has similarly shown variation in usage patterns, with some students using the tool occasionally and others relying on it more consistently for linguistic monitoring and revision (Yousofi, 2022).

Despite this growing body of research, few studies have examined whether frequent users, occasional users, and non-users of AI tools differ in their academic writing agency, particularly in EFL higher education contexts. Consequently, the relationship between the extent of AI use and key dimensions of academic writing agency, including independence, confidence, and authorship, remains insufficiently understood.

2.5 Theoretical Framework

This study draws on Linguistic Agency Theory and Formative Assessment Theory to explain how AI writing tools may influence students' academic writing agency.

According to Linguistic Agency Theory, agency refers to individuals' ability to make choices and act through language in different social contexts (Ahearn, 2001). Within academic writing, students' agency is reflected in their ability to make autonomous decisions, critically evaluate suggestions, maintain ownership of their ideas, and exercise control over the final written product. From this perspective, AI writing tools may either strengthen or weaken students' agency depending on how they are used. Students who critically evaluate, revise, and selectively incorporate AI-generated suggestions are more likely to maintain control over their writing than those who accept AI-generated content without careful evaluation (Jin et al., 2025; Kim et al., 2026; Werdiningsih et al., 2024). Thus, Linguistic Agency Theory provides a useful framework for examining differences in students' confidence, independence, and authorship across varying levels of AI tool use.

Formative Assessment Theory highlights the importance of feedback in guiding learners' decisions, supporting learning, and promoting self-regulation (Black & Wiliam, 1998). In AI-assisted writing, automated feedback enables students to identify errors, revise drafts, evaluate their performance, and make informed writing decisions. Previous research has shown that AI-generated feedback can facilitate revision, reduce writing difficulties, and improve learners' confidence and competence (Teng, 2024; Tran, 2025; Wiboolyasarin et al., 2024). Nevertheless, the educational value of AI-generated feedback depends on students' ability to evaluate these suggestions critically and integrate them appropriately with their own judgement (Kim et al., 2026; Werdiningsih et al., 2024). AI-generated suggestions may also influence students' perceptions of ownership, authenticity, and authorial voice (Bozkurt, 2024; Jin et al., 2025).

Together, these two theoretical perspectives provide a conceptual foundation for examining how students negotiate confidence, independence, control, and authorship while using AI writing tools. Linguistic Agency Theory explains how students exercise authority over their writing, whereas Formative Assessment Theory explains how AI-generated feedback may influence revision, self-

evaluation, and writing confidence. Their combined application supports the comparison of academic writing-related perceptions across different levels of AI tool usage.

2.6 Synthesis and Link to the Present Study

Previous studies have shown that AI writing tools provide valuable linguistic support, facilitate revision, and improve students' writing confidence. Nevertheless, concerns regarding overreliance on AI, authorship, and writing independence remain prominent in the literature. More importantly, the relationship between writing confidence, independence, and authorship across different levels of AI tool use remains insufficiently understood. Despite the increasing adoption of AI writing technologies, empirical evidence from EFL contexts such as Pakistan remains limited.

To address these gaps, the present study investigates differences in university students' perceptions of confidence, independence, and authorship across varying levels of AI writing tool usage, including frequent users, occasional users, and non-users. By examining these dimensions simultaneously in an under-researched Pakistani EFL higher education context, this study extends current understanding of academic writing agency in AI-assisted writing. Unlike many previous studies that focus primarily on the benefits of AI-assisted writing, this study also considers concerns related to overreliance on AI, students' ability to evaluate AI-generated content critically, and their perceptions of authorship and writing ownership.

3.0 Methods

3.1 Research Design

This research employed the quantitative cross-sectional survey design that is used to explore academic writing attitudes of EFL university students who differed in their use of AI writing tools. As Creswell and Creswell (2018) state that the use of such a research design is appropriate for hypothesis testing and for making comparisons between pre-defined groups of people employing standardized measurements. This research design allowed comparing three dimensions of academic writing independence, confidence, and authorship between the groups of participants having different degrees of experience with AI writing tools such as frequent, occasional and non-users.

3.2 Participants and Sampling

A total of 200 complete and eligible responses were taken from institutions located in Punjab, Pakistan; COMSATS University Islamabad (Lahore Campus) and University of Narowal. The total number of students in both institutions was above 10,000, which served as the basis for calculating the sample size.

The Cochran formula was applied to calculate the sample size for the survey-based research. A non-probability sampling method involving convenience sampling technique with purposive criteria for eligibility was adopted as the research intended to target university students that used their writing skills with or without AI tools. The survey link was sent out via WhatsApp group chats, academia, teachers, friends, and academic networks of the researcher. As the survey link was disseminated among several academic communities, the exact number of students who received the survey could not be known. Thus, the sample size calculated was used as a general guide for adequacy of participants instead of generalisability to the population. With a 95% confidence level and a 5% margin of error, the sample size estimated was 196 participants. The study collected 200 valid responses.

In the study, participants willingly participated in the research and provided their consent prior to taking part in the survey. They were divided into three groups depending on their self-reported usage of AI writing tools, that is frequent users, occasional users, and non-users. Frequent users refer to those individuals who use AI tools on a regular basis or where the frequency is several times per week. Occasional users refer to those individuals who report irregular usage of AI writing tools or only use them a few times a month while non-users report not using AI tools in their academic writing.

Although non-users had no direct experience using AI writing tools, they were retained in the sample to provide a comparative perspective regarding AI-supported writing practices. Their responses to AI-related items reflected their understanding and perceptions of AI-assisted writing rather than their personal frequency of AI tool use.

While interpreting the comparison between the different groups who used AI, the fact that the respondents were not equally distributed into these three groups, particularly because of the low number of non-users, needs to be taken into account. Since the data was gathered through only two universities in Punjab, the results cannot truly reflect the perceptions of the students in the other parts of Pakistan. For future studies, it would be better to include participants from more universities as well as multiple provinces, so the sample is more diverse and balanced across the regions.

3.3 Instruments and Measures

Data were collected using an online questionnaire administered through Google Forms. The instrument consisted of two sections. The first section measured students' frequency of using AI writing tools for academic tasks such as idea generation, drafting, revising written work, and correcting grammatical errors. Based on their self-reported frequency of use, participants were categorised into three AI usage groups: frequent users, occasional users, and non-users.

The second section examined students' perceived independence, confidence, and authorship in AI-supported writing through 12 Likert-scale items. Of these items, four measured confidence, six measured independence, and two measured authorship. Independence referred to students' perceptions of their ability to develop, evaluate, and revise academic work without relying heavily on AI. Confidence referred to students' belief in their ability to successfully complete academic writing tasks. Authorship reflected students' perceptions of ownership, originality, writing voice, and control over their written work when using AI.

The questionnaire was guided by past studies regarding AI-enabled writing, self-regulated learning, and writing self-efficacy (Amani & Bisriyah, 2025; Burkhard, 2022; Chan & Hu, 2023). Items related to confidence were modified from past research related to writing self-efficacy and AI-enabled learning, while items related to independence and authorship were constructed to reflect students' AI-assisted academic writing experience within the Pakistani EFL context. Only minor changes were made to the wording of the adapted items, in a way that would help clarity and local relevance, while still keeping the original meaning.

Prior to administering the study, the questionnaire was assessed by the research supervisor, an expert in research, for its clarity, pertinence, and appropriateness within the specific context. It helped ensure the content validity of the instrument by making sure that the questionnaire was a representative measure of the constructs of interest: writing confidence, independence, and authorship. Considering the supervisor's comments, slight wording changes were made to make items more understandable without distorting their meaning.

After the expert assessment, the survey instrument was tested with three university students to make sure that the instructions, definitions, and answer options were comprehensible to the targeted group. The pre-test results showed that the questionnaire was clear and no substantial changes to the wording were required except for some minor adjustments. No questions were discarded prior to data collection. All questions were scored using a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Reliability analysis was conducted to assess the internal consistency of the three dimensions. The confidence dimension showed acceptable reliability (Cronbach's $\alpha = .703$) and was therefore analysed as a composite variable. However, the independence (Cronbach's $\alpha = .452$) and authorship (Cronbach's $\alpha = .385$) dimensions showed low internal consistency. Therefore, these dimensions were analysed at the item level rather than as composite scales. Findings related to independence and authorship should consequently be interpreted cautiously and regarded as exploratory rather than definitive measures of academic writing agency.

The complete questionnaire used in this study is provided in Appendix A.

3.4 Data Collection Procedures

The data was collected through an online survey conducted from 13th September 2025 to 27th September 2025. The online survey form was designed through Google forms, and the survey form link was sent to the students of COMSATS University Islamabad, Lahore campus and University of Narowal. The survey link was distributed through student academic groups, departmental mailing lists and other informal student networks as well as researcher's academic contacts. The researcher had no access to institutional student mailing list.

Before completing the questionnaire, participants were provided with a description of the study, including its purpose, the voluntary nature of participation, and their right to withdraw before submitting their responses. Participants were asked to provide informed consent before proceeding to the questionnaire. No personally identifiable information was collected, and all responses were submitted anonymously.

All items in the questionnaires were set to mandatory using Google Forms, thus only complete responses were accepted as answers. At the end of the data gathering process, the researcher screened all responses submitted to verify that these met the inclusion criteria of the study and detect any duplication of responses. There were no duplications found in the final set of responses. This resulted in all 200 responses being complete and usable for analysis.

3.5 Data Analysis

SPSS was used to analyse the data. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were calculated to summarise participants' demographic characteristics and responses to the questionnaire items. The internal consistency of the three dimensions of academic writing agency was assessed using Cronbach's alpha.

Before conducting the one-way analysis of variance, the assumptions of normality, homogeneity of variance, and independence of observations were assessed. Minor deviations from normality were observed; however, the one-way ANOVA was considered sufficiently robust given the overall sample size. The assumption of homogeneity of variance was assessed using Levene's test. Since the assumption was satisfied for the analysed variables, standard one-way ANOVA and Tukey's HSD post-hoc comparisons were used for significant results.

To address the research questions, group differences among frequent, occasional, and non-users of AI writing tools were examined. When a statistically significant standard ANOVA result was obtained, Tukey's HSD test was used to identify specific group differences. When Welch's ANOVA was statistically significant and the homogeneity assumption was violated, Games–Howell post-hoc comparisons were used to identify specific group differences.

Confidence was analysed as a composite variable because the scale showed acceptable internal consistency. Independence and authorship were analysed at the item level because their scales showed low internal consistency. Statistical significance was set at $p < .05$.

3.6 Ethics and Consent

This study was conducted in accordance with the established guidelines for studies involving human participants. Data were obtained from an anonymous online survey questionnaire, and no personal identifiable data were collected from the participants. The entirely anonymous and voluntary nature of the research meant that there was little or no risk to participants. Prior to data collection, informed consent was obtained from all the participants. Formal ethical approval was not required for this study according to the institutional policy for anonymous, minimal-risk educational research involving voluntary survey participation.

4.0 Results

4.1 Demographic Characteristics

This study included 200 participants from two higher education institutions in Punjab, Pakistan: COMSATS University Islamabad, Lahore Campus, and the University of Narowal. Of the participants, 73% were female and 27% were male. As shown in Table 1, 37% of respondents were aged 17 to 20, 52% were aged 21 to 24, and 11% were aged 25 years or above.

Regarding academic level, 70.5% of the respondents were undergraduate students, 25% were master's students, 1% were doctoral students, and 3.5% were enrolled in other academic programmes. Most participants reported frequent use of AI writing tools, with 57.5% classified as frequent users and 38% as occasional users. Only 4.5% of the participants reported that they did not use AI writing tools.

Participants also reported varying levels of English proficiency. Most rated their proficiency as good (62%), followed by fair (24%), excellent (12.5%), and poor (1.5%). The unequal distribution of participants across the AI usage groups, particularly the small number of non-users, should be considered when interpreting comparisons among the groups. Participants came from a range of academic disciplines, including languages, linguistics, computer science, education, psychology, and engineering. However, the number of respondents within individual disciplines was insufficient for meaningful discipline-based comparisons.

Table 1

Demographic Characteristics of Participants (N = 200)

Variable	Category	n	%
Age	17–20	74	37
	21–24	104	52
	25 or above	22	11
Gender	Female	146	73
	Male	54	27
Academic Level	Undergraduate	141	70.5
	Master's	50	25
	PhD	2	1
	Other	7	3.5
AI Writing Tool Usage	Frequent	115	57.5
	Occasional	76	38
	Non-user	9	4.5
Self-rated English Proficiency	Excellent	25	12.5
	Good	124	62
	Fair	48	24
	Poor	3	1.5

4.2 Reliability of Measures

Three Cronbach's alpha coefficients were calculated to assess the internal consistency of the three dimensions of academic writing agency. As shown in Table 2, the confidence scale demonstrated acceptable internal consistency ($\alpha = .703$), meeting Nunnally's (1978) recommended minimum value of .70. It was therefore used as a composite variable in the subsequent analysis.

In contrast, the independence and authorship dimensions showed low internal consistency, with Cronbach's alpha coefficients of $\alpha = .452$ and $\alpha = .385$, respectively. These dimensions were therefore not used in scale-level analyses and were instead examined at the item level.

Table 2

Reliability Coefficients (Cronbach's α) for Academic Writing Agency Dimensions

Construct	No. of Items	Cronbach's α
Confidence	4	0.703
Independence	6	0.452
Authorship	2	0.385

4.3 Descriptive Statistics for Confidence

The confidence construct was analysed as a composite score based on the four confidence items because it demonstrated acceptable internal consistency (Cronbach's $\alpha = .703$). Table 3 presents the descriptive statistics for writing confidence across the three AI usage groups, and higher scores indicate greater perceived writing confidence.

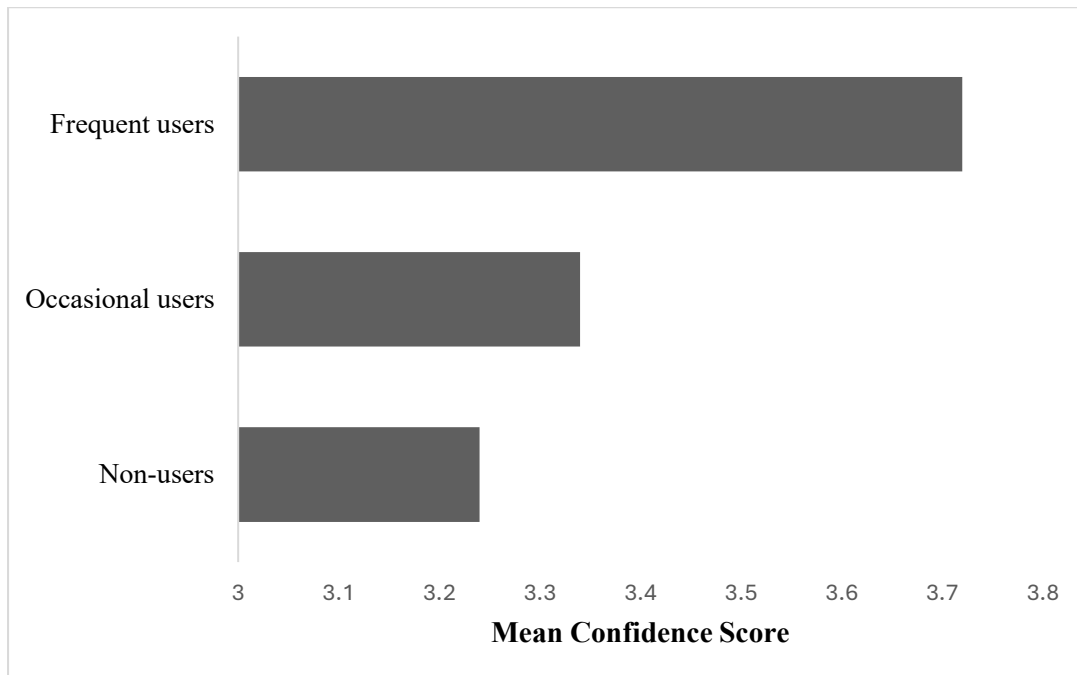
Table 3

Descriptive Statistics for Writing Confidence by AI Usage Group

AI Usage Group	N	Mean	SD
Non-users	9	3.24	0.83
Occasional users	76	3.34	0.57
Frequent users	115	3.72	0.53

Figure 1

Mean Writing Confidence Scores Across AI Usage Groups



To determine whether writing confidence differed significantly across AI usage groups, a one-way analysis of variance (ANOVA) was conducted. The ANOVA results are provided in Table 4.

Table 4

One-way ANOVA for Writing Confidence across AI Usage Groups

Source	SS	df	MS	F	p
Between Groups	7.615	2	3.808	12.070	< .001
Within Groups	62.143	197	0.315		
Total	69.758	199			

Because the one-way ANOVA revealed a statistically significant overall difference in writing confidence across the three AI usage groups, further analysis was required to identify where the specific group differences occurred. Therefore, Tukey's Honestly Significant Difference (HSD) post-hoc test was conducted to compare the mean writing confidence scores of frequent users, occasional users, and non-users in pairs. This test was used to determine which groups differed significantly while controlling for the increased risk of a Type I error associated with conducting multiple comparisons. The results of the pairwise comparisons are presented in Table 5.

Table 5

Tukey HSD Post-hoc Test for Writing Confidence

Comparison	Mean Difference	p-value
Frequent vs. Non-users	0.476	.040
Frequent vs. Occasional	0.383	< .001

Comparison	Mean Difference	p-value
Occasional vs. Non-users	0.092	.887

Note. Positive mean differences indicate higher confidence scores for the first group listed in each comparison.

The results show there was a significant difference in writing confidence between the three groups of AI usage, $F(2, 197) = 12.07$, $p < .001$, with a medium effect size of $\eta^2 = .109$. The results of Tukey HSD post-hoc comparisons showed that individuals who used AI frequently had significantly higher writing confidence than non-users and occasional users ($p = .040$ and $p < .001$, respectively). But no statistical difference was observed between occasional users and non-users ($p = .887$). These results indicate that students who used AI writing tools on a regular basis showed greater confidence in their writing than those in both the other groups.

4.4 Descriptive Statistics for Independence

Because the independence dimension demonstrated low internal consistency, the six items were analysed individually rather than combined into a composite score. Table 6 presents the means and standard deviations for each item across non-users, occasional users, and frequent users.

Overall, frequent users reported higher mean scores on several items, particularly those related to making final writing decisions, rejecting unsuitable AI suggestions, and feeling more independent when using AI tools. However, the differences were smaller for checking AI accuracy, viewing AI as support for critical thinking, and accepting AI outputs without much thought. Separate one-way ANOVAs were therefore conducted to determine whether these observed differences were statistically significant. The results are summarised in Table 7.

Table 6

Descriptive Statistics for Independence Items Across AI Usage Groups

Independence Item	AI Usage Group	N	Mean	SD
I make the final decisions about wording and structure, even when I use AI.	Non-users	9	2.78	1.394
	Occasional users	76	3.47	1.021
	Frequent users	115	3.90	0.968
I can reject AI suggestions if they do not match my intended meaning.	Non-users	9	3.33	0.866
	Occasional users	76	3.88	1.013
	Frequent users	115	4.22	0.876
I check the accuracy and relevance of AI suggestions before using them.	Non-users	9	3.00	0.866
	Occasional users	76	3.65	1.048
	Frequent users	115	3.69	1.003
AI tools support, but do not replace, my own critical thinking.	Non-users	9	3.22	0.972
	Occasional users	76	3.73	1.177
	Frequent users	115	3.94	1.003
I sometimes accept AI outputs without much thought.	Non-users	9	2.89	0.928
	Occasional users	76	3.17	1.152

Independence Item	AI Usage Group	N	Mean	SD
I feel more independent in my writing when I use AI tools.	Frequent users	115	3.34	1.099
	Non-users	9	3.22	1.394
	Occasional users	76	3.23	1.062
	Frequent users	115	3.85	0.966

Note. N = number of participants; SD = standard deviation.

Separate one-way ANOVAs were conducted to determine whether responses to each of the six independence items differed across the three AI usage groups: frequent users, occasional users, and non-users. Each item was analysed separately because the independence dimension did not demonstrate sufficient internal consistency to support the use of a composite score. The analyses examined whether the observed differences in group mean scores were statistically significant. The results for all six independence items are presented in Table 7.

Table 7

One-way ANOVA Results for Independence Items Across AI Usage Groups

Independence Item	SS (Between)	SS (Within)	SS (Total)	df	F	p
Final decisions about wording and structure	16.782	199.093	215.875	2,197	8.303	< .001
Reject AI suggestions	10.346	170.249	180.595	2,197	5.986	.003
Check AI accuracy	3.940	202.415	206.355	2,197	1.917	.150
AI supports critical thinking	5.548	227.327	232.875	2,197	2.404	.093
Accept AI without much thought	2.924	242.071	244.995	2,197	1.190	.306
Feel more independent when using AI	18.601	207.779	226.380	2,197	8.818	< .001

Post-hoc comparisons were conducted only for the independence items that showed statistically significant differences in the overall one-way ANOVA. Tukey's Honestly Significant Difference (HSD) test was used to identify which specific AI usage groups differed from one another. The results of these pairwise comparisons are presented in Table 8.

Table 8

Tukey HSD Post-hoc Comparisons for Significant Independence Items

Independence item	Comparison	Mean difference	p
I make the final decisions about wording and structure, even when I use AI.	Frequent users vs. non-users	1.118	.004
	Frequent users vs. occasional users	0.448	.008

Independence item	Comparison	Mean difference	p
I can reject AI suggestions if they do not match my intended meaning.	Occasional users vs. non-users	0.670	.144
	Frequent users vs. non-users	0.884	.018
	Frequent users vs. occasional users	0.349	.032
I feel more independent in my writing when I use AI tools.	Occasional users vs. non-users	0.535	.234
	Frequent users vs. non-users	0.630	.182
	Frequent users vs. occasional users	0.615	< .001
	Occasional users vs. non-users	0.015	.999

Note. Tukey HSD post-hoc comparisons are reported only for independence items that showed statistically significant overall one-way ANOVA results ($p < .05$).

4.5 Descriptive Statistics for Authorship

The authorship dimension showed low internal consistency. Therefore, the results were interpreted cautiously and analysed at the item level rather than as a single composite scale. Table 9 presents the descriptive statistics for the two authorship items across the three AI usage groups.

Table 9

Descriptive Statistics for Authorship Items by AI Usage Group

Authorship Item	AI Usage Group	N	Mean	SD
I can adapt my writing voice and style without relying on AI.	Non-users	9	3.22	0.83
	Occasional users	76	3.49	1.09
	Frequent users	115	3.47	1.01
	Total	200	3.47	1.03
My final draft still sounds like me, even if AI supported my process.	Non-users	9	3.44	1.13
	Occasional users	76	3.51	0.95
	Frequent users	115	3.61	1.08
	Total	200	3.57	1.03

Mean scores in the AI usage groups showed only minor differences in relation to both authorship questions, suggesting that there was not much descriptive variability among students' perceptions of their voice and ownership of written assignments in regard to the various levels of AI use. Two questions regarding authorship "I can adapt my writing voice and style without using AI" and "The final draft still

sounds like me despite AI's assistance in the writing process" were assessed by conducting one-way ANOVAs for each question separately.

4.5.1 ANOVA for Item 1

Adapt Writing Voice Without AI

A one-way ANOVA was conducted to determine whether students' responses to the item "I can adapt my writing voice and style without relying on AI" differed across the three AI usage groups. The analysis showed no statistically significant differences among non-users, occasional users, and frequent users, $F(2, 197) = 0.265, p = .767$. This finding indicates that students' perceptions of their ability to maintain and adapt their writing voice without relying on AI were broadly similar across the three levels of AI tool use. The ANOVA results are presented in Table 10.

Table 10

One-way ANOVA for Authorship (Voice Adaptability)

Source	SS	df	MS	F	p
Between Groups	0.569	2	0.285	0.265	0.767
Within Groups	211.186	197	1.072		
Total	211.755	199			

4.5.2 ANOVA for Item 2

Final Draft Still Sounds Like Me

A second one-way ANOVA was conducted to determine whether responses to the item "My final draft still sounds like me, even if AI supported my writing process" differed across the three AI usage groups. The analysis showed no statistically significant differences among non-users, occasional users, and frequent users, $F(2, 197) = 0.259, p = .772$. The descriptive statistics also indicated only small differences in mean scores across the groups. These findings suggest that students' perceptions of maintaining their personal writing voice were broadly similar across different levels of AI tool use. The ANOVA results are presented in Table 11.

Table 11

One-way ANOVA for Authorship (Final Draft Voice Alignment)

Source	SS	df	MS	F	p
Between Groups	0.555	2	0.277	0.259	0.772
Within Groups	210.6	197	1.069		
Total	211.155	199			

The findings for both authorship items showed no statistically significant differences across the AI usage groups. However, these results should be interpreted cautiously because the authorship dimension showed low internal consistency and was therefore analysed at the item level.

4.6 Hypothesis Testing Summary

To evaluate the proposed hypotheses, the findings from the statistical analyses were reviewed in relation to each hypothesis. Table 12 presents the summary of hypothesis testing decisions based on the results obtained for writing confidence, independence, and perceived authorship across the three AI usage groups.

Table 12

Summary of Hypothesis Testing Results

Hypothesis	Findings	Decision
H1: Writing independence will differ significantly among frequent, occasional, and non-users of AI writing tools.	Writing independence was analysed at the item level due to low internal consistency. Some independence items showed statistically significant differences across AI usage groups, whereas others did not.	Partially supported
H2: Students who frequently use AI writing tools will report significantly higher writing confidence than occasional and non-users.	Writing confidence showed significant differences across AI usage groups. Frequent users reported significantly higher confidence than both occasional users and non-users.	Supported
H3: Perceived authorship will differ significantly among frequent, occasional, and non-users of AI writing tools.	No statistically significant differences were found among AI usage groups for the authorship-related items measuring writing voice and ownership.	Not supported

Note. Independence and authorship were interpreted at the item level because these dimensions showed low internal consistency.

5.0 Discussion

The present study investigated differences in university students' confidence, independence, and sense of authorship across varying levels of AI writing tool usage in an EFL higher education context. Guided by Linguistic Agency Theory (Ahearn, 2001), the study examined how students perceived their ability to make choices, exercise control, and maintain ownership of their writing during AI-assisted writing activities.

The first research objective examined whether confidence-related perceptions differed across AI usage groups. The findings showed that frequent users reported significantly higher writing confidence than non-users, with post-hoc analyses confirming that confidence was also significantly higher among frequent users than occasional users. These findings are consistent with previous research suggesting that AI-assisted writing tools can reduce writing-related difficulties, support revision, and enhance learners' perceived confidence and competence (Amani & Bisriyah, 2025; Teng, 2024; Tran, 2025). AI writing tools may provide linguistic support during idea generation, drafting, and revision, particularly for EFL learners who encounter challenges related to vocabulary, grammar, organisation, and the expression of ideas. Consequently, the higher confidence reported by frequent users may reflect their perception that AI tools provide effective support during academic writing. However, because this study employed a cross-sectional design and relied on self-reported data, the findings should not be interpreted as evidence that AI use directly causes higher writing confidence.

The second aspect examined students' writing independence. Because the independence dimension demonstrated low internal consistency (Cronbach's $\alpha = .452$), the six items were analysed individually rather than as a composite scale. The findings were mixed. Of the six independence items, three showed statistically significant differences across AI usage groups, whereas the remaining three did not. Significant differences were observed for making final writing decisions independently, rejecting AI suggestions that did not align with students' intended meaning, and feeling more independent when using AI writing tools. In contrast, no statistically significant differences were found for checking AI suggestions before adopting them, viewing AI as a support for rather than a substitute for critical thinking, or accepting AI-generated output without careful consideration. These findings suggest that the frequency of AI use is associated with certain aspects of perceived writing independence but not others.

The mixed pattern of findings further suggests that students who frequently used AI writing tools perceived themselves as exercising greater control over their writing, particularly in making final writing decisions and rejecting inappropriate AI-generated suggestions. However, behaviours related to evaluating AI-generated content critically did not differ significantly across the AI usage groups. This finding is consistent with previous studies suggesting that learner agency depends not merely on AI use itself but also on learners' ability to critically evaluate, regulate, and selectively incorporate AI-generated output into their writing (Jin et al., 2025; Kim et al., 2026; Werdiningsih et al., 2024). Nevertheless, because the independence dimension demonstrated low internal consistency, these findings should be interpreted cautiously and regarded as exploratory.

Authorship was examined through two items measuring students' perceived ability to maintain their writing voice and their perception that the final draft continued to reflect their own identity as writers. No statistically significant differences were found across the AI usage groups for either item. These findings suggest that students' perceptions of writing voice and ownership remained relatively similar regardless of their level of AI tool usage. Importantly, the absence of statistically significant differences should not be interpreted as evidence that AI has no influence on authorship. Rather, the present findings indicate that no measurable differences were detected in students' reported perceptions of writing voice and ownership across the three AI usage groups.

The authorship findings may be interpreted alongside previous research suggesting that generative AI complicates traditional understandings of ownership, originality, and human authorship rather than producing a single or uniform effect on writers (Bozkurt, 2024). The influence of AI on authorship may depend on how learners select, modify, reject, and integrate AI-generated content into their writing (Kim et al., 2026; Werdiningsih et al., 2024). Given the low internal consistency of the authorship dimension, the present findings should be interpreted cautiously and should not be regarded as definitive evidence regarding the effects of AI use on students' authorial identity.

Overall, statistically significant differences were observed for writing confidence and three of the six independence items, whereas the remaining independence items and both authorship items showed no statistically significant differences across the AI usage groups. These findings indicate that the relationship between AI writing tool usage and students' writing-related perceptions is multidimensional, with confidence showing the most consistent differences, independence yielding mixed results, and perceptions of authorship remaining relatively stable.

The findings also have important implications for writing instruction. AI writing tools may provide valuable support during idea generation, drafting, language refinement, and revision. However, students require explicit guidance on evaluating AI-generated suggestions critically, maintaining control over their writing, and using AI ethically and responsibly. Educators play an important role in helping students distinguish between using AI as a learning support and relying on it as a substitute for their own judgement. Clear institutional policies and AI literacy instruction may therefore encourage students to engage with AI more critically while maintaining their independence and sense of authorship.

Finally, the findings should be interpreted as students' self-reported perceptions associated with different levels of AI writing tool usage rather than as evidence of causal effects on academic writing agency. The relatively small number of non-users, the low reliability of the independence and authorship dimensions, and the cross-sectional nature of the study should all be considered when interpreting the findings.

6.0 Conclusion

This study examined differences in university students' writing confidence, independence, and perceptions of authorship across varying levels of AI writing tool usage in a Pakistani EFL higher education context. The findings showed that frequent users of AI writing tools reported significantly higher writing confidence than both occasional users and non-users, suggesting that regular AI use is associated with greater confidence in completing academic writing tasks.

Findings related to writing independence were mixed. Three of the six independence items showed statistically significant differences across AI usage groups, whereas the remaining three did not. These

results suggest that AI writing tool usage is associated with certain aspects of perceived writing independence, particularly making final writing decisions, rejecting inappropriate AI suggestions, and feeling more independent during writing. However, no statistically significant differences were observed for evaluating AI-generated suggestions, viewing AI as a support for critical thinking, or accepting AI-generated output without careful consideration. Given the low internal consistency of the independence scale, these findings should be interpreted cautiously.

No statistically significant differences were found between the AI usage groups for either authorship item, suggesting that students' perceptions of writing voice and ownership remained relatively consistent regardless of their level of AI writing tool usage. However, because the authorship dimension demonstrated low internal consistency, these findings should also be interpreted with caution and should not be regarded as definitive evidence regarding the relationship between AI use and students' perceptions of authorship.

Overall, the findings suggest that AI writing tools are perceived as supportive resources for idea generation, language improvement, drafting, and revision rather than as replacements for students' own writing abilities. At the same time, the results highlight the importance of developing students' AI literacy so that they can critically evaluate AI-generated content, maintain control over their writing, and use AI ethically and responsibly.

These findings have important implications for EFL writing instruction. AI writing tools may support learners in improving grammar, vocabulary, organisation, and revision processes when integrated appropriately into writing pedagogy. Consequently, educators should incorporate AI literacy into academic writing instruction, while higher education institutions should establish clear guidelines that promote the ethical, critical, and responsible use of AI writing tools.

6.1 Limitations and Future Research

This study has several limitations. First, it relied primarily on self-reported data, which may not accurately capture students' actual writing behaviours, decision-making processes, or writing proficiency. Future research should incorporate additional sources of evidence, such as writing samples, screen recordings, or digital records of AI-assisted writing activities.

Second, the study used a purposive convenience sampling approach, which limits the generalisability of the findings. The sample was drawn from only two universities and included a small number of non-users, reducing the strength of comparisons across the three AI usage groups. Future studies should recruit more balanced samples from a wider range of institutions, academic disciplines, and geographical regions. In addition, the cross-sectional design captured students' perceptions at only one point in time. Longitudinal research could examine how students' confidence, independence, and authorship develop as their use of AI tools and exposure to institutional policies change over time.

Third, the independence and authorship dimensions demonstrated low internal consistency and were therefore analysed at the item level rather than as composite scales. This limitation restricts the extent to which firm conclusions can be drawn about these dimensions of academic writing agency. Future studies should refine the construct definitions, develop and validate more reliable measurement scales, and ensure that the instruments adequately capture the multidimensional nature of agency in AI-assisted writing.

Qualitative and ethnographic approaches could also provide deeper insights into students' and teachers' experiences, institutional policies, classroom practices, and the ways in which learners negotiate control, ownership, and critical judgement when using AI writing tools.

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Conflict of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

Author Contribution Statement

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This research did not require formal institutional ethics approval as it involved an anonymous survey with no collection of personal or sensitive data. Participation was voluntary, and informed consent was obtained from all participants prior to data collection.

Data Access Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Appendix A

Questionnaire Used in the Study

Section A: Demographic Information

1. Age
 - 17–20
 - 21–24
 - 25 or above
2. Gender
 - Male
 - Female
 - Prefer not to say
3. Academic level
 - Undergraduate
 - Master's
 - PhD
 - Other
4. Self-rated English proficiency
 - Excellent
 - Good
 - Fair
 - Poor

Section B: AI Writing Tool Usage

How frequently do you use AI writing tools (e.g., ChatGPT, Grammarly, Gemini) for academic writing?

- Daily
- Several times per week
- Several times per month
- Rarely
- Never

(For analysis, responses were grouped into frequent users, occasional users, and non-users.)

Section C: Academic Writing Perceptions

For each statement, select your level of agreement. (*1 = Strongly Disagree ... 5 = Strongly Agree*)

Scale (Columns): 1 Strongly Disagree | 2 Disagree | 3 Neutral | 4 Agree | 5 Strongly Agree

Writing Confidence

1. AI tools improve my confidence in academic writing.
2. AI tools make my writing process faster and easier.
3. AI tools help me organize my ideas more clearly.
4. Using AI reduces my anxiety about grammar or wording.

Writing Independence

1. I make the final decisions about wording and structure, even when I use AI.
2. I can reject AI suggestions if they do not match my intended meaning.
3. I check the accuracy and relevance of AI suggestions before using them.
4. AI tools support, but do not replace, my own critical thinking.
5. I sometimes accept AI outputs without much thought.
6. I feel more independent in my writing when I use AI tools.

Authorship

1. I can adapt my writing voice and style without relying on AI.
2. My final draft still sounds like me, even if AI supported my writing process.

Note. Only the questionnaire items included in the statistical analyses and reported in the manuscript are presented in this appendix.