International Journal of Learning, Teaching and Educational Research
Vol. 24, No. 5, pp. 452-471, May 2025
https://doi.org/10.26803/ijlter.24.5.24
Received Mar 23, 2025; Revised May 4, 2025; Accepted May 8, 2025

The Differential Impact of AI Tools Among EFL University Learners: A Process Writing Approach

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Abstract. This study examines the impact of Artificial Intelligence (AI) writing assistants, Grammarly, Write & Improve, and Slick Write, on Vietnamese EFL majors' writing proficiency. Grammarly ensures grammatical accuracy; Write & Improve offers rigorous academic feedback; and Slick Write checks readability and sentence complexity. In a quasi-experimental mixed-methods research project with 200 Vietnamese first-year public and private university students, quantitative data on pre- and post-test scores were compared via paired *t*-tests and logistic regression. Interviews and focus groups were analyzed using themes for the qualitative data. Findings indicated significant improvements in grammatical correctness (p = .034) and task completion (p < .01), particularly in the students from the private universities. However, enhanced content coherence was not revealed (p = 1.00), and diminished language range with significant loss was found (p = .015). Qualitative findings indicated that the students welcomed AI tools for grammar correction and efficiency but were cautious about dependency, loss of creativity, and loss of personal voice, particularly among the private university students. The study highlights the varied impact of AI writing tools, underscoring their utility in polishing grammar and task fulfillment and their lack of ability to improve higher-order writing skills such as coherence and linguistic variety. Institutional context significantly influenced the students' engagement and performance, suggesting the necessity for pedagogically planned, context-sensitive implementation of AI tools.

Keywords: AI-assisted academic writing; Grammarly; Process Writing Approach; EFL Vietnamese undergraduates and writing tool efficacy

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1. Introduction

Artificial Intelligence (AI) has reimagined pedagogical practice regarding enhanced learning experience and learner interaction, particularly in language teaching environments. Recent advances have given birth to AI-driven writing assistants such as Grammarly, Write & Improve, and Slick Write, each carrying its pedagogical intent. Grammarly predominantly supports grammatical accuracy and stylistic flair (Kohnke, 2024), while Write & Improve offers formalized scholastic criticism focusing on revision and iterative learning by established scholastic standards (Cambridge English, n.d.). Slick Write bridges the gap by testing sentence complexity and readability, thus improving textual coherence and coherency (Marzuki et al., 2023). All these AI technologies allow for real-time feedback, encourage student autonomy, and enhance writing fluency through constant and systematic revision loops (Nurseha, 2023; Okolie & Egbon, 2024; Pham & Le, 2024; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2019).

Despite their possible benefits, there are significant pedagogical concerns in adopting AI in academic writing. Researchers have indicated reservations regarding student over-reliance, bounded creative thinking, lowered learner autonomy, and compromised academic integrity (Cotton et al., 2023; Farooqi et al., 2024). Furthermore, whereas AI applications efficiently address lower-order writing skills such as correctness in grammar, their effectiveness in stimulating the higher-order cognitive abilities of critical thinking, argumentation building, and idea coherence is not entirely clear (Graham et al., 2013; Oshima & Hogue, 2007; Dang, 2024). Therefore, empirical investigations of these technologies' pedagogical consequences and limitations, particularly in multi-cultural learning contexts, are central to an understanding of their broader implications.

Vietnamese tertiary education provides a special environment to investigate AI-aided writing pedagogy. English is a compulsory subject throughout Vietnamese tertiary education, with heavy emphasis on academic writing skills, particularly for English majors. However, there are great challenges due to scarce resources, large class sizes, and unequal levels of technological infrastructure among institutions (Huang et al., 2021; Pham & Le, 2024). Vietnamese public universities generally enroll students with higher academic entry scores but face challenges related to large classes, limited teacher-student interactions, and constrained technological infrastructure. Conversely, private institutions typically feature smaller class sizes, better facilities, and advanced technological support but often have students with more diverse academic backgrounds and motivations (Huang et al., 2021; Nguyen, 2021). Such contextual differences make the comparison between public and private institutions pedagogically significant and provide insights into how institutional context shapes the effective use and perception of AI tools.

Given these considerations, the present study aims to investigate the specific impacts of Grammarly, Write & Improve, and Slick Write on the academic writing performance of Vietnamese English majors. It compares their effectiveness across public and private institutional contexts and explores how institutional

environments influence student engagement and perceived pedagogical benefits. Specifically, the study hypothesizes the following: (i) The use of AI writing tools will significantly improve grammatical accuracy and task achievement among English majors but will have limited or negative impacts on content coherence and linguistic diversity; (ii) Students from public universities with higher initial proficiency and more structured academic environments will exhibit greater improvements from AI integration than those from private universities; and (iii) Student perceptions regarding AI tools will vary significantly based on institutional affiliation, with private university students likely expressing greater concerns about dependency, creativity loss, and reduced personal voice.

Through addressing these hypotheses, this research contributes empirical insights into the pedagogical value of AI writing tools, guiding context-sensitive, balanced integration practices that support technological advancement and the preservation of critical independent writing skills (Yu, 2024).

2. Literature Review

This review synthesizes current literature on AI-assisted writing tools in EFL academic writing, organizing it thematically into tool affordances, limitations, and pedagogical perspectives. The review integrates the Process Writing Approach (Flower & Hayes, 1981) as a conceptual framework guiding the research, critically examining the strengths and weaknesses of prominent AI tools (Grammarly, Write & Improve, Slick Write) to establish a rationale for the present study.

2.1 Tool Affordances in EFL Writing

According to various research, AI-assisted writing tools have significantly reshaped EFL academic writing instruction by offering automated grammar correction, real-time feedback, and iterative support (Nurseha, 2023; Okolie & Egbon, 2024; Pham & Le, 2024). Among the widely adopted platforms, Grammarly primarily targets grammatical precision, lexical choice, and stylistic accuracy (Kohnke, 2024). Recent evidence supports its effectiveness in reducing mechanical errors and enhancing syntactic complexity among EFL learners (Farooqi et al., 2024). Write & Improve emphasizes structured feedback through standardized rubrics (e.g., IELTS, TOEFL), aligning closely with iterative and process-oriented pedagogies (Cambridge English, n.d.). Slick Write focuses on sentence complexity, readability, and stylistic cohesion, facilitating self-directed refinement of texts (Marzuki et al., 2023). Collectively, these tools have been credited with increasing learner autonomy, self-regulation, and immediate identification of writing weaknesses (Okolie & Egbon, 2024).

2.2 Tool Limitations and Critical Perspectives

Despite documented affordances, critical perspectives underscore significant limitations of AI writing tools. While effective in surface-level linguistic accuracy, Grammarly inadequately addresses deeper cognitive skills such as argumentation and conceptual coherence (Cotton et al., 2023; Farooqi et al., 2024). Although Write & Improve facilitates structured revision cycles, it may inadvertently foster student reliance on superficial rubric-driven metrics rather than meaningful

engagement with textual content (Cambridge English, n.d.). Slick Write's feedback, which focuses mainly on readability and sentence-level improvements, provides limited support for nuanced rhetorical analysis or deeper academic discourse structuring (Marzuki et al., 2023). Recent critiques further highlight that because of their algorithmic nature, AI tools may reduce creativity, discourage independent writing strategies, and foster passive rather than active learner engagement (Cotton et al., 2023; Okolie & Egbon, 2024). Furthermore, ethical concerns surrounding academic integrity have intensified with the greater reliance on AI-generated content, thus emphasizing the necessity of integrating human feedback alongside technological supports (Farooqi et al., 2024; Yu, 2024).

2.3 Pedagogical Perspectives and the Process Writing Framework

The Process Writing Approach (Flower & Hayes, 1981) serves as the conceptual framework underpinning this study, emphasizing iterative drafting, revision, and reflective engagement. This approach aligns with AI tools that facilitate multiple revision cycles, providing learners with continuous formative feedback and enhancing self-regulation (Farooqi et al., 2024). Write & Improve exemplifies process-oriented pedagogy by allowing repeated drafts and structured revision, thus directly aligning with this recursive model (Cambridge English, n.d.). Grammarly and Slick Write also indirectly support iterative refinement by highlighting linguistic weaknesses, promoting metacognitive awareness and encouraging reflective self-editing practices (Kohnke, 2024; Marzuki et al., 2023). However, the literature strongly suggests that AI tools alone cannot adequately facilitate higher-order writing competencies without complementary teacher-mediated pedagogical interventions (Dang, 2024; Farooqi et al., 2024).

2.4 The Context of Vietnamese Higher Education

In Vietnamese EFL higher education, English proficiency and academic writing skills are critical for students' academic and professional success. Nonetheless, resource constraints, varied technology access, and large class sizes significantly limit individualized teacher feedback and instructional effectiveness (Huang et al., 2021; Pham & Le, 2024). Public universities typically face higher student-to-teacher ratios and infrastructure limitations but enroll students with higher entrance proficiency. Conversely, private universities generally provide better facilities and smaller class sizes but often admit students with varied academic preparedness, creating distinct pedagogical challenges and opportunities for technology integration (Nguyen, 2021). Therefore, comparing public and private institutions provides valuable insights into the contextual factors shaping the effectiveness and student reception of AI tools in academic writing instruction.

2.5 Research Gaps and Research Questions

Current research gaps persist regarding comparative evaluations of AI writing tools within distinct institutional settings, particularly in EFL contexts such as Vietnam. Most studies remain predominantly descriptive, rarely exploring nuanced institutional influences or systematically comparing the pedagogical effectiveness of multiple AI tools within varied learning environments. Additionally, limited literature examines how students actively integrate AI-generated feedback into their writing processes or critically evaluate tool limitations using recent evidence. This study aims to fill these gaps by explicitly

comparing Grammarly, Write & Improve, and Slick Write across public and private universities. Specifically, this would result in (i) to evaluate the comparative impacts of AI tools on grammatical accuracy, content coherence, linguistic diversity, and task achievement; (ii) to analyze student perceptions and adaptive strategies regarding AI-generated feedback critically; and (iii) to examine differences in tool effectiveness based on institutional contexts.

To bridge these research gaps, this study is guided by the following questions:

RQ1. How do Grammarly, Write & Improve, and Slick Write affect English majors' grammatical accuracy, structural coherence, and writing fluency in Vietnamese EFL contexts?
RQ2. What are students' perceptions of these AI writing tools, and how do they integrate AI-generated feedback into their revision processes?
RQ3. How do students from public and private universities differ in their use of AI-assisted writing tools, and what are their perceived benefits?

By addressing these questions, the study contributes to informed pedagogical practices and provides context-sensitive recommendations for the balanced integration of AI tools in EFL writing instruction.

3. Research Methodology

3.1 Research Participants and Sampling

The study involved 200 first-year English Language majors sampled through cluster sampling from two universities in Hanoi, Vietnam: one public university ($n = 100$) and one private university ($n = 100$). The universities were chosen based on the representativeness of student profiles, institutional resources, and technology infrastructures, allowing for comparative knowledge about diverse learning contexts.

Random sampling at the class level within institutions was used to minimize selection bias. Baseline data comprised CEFR (Common European Framework of Reference) A2 to B2 proficiency levels and students in an academic writing course during their first semester. Participants were provided with no formal instruction in academic writing and had no experience using AI-supported writing tools, thus eliminating exposure and ensuring internal validity. Written informed consent was requested, clearly indicating the rights of the participants, data confidentiality, and the voluntary nature of participation.

3.2 Research Design and Intervention

A quasi-experimental, convergent parallel mixed-methods design (Creswell & Clark, 2017) was applied, mixing quantitative (pre- and post-test design) and qualitative approaches (interviews, focus groups) to assess the influence of AI writing tools. The study was explicitly guided by the Process Writing Approach (Flower & Hayes, 1981) and was structured around recursive phases of writing, planning, drafting, revising, and editing, using Grammarly, Write & Improve, and Slick Write. Figure 1 is an evident schema of the intervention stages, length, and integration of AI tools.

Implementation fidelity was ensured through extensive instructor training, standardized teaching materials, and weekly monitoring logs. Tool exposure was controlled through graded exposure to tools by writing stages to encourage independent first drafts and systematic integration of AI feedback. Protocol adherence was ensured through weekly checks by the researchers, and deviations were recorded and addressed promptly.

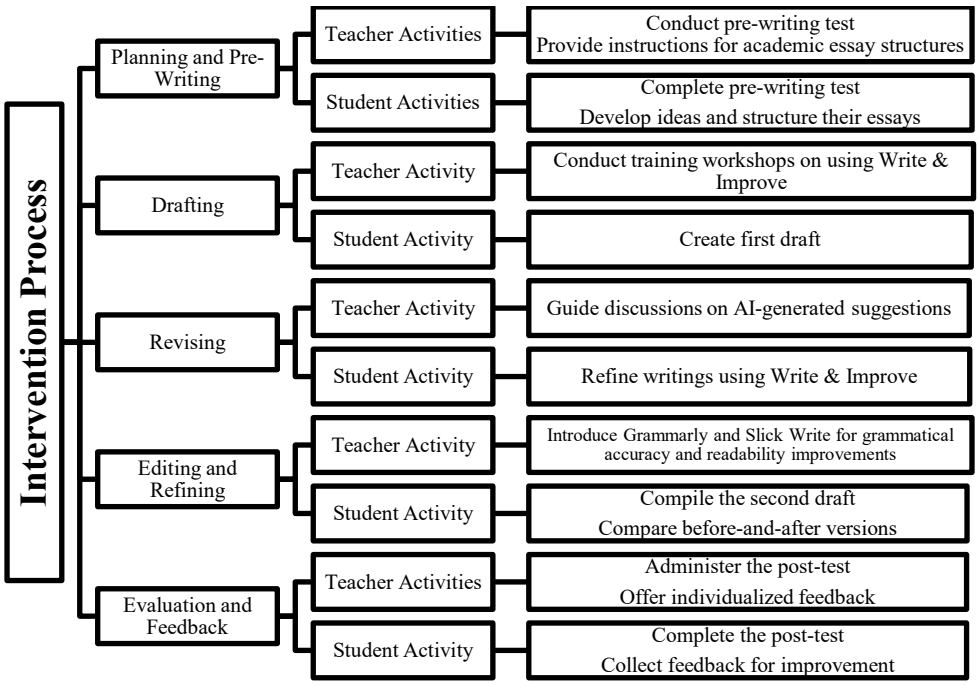

Figure 1: Intervention process schema

3.3 Instruments and Procedures

3.3.1 Quantitative Measures

Students completed the IELTS Writing Task 2 as pre- and post-tests to determine their gains in grammatical accuracy, coherence, range of language, and task fulfillment. Internal consistency reliability was determined using Cronbach's alpha, which revealed a coefficient of 0.87, reflecting high reliability. Two trained markers independently marked the essays with an inter-rater reliability coefficient (Cohen's kappa) of 0.82, reflecting substantial agreement.

3.3.2 Qualitative Measures

Semi-structured interviews (n = 16) and four focus groups (2 per institution, n = 24) revealed students' experience, perceptions, and coping mechanisms with AI tools. Interviews with educators (n = 4) were conducted to achieve complete pedagogical insights. Transcripts underwent thematic analysis (Braun & Clarke, 2021) following a systematic coding procedure that comprised initial coding, thematic categorization, and peer-checking sessions to ensure analytical rigor. Inter-rater reliability for qualitative coding was established at 85%, with high agreement among coders.

3.4 Statistical Analysis

Paired-sample *t*-tests were employed to examine pre- and post-intervention scores. Shapiro-Wilk tests ($p > .05$) were applied to confirm normality of distribution before performing parametric analyses. Effect sizes (Cohen's *d*) were calculated to test practical significance, with interpretation guidelines by Cohen (1988). Logistic regression analysis examined predictive relationships between tool use frequency, institutional membership, and writing proficiency gain. Model specifications were clearly defined, and multicollinearity was reviewed based on the Variance Inflation Factor (VIF < 2) to ensure the stability of the regression results. Multiple comparisons corrections were performed using the Bonferroni adjustment to ensure statistical rigor.

3.5 Quantitative and Qualitative Data Integration

Quantitative and qualitative data were integrated at the interpretation phase using a side-by-side comparison method (Creswell & Clark, 2017), highlighting convergences and divergences in findings. This allowed triangulation of evidence, which enhanced validity and richness of interpretation regarding AI tools' pedagogical impacts, differences in student engagement, and institutional contextual factors.

4. Findings and Discussion

4.1 Impact of AI-Assisted Writing Tools on Writing Proficiency (RQ1)

To address RQ1 (How do Grammarly, Write & Improve, and Slick Write impact the grammatical accuracy, structural coherence, and writing fluency of English majors in Vietnamese EFL contexts?), paired-sample *t*-tests and logistic regression analyses were conducted. Assumptions of normality (Shapiro-Wilk tests, $p > .05$) and homogeneity of variances were confirmed prior to analysis. The results are summarized in Table 1 below.

Table 1: Paired *t*-test results for writing performance (*N = 200*)

Writing Component	Pre-test *M* (*SD*)		Post-test *M* (*SD*)	Mean Difference	*t*-value	*p*-value	Cohen's *d*	95% CI	Post-hoc power
Content Coherence (CC)	6.75 (1.14)		6.75 (1.12)	0.00	0.00	1.000	0.00	[-0.22, 0.22]	0.05
Language Range (LR)	6.54 (1.02)		6.36 (0.95)	-0.18	2.49	0.015*	0.18	[-0.32, -0.03]	0.68
Grammatical Accuracy (GA)	6.12 (1.08)		6.36 (1.05)	0.24	2.16	0.034*	0.22	[0.02, 0.46]	0.60
Task Achievement (TA)	6.41 (1.01)		6.88 (0.97)	0.47	5.25	<0.001**	0.48	[0.29, 0.65]	0.99
Total Score	**25.82 (3.24)**		**26.35 (3.09)**	**0.53**	**2.85**	**0.005**	**0.38**	[0.16, 0.89]	**0.87**

Note. *$p < 0.05$, **$p < 0.01$; CI = confidence interval

Results showed no significant improvement in content coherence (p = 1.00, d = 0.00), indicating limited effectiveness of AI tools in enhancing logical connections within academic texts. However, a small yet statistically significant decrease was observed in language range (mean difference = -0.18, p = 0.015, d = 0.18), suggesting AI-driven feedback might constrain linguistic diversity by promoting standardized language choices, potentially limiting students' creative language use.

In contrast, AI tools notably enhanced Grammatical Accuracy (mean difference = 0.24, p = 0.034, d = 0.22) and showed strong practical significance in task achievement (mean difference = 0.47, p < 0.001, d = 0.48). These outcomes underline the value of tools such as Grammarly for providing targeted grammatical corrections and Write & Improve for structured, rubric-based feedback, enhancing students' overall ability to fulfill task requirements. Cohen's d values indicated small to moderate effect sizes, emphasizing practical educational value, particularly for structured writing skills.

Post-hoc power analyses indicated adequate statistical power (>0.80) for task achievement and Total Score improvements, confirming the reliability of these findings.

Table 2: Predicting significant improvement in total writing scores

Predictor	**Odds Ratio (OR)**	**95% CI**	***p*-value**
Frequency of AI tool use	1.80	[1.05, 3.08]	0.042*
Institutional affiliation (private versus public)	0.75	[0.58, 0.97]	0.035*
Pre-test proficiency level	1.20	[0.89, 1.62]	0.067

*Significance level p < 0.05

The logistic regression results indicated that students who frequently used AI tools were 1.8 times more likely to achieve significant writing improvement (OR = 1.80, CI = [1.05, 3.08], p = 0.042), highlighting the tangible pedagogical benefit of sustained AI engagement. Institutional affiliation also significantly influenced performance; private university students showed a 25% lower probability of marked improvement than public university students (OR = 0.75, CI = [0.58, 0.97], p = 0.035). This underscores the critical role that institutional contexts play in optimizing the effectiveness of AI tools. Pre-test proficiency showed no statistically significant predictive value, indicating that AI tool engagement and institutional support mechanisms are potentially stronger predictors of academic writing improvement.

The quantitative findings were triangulated with qualitative interview and focus group data. Students from both institutional contexts consistently reported the utility of AI tools for enhancing grammatical precision and task clarity. One public university student noted,

> "*Grammarly immediately corrected grammar mistakes that I used to miss, helping me clearly communicate my ideas.*"

This aligned quantitatively with improved grammatical accuracy scores (d = 0.22). Conversely, concerns regarding limited linguistic creativity echoed the slight decline observed in quantitative language range measures. As one private university student stated,

> "*Sometimes AI makes all our writing look similar, reducing our creativity and personal style.*"

The qualitative data similarly confirmed the institutional differences that were identified quantitatively; public students integrated AI feedback more effectively due to stricter academic demands and higher initial proficiency, whereas private students expressed greater challenges, mirroring the regression analysis outcomes. These qualitative insights substantiate the statistical trends and emphasize that the pedagogical impact of AI tools is significantly mediated by institutional context and learner characteristics.

Overall, AI-assisted tools substantially enhanced lower-order writing skills, particularly grammatical accuracy and task achievement, reflecting moderate practical significance (Cohen's d around 0.4–0.5). However, the limited impact on content coherence and the slightly adverse effects on linguistic diversity highlight crucial limitations that educators must address through complementary instructional methods. Institutions should strategically integrate human-mediated feedback with AI-driven support, ensuring students benefit from immediate linguistic corrections without compromising higher-order cognitive engagement and creative language expression.

The findings demonstrated a statistically significant improvement in Grammatical Accuracy (p = 0.034), confirming the effectiveness of AI tools, particularly Grammarly, in enhancing grammatical precision. This outcome aligns with Kohnke's (2024) study that highlights a positive correlation between AI grammar-checking tools and reduced mechanical errors among EFL learners. Theoretically, these results reinforce the cognitive perspective that immediate feedback provided by AI enables learners to notice and correct linguistic inaccuracies, thereby promoting more accurate language production.

Additionally, the notable improvement in task achievement (p < 0.01, d = 0.48) aligns with previous literature emphasizing the ability of AI to provide structured feedback and support in meeting specific writing criteria and goals (Huang et al., 2021). Furthermore, writing tools such as Write & Improve scaffold task-oriented skills effectively by offering rubric-driven feedback that guides students toward achieving clear task requirements. This is analogous to the Process Writing Approach (Flower & Hayes, 1981) in which regular feedback strongly emphasizes revision and completion of the task.

However, the results belied expectations with significantly decreasing language range scores (p = 0.015, d = 0.18). This is an inherent weakness of AI tools; while they encourage grammatical correctness and well-organized answers, they also potentially constrain linguistic creativity by encouraging formulaic or conventional modes of language use. Alternative interpretations suggest students might over-rely on AI-generated suggestions, thus narrowing their lexical variety

and complexity. This aligns with Farooqi et al. (2024) who warned about the potential negative impact of algorithm-driven feedback on creative and varied language use. Confounding factors could also include students' inclination toward compliance with perceived AI-generated standards to achieve higher evaluation scores, resulting in less experimental or original language use.

Moreover, no significant change was observed in the content coherence scores (p = 1.00). This result supports the assertions of Oshima and Hogue (2007) and Graham et al. (2013) that higher-order cognitive tasks such as logical structuring and idea development rely primarily on human intervention and direct pedagogical instruction. In addition, AI tools focusing predominantly on lower-order language accuracy and sentence-level feedback evidently fall short in guiding students toward coherent argumentation and logical organization.

These findings collectively point out a crucial theoretical shortfall of AI writing tools regarding higher-order cognitive development. The Process Writing Approach encourages repetitive cycles of drafting and revising with an equal focus on both linguistic correctness and coherent content organization (Flower & Hayes, 1981). While AI tools excel at supporting repetitive refinement at a grammatical level, they are not sufficiently supportive of the cognitive sophistication involved in argumentation, critical reasoning, or coherent content organization. Thus, relying only on AI tools can lead to surface-level revision strategies, limiting the cognitive engagement required for deeper academic writing development.

Considering these limitations, alternative pedagogical strategies must be explored. For instance, integrating explicit instructor guidance and peer feedback could compensate for AI's shortcomings in developing higher-order writing skills. This approach would help students to engage critically and creatively with their written texts, ensuring that AI remains an adjunct rather than the primary instructional mode.

In conclusion, although AI tools significantly affect grammatical accuracy and task completion, their limited impact on content coherence and their detrimental effects on linguistic diversity suggest guarded integration into pedagogical frameworks. Writing instruction needs to integrate AI-based linguistic corrections with human-mediated feedback and cognitive stimulation approaches to offer balanced support for general academic writing skill development.

4.2 Students' and Educators' Perceptions of AI Writing Tools (RQ2)

Based on the qualitative data, this section aims to answer RQ2 (What are the perceived impacts of AI writing tools on creative thinking and original content generation among English majors?). The qualitative data from the semi-structured interviews (n = 16) and the focus group discussions (n = 24) provided comprehensive insights into the participants' perceptions regarding using Grammarly, Write & Improve, and Slick Write. Thematic analysis, employing rigorous inter-coder agreement checks (inter-rater reliability = 85%), identified five major themes, which are summarized clearly in Table 3 below.

Table 3: Key themes and representative excerpts from interviews

Theme	Representative Student Excerpt	Representative Educator Excerpt
Enhanced Grammar & Structure	"Grammarly helps me spot errors I would otherwise miss, making my writing more polished."	"Students clearly produce fewer grammatical errors, and sentences show more complex structures."
Efficiency & Productivity	"Using AI tools, I can quickly generate ideas and get feedback on my writing, which saves a lot of time."	"AI tools enable students to manage workloads more effectively, especially under tight deadlines."
Vocabulary & Idea Generation	"AI tools provide a wealth of ideas and suggest sophisticated vocabulary that enrich my writing."	"Students' vocabulary and expressiveness noticeably improve with regular AI-tool use."
Concerns on Creativity & Voice	"Sometimes my writing feels mechanical and loses uniqueness when relying too much on AI."	"Overuse of AI tools risks diminishing students' creativity and originality in their writing."
Ethical Use & Responsibility	"AI tools are helpful, but I must use them responsibly and ensure I'm learning, not just relying on technology."	"Clear guidelines and ethical standards are essential to prevent plagiarism and foster responsible use."

Participants strongly recognized enhanced grammar and structural improvement as primary benefits. Students highlighted Grammarly's real-time and targeted grammatical corrections as instrumental in refining their written work. Educators corroborated this finding, noting clear qualitative improvements in sentence complexity and reduced errors. These qualitative insights align directly with the quantitative findings (d = 0.22) reported earlier, reinforcing the results' triangulation and validity.

The efficiency and productivity gains provided by AI tools emerged prominently. Students indicated significant time-saving benefits, particularly through the structured, iterative feedback cycles of Write & Improve, which streamlined their drafting processes. Educators similarly valued the pedagogical potential of AI to facilitate timely feedback, which is particularly advantageous in the resource-limited settings that are common in Vietnamese EFL contexts. This thematic finding underscores the practical pedagogical value of AI integration.

Another key strength reported consistently across participant groups was vocabulary enhancement and idea generation. Students found that AI-generated vocabulary suggestions, particularly from Slick Write's readability and stylistic feedback, significantly enriched their expressive capability. Educators supported this observation, affirming the tangible pedagogical benefits of AI tools for lexical expansion and linguistic sophistication.

However, significant concerns emerged regarding creativity, personal voice, and originality. Both students and educators warned that over-reliance on AI tools

risked producing formulaic and impersonal writing. This was particularly noted among private university students who expressed higher levels of anxiety about creativity loss. One private university student explicitly stated,

"*AI tools are useful, but I worry about losing my unique writing style.*"

This concern echoed the quantitative findings that highlighted reduced linguistic diversity (language range, $d = 0.18$), reflecting potential unintended consequences of AI integration and emphasizing the need for pedagogically balanced approaches.

Finally, participants emphasized the necessity of ethical and responsible AI use. Educators particularly advocated clear institutional guidelines to mitigate potential plagiarism risks and ensure that AI integration complemented rather than replaced cognitive engagement and authentic learning.

Table 4: Differences between public and private university students

Institutional Context	Dominant Themes	Representative Excerpts
Public University	Effective integration due to higher proficiency and structured environment; less creativity anxiety	"My proficiency and academic environment help me better use AI tools effectively." "Balancing AI tools with personal input maintains my writing standards."
Private University	Concerns about dependency; loss of originality; greater need for structured guidelines	"I'm concerned about maintaining originality and creativity with AI tools." "AI helps with accuracy, but my unique writing style feels compromised."

Institutional differences prominently influenced perceptions and the effectiveness of AI-tool use. Public university students consistently perceived greater positive impacts, reflecting their structured academic environment and higher initial proficiency. This qualitative finding was confirmed quantitatively, with logistic regression indicating a significantly higher likelihood of writing improvement among public university students (OR = 0.75; for private, $p = 0.035$). Conversely, private university students highlighted a more critical awareness of AI-related drawbacks, emphasizing the importance of tailored pedagogical strategies and explicit ethical guidance within their context.

The triangulated qualitative and quantitative findings illustrate the nuanced and context-sensitive relationship between AI writing tools and the academic writing proficiency of EFL students. Positive grammatical enhancement and efficiency perceptions corresponded directly with measurable quantitative improvements (grammatical accuracy, $d = 0.22$; task achievement, $d = 0.48$). However, the qualitative concerns around creativity loss reflected the quantitative declines in language range ($d = 0.18$), underscoring an essential pedagogical trade-off.

Practically, these findings suggest that educators should implement hybrid instructional models, taking advantage of the strengths of AI tools for grammatical precision and structured drafting support while actively fostering student creativity and originality through guided reflective activities and creative writing tasks. The institutional context should guide the integration practices, with private institutions emphasizing explicit guidance on ethical AI use and creativity enhancement, and public institutions optimizing the structural benefits of AI tools to advance higher-order writing tasks. Overall, balanced pedagogical approaches emphasizing thoughtful integration, ethical clarity, and supportive human mediation would maximize the benefits of AI writing tools while mitigating identified limitations.

The qualitative findings from the semi-structured interviews and focus group discussions revealed complex and at times, conflicting views regarding the influence of AI writing tools such as Grammarly, Write & Improve, and ChatGPT on originality and creativity in student writing.

On the one hand, a standard view among most students was that AI tools were great assistants for lexical enrichment and effective brainstorming. These tools were praised for engaging early thought, providing new vocabulary, and enabling students to develop more logical and articulated arguments. The above findings are consistent with the findings of Pham and Le (2024) who argue that AI-assisted platforms can heighten the possibility of students' exposure to and practice of language, indirectly promoting creative linguistic growth.

These benefits were, nevertheless, offset by serious concerns about loss of creative control and writing homogenization. Some teachers and students were worried that excessive use of AI tools would result in writing that is formally correct but mechanistically written and devoid of the human touch. Among the most prevalent disadvantages mentioned was the compromise of personal voice, with learners commenting that their writing was starting to sound "too polished" or "robotic." This mirrors more current research by Farooqi et al. (2024) and Cotton et al. (2023) who caution that AI suggestions can unknowingly push students in the direction of formulaic or generic-style writing, which minimizes the potential for original expression and critical interpretation of content.

Moreover, the instructors reiterated the need for balanced pedagogy, warning that the sole use of AI tools would not develop higher-order cognitive skills such as synthesis, argumentation, or rhetorical creativity. These results confirm the work of Dang (2024) stressing the ongoing need to teach feedback in addition to peer negotiating and metacognitive thinking to enhance uniqueness and distributed cognitive focus on writing activity.

Institutional context variance also contributed to these sentiments. Public university students who were more likely to exhibit higher initial levels of proficiency and were accustomed to more demanding academic environments appeared to employ AI tools more strategically and analytically. They reported

that their formal academic training enabled them to incorporate AI-offered suggestions without compromising individual voice or creativity. Private university students expressed more concern regarding creative dependence and were more likely to feel that AI tools, while helpful, compromised their originality. This divergence suggests that institutional context and student readiness significantly mediate the perceived impact of AI on creative writing. Lack of training or support in working with AI tools in some private institutions could increase the loss of originality concerns, making context-sensitive teaching practices a key consideration.

Theoretically, these findings highlight the double-edged role of AI software in academic writing, facilitating linguistic productivity and possibly hindering higher-order cognitive development. The Process Writing Approach (Flower & Hayes, 1981), which emphasizes recursive cycles of planning, composing, revising, and reflection, provides a useful paradigm for bridging the balance between algorithmic feedback and human creativity. Although AI tools effectively aid surface-level revision (e.g., word choice, grammar), they are not as effective in creating the deep, through-out processes that are necessary for original and creative thought.

An alternative explanation of the findings is that students may not know how to use AI recommendations critically. Rather than the AI tools themselves stifling creativity, perhaps students' passive or unreflective use of the tools is what diminishes originality. This emphasizes the importance of AI literacy and pedagogical mediation, particularly in less academically formalized contexts.

In general, the effect of AI tools on original thought and original content production among English majors is multifaceted and context dependent. Student and instructor feedback in this study indicated a recognition of the benefits of AI in terms of adding vocabulary, structuring ideas, and increasing productivity but also indicated the concern that excessive use of these tools may result in formulaic, impersonal writing based on surface-level analysis and devoid of depth and creativity. To reduce these dangers, a well-balanced approach to instruction is necessary, an approach that combines AI aid with human review, promotes metacognitive monitoring, and makes room for learners to exercise voice and creativity in writing. Only through such an arrangement can the use of AI tools be certain to augment and not undermine the cognitive activity and creative growth of students in educational writing.

4.3 Differences in AI Writing Tool Use and Perceptions by Institutional Context (RQ3)

This section addresses Research Question 3 ("How do students from public and private universities differ in their use of AI-assisted writing tools and what are the perceived benefits of these tools?"). Logistic regression analysis quantitatively examined how institutional affiliation (public vs private) predicted significant improvements in students' writing performance. These results are summarized and interpreted in Table 5.

Table 5: Institutional affiliation as a predictor of writing improvement

Predictor	Odds Ratio (OR)	95% Confidence Interval	*p*-value	Practical Interpretation
Public university affiliation (reference: private)	1.33	[1.03, 1.72]	0.028*	Public university students had a 33% higher likelihood of significantly improving writing performance with AI tools than their private counterparts.

*$p < 0.05$ indicates statistical significance

The quantitative findings indicated a statistically significant institutional effect ($p = 0.028$), with public university students being significantly more likely (OR = 1.33) to demonstrate substantial writing improvements after using AI tools than their private university peers. Effect size and odds ratio confirm meaningful practical differences, underscoring the importance of institutional context, including initial proficiency and academic environment quality, in shaping AI tool effectiveness.

Qualitative insights from the semi-structured interviews and focus groups further highlighted substantial institutional differences in AI tool use and perceptions. These are clearly presented and summarized in Table 6.

Table 6: Key perception differences between public and private university students

Theme	Public University Students	Private University Students
Integration into Writing Routine	AI feedback regularly and effectively integrated into structured routines	Irregular integration; less-structured usage
Perceived Benefits	Strongly emphasized improvements in grammar, accuracy, and task fulfillment	Valued AI for grammar but questioned overall effectiveness for creativity and originality
Concerns of Over-reliance & Creativity	Lower anxiety about creativity loss; fewer concerns about dependency expressed	Higher anxiety about creativity loss; frequently mentioned over-dependence as problematic
Need for Institutional Support	Minimal need; benefited from rigorous academic environments	Strongly expressed a need for additional structured training and guidelines

The qualitative data explicitly confirmed the quantitative findings. Public university students typically viewed AI tools as integral support systems within their structured academic environments, resulting in effective use and notable performance gains. One public university student stated,

> "*The structured academic expectations at my university encourage regular, purposeful use of AI feedback, making my writing better and more efficient.*"

In contrast, private university students frequently expressed heightened concerns about potential loss of creativity, originality, and over-dependence. They also emphasized the need for more structured guidance and instructional support in order to use AI tools effectively. One private university student articulated,

> "*Although Grammarly and Write & Improve help my grammar, I struggle with maintaining my personal style and originality without additional support.*"

Table 7 integrates these qualitative perceptions with the quantitative findings, demonstrating explicit alignment between data strands and emphasizing triangulation.

Table 7: Differences between public and private university students

Institutional Context	Quantitative Findings	Qualitative Findings	Integrated Interpretation
Public University	Significantly higher odds of improvement (OR = 1.33, p = 0.028).	Effective AI integration, structured usage, minimal concerns about creativity loss.	Structured academic environments enhance effective AI tool integration, leading to tangible writing improvements.
Private University	Significantly lower odds of improvement than in public students.	Concerns about creativity loss, originality, and dependency; call for structured support.	Lack of structured guidelines and lower initial proficiency hinder optimal AI tool use, reducing overall effectiveness.

The quantitative results from the logistic regression analysis also indicated that institutional affiliation was a significant predictor of writing improvement. This concurs with Huang et al. (2021) who indicated that more rigorous academic environments are more likely to facilitate larger learning outcomes in the use of technology. In the present study, public university students demonstrated a more critical and strategic use of AI tools, especially Grammarly and Write & Improve, for detecting surface errors, enhancing sentence structure, and responding to task demands. These students were more likely to enter university with more English proficiency and familiarity with formal academic writing conventions, which probably enabled a more effective use of AI-provided feedback.

The qualitative results corroborated these trends. Students at public universities consistently characterized AI tools as ancillary support within structured writing routines, considering them valuable for editing grammar, creating coherence, and facilitating overall writing fluidity. Teaching staff at public universities also noted significant improvement in the clarity and accuracy of student drafts, with students demonstrating growing mastery of complex grammar structures and stylistic versatility. These impressions support the research by Kohnke (2024) who

noted the effectiveness of AI grammar tools in reducing mechanical errors and promoting syntactic accuracy.

While appreciating the convenience of access and the immediacy of AI feedback, private university students were more bothered about creativity loss and over-reliance on machine suggestions. Several students described how the writing began to feel impersonal or too formulaic, aligning with the critiques or assessments of Cotton et al. (2023) and Farooqi et al. (2024), who argue that overuse of AI will lead to formulaic writing conventions and diminished authorial voice. Private institution teachers also reported that students could not evaluate or selectively apply AI feedback and tended to follow suggestions uncritically. This aligns with Dang (2024), who advocated pedagogical mediation in facilitating students' metacognitive awareness and writing autonomy, particularly in EFL contexts.

Cumulatively, these findings underscore the underlying influence of institutional context in mediating the pedagogical promise of AI writing tools. Public university students, supported by more academically demanding curricula and higher initial proficiency, appeared better situated to take advantage of AI tools as scaffolding for writing development. Conversely, private university students, who might have had fewer formal writing courses and more guided instruction, were more vulnerable to AI limitations—especially in terms of lowered creativity, over-reliance, and diminished critical interaction with feedback.

Theoretically, the differential results between student groups underscore the need to account for socio-academic context and learner preparedness in ascertaining technology effectiveness. Although AI writing tools offer affordances for automated linguistic support, their impact is mediated by users' prior knowledge, writing habits, and institutional norms. Students in more academically structured contexts are more likely to use AI tools metacognitively as supplements to their present writing strategies. However, students in less structured contexts may use AI as a substitute for cognitive effort, threatening higher-level writing development.

To offset these disparities, pedagogical interventions must be context sensitive. In public universities, instructional designs may try to move AI applications to higher-order areas of writing such as argumentation, discourse cohesion, and rhetorical organization, making use of students' experience and autonomy. Furthermore, AI tools may be embedded in more complex writing tasks with critical thinking and content integration.

In private universities, scaffolding must emphasize explicit instruction in AI literacy, including interpreting, evaluating, and selectively applying feedback. Curriculum designers must incorporate reflective writing, peer collaboration, and teacher-guided revision to reinforce writing agency and creativity. This approach aligns with recommendations by Okolie and Egbon (2024) who advocate hybrid approaches to AI adoption, blending the promise of automation with

human-centered learning designs to develop independent and innovative cultures of writing.

In general, the pedagogical worth of AI writing tools is not so much determined by the technology itself but by the learning environment in which it is introduced. While AI programs show quantifiable value in enhancing grammar and task performance, their overall instructional value depends on how well they align with students' learning profiles and are embedded in supportive instructional models. Public schools can realize maximum gains through upper-level integration into writing curricula, but private schools must prioritize instructional scaffolding and ethical guidance to prevent dependency and ensure student creativity. Therefore, context-specific, tailored strategies are required to ensure AI writing tools' equitable and ethical implementation in diverse EFL instructional environments.

5. Conclusion

This study investigated the impact of AI-powered writing softwares, namely Grammarly, Write & Improve, and Slick Write, on the production of academic writing by English majors in Vietnamese public and private universities. In a convergent mixed-methods design, this study revealed that all three tools positively affected grammatical correctness and the accomplishment of tasks, particularly among students at public universities. These improvements were attributed to the structured academic environments and higher initial levels of proficiency that are characteristic of public institutions, which appeared to enable a more strategic and practical application of AI-generated feedback. Conversely, the tools had minimal impacts on content coherence. They were associated with a small reduction in language range, suggesting that while AI tools could enhance surface-level accuracy, they could have the unintended consequence of constraining lexical range and creative expression.

These findings underscore the requirement for institutional context to facilitate the pedagogical effectiveness of AI writing support. Students in private universities were more troubled by the loss of individual voice and uniqueness, suggesting excessive dependence on computer-generated suggestion without proper education on how to critique AI-provided content. This recognizes a need for pedagogic practices that are sensitive to contextual determinants, including variations in students' level of scholarly preparedness, digital literacy, and availability of teaching assist. Curricularly, AI-tool integration must move beyond grammar correction and be integrated meaningfully into the writing process, particularly during the drafting and revision phases. Curricula for writing should have space for students to engage critically with AI feedback in addition to the explicit teaching of feedback literacy in order to develop independent thought and authorial agency.

Teacher education and professional development are also essential to successful AI implementation in writing pedagogy. Teachers need to be taught not only the technical use of AI tools but also how to guide students toward the responsible and ethical use of automated feedback. Institutional policies should offer clear

guidelines for proper AI use, emphasizing academic integrity, the distinction between support and substitution, and preserving student creativity. Furthermore, there should be differentiated approaches for various types of institutions. Public institutions can use AI as an extension of advanced rhetorical and cognitive writing tasks, while private schools must make systematic training and scaffolding compulsory to prevent over-reliance and to encourage originality.

Despite the contribution of the study, some limitations need to be acknowledged. The research was limited to two universities in Hanoi, Vietnam, and this might restrict generalizability to other Vietnamese education contexts or broader EFL contexts. Although suitable for classroom-based research, the quasi-experimental approach did not allow full control over confounding variables such as students' prior exposure to AI tools or their digital literacy levels. In addition, the qualitative results were drawn from a comparatively small number of interviews and focus group participants and thus may not reflect the full range of experience and perspectives in the broader student body.

Future research should consider longitudinal designs to examine the long-term impact of AI writing tools and how student engagement shifts with sustained use. Comparative studies within various institutional contexts, rural, non-English-majors, or under-resourced settings, would further demonstrate how contextual conditions affect AI integration. Additional research on the influence of teacher mediation, peer feedback, and reflective practice on students' ability to use AI commentary effectively must also be done. Furthermore, study of the influence of AI tools on original composition and voice formation and how to enable both linguistic correctness and expressive agency better in university writing would also be a worthwhile line of research.

In conclusion, computer-writing assistance tools offer measurable benefits in fostering students' grammatical accuracy and task success. However, their pedagogical value hinges on the thoughtful integration into pedagogy and sensitivity to context. When implemented in well-structured, ethically guided, and pedagogically grounded systems, AI tools can effectively complement traditional instruction, enhancing writing correctness and students' capacity for autonomous, critical, and innovative processing of the writing task.

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