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Experiences of ESL Students and Instructors Using Grammarly in Academic Writing

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Abstract

Incorporating artificial intelligence writing assistants (AIWAs) into academic writing provides opportunities to improve higher educational formative assessment. The current study seeks to examine the effectiveness of Grammarly, an AI writing assistant (AIWA), in providing instantaneous and personalised feedback to English as a second language (ESL) graduate students. The data were collected through semi-structured interviews and focus group discussions with 30 graduate students and five writing instructors with more than three years of teaching experience in graduate writing at a Malaysian public university. The results demonstrated that Grammarly enhanced student motivation, engagement, and writing proficiency through constant and detailed feedback compared to conventional approaches with time constraints and high subjectivity. However, the findings also highlighted limitations in the variety of feedback provided by Grammarly particularly in addressing nuanced academic writing needs and tailoring suggestions for complex content. Furthermore, Grammarly can support self-regulated learning while decreasing writing anxiety. This finding contributes to the ongoing discourse on AI incorporation in education and employing a balanced method in incorporating AI feedback with human oversights. This limitation underscores the importance of using Grammarly as a complementary tool rather than a standalone solution. Summarily, incorporating AIWAs responsibly can assist in providing a more conducive learning context for students' future academic and professional endeavours.

Keywords: AI writing assistants, Grammarly, formative assessment, ESL academic writing, self-regulated learning

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1. INTRODUCTION

Academic writing is an effective, challenging, and intricate journey that can shape students' academic and professional success (Şahan & Sahan, 2023). It is also an essential, integrative, and sophisticated process for native and international students (Lo, 2023; Phyo et al., 2023). Specifically, English as a second language (ESL) graduate students encounter various educational and language barriers in English academic writing (Jónsdóttir et al., 2023). To support the students, instructors use monitoring processes involving continual evaluation through drafting, reviewing, and providing constructive feedback, whether written or oral. However, such feedback practices are labour-intensive, time-consuming, and often subjective, particularly when instructors are responsible for large classes or multiple sections.

To address these challenges, computer-based applications provide efficient alternatives. For example, Automated Written Corrective Feedback (AWCF) systems generate immediate error-focused suggestions, Automated Writing Evaluation (AWE) tools assess broader writing quality (coherence and organization), and Automated Essay Scoring (AES) programs provide holistic scores to benchmark student writing performance. More recently, writing applications integrated with artificial intelligence (AI), such as Grammarly and Quill Bot, have emerged as valuable aids. These tools help students learn and develop essential writing skills more effectively compared to conventional approaches that are constrained by limited time and instructor workload (Daulay et al., 2024; Kurniati & Fithriani, 2022).

The AI comprehensively defines an automated device simulating human intelligence processes, including learning, reasoning, and self-correction (Yu & Lu, 2021). AI-integrated writing tools potentially increase flexibility and save time through AWE, AES, and AWCF. Furthermore, AI offers alternative teaching and learning experiences, including tutoring, content generation, assessments, and feedback (Alam, 2023). Numerous AI tools also offer holistic instruction and are embedded with the plagiarism detection component to help ESL students in research writing (Alharbi, 2023). Simultaneously, AI integration corresponds to mobile learning (m-learning), which is emergent in higher education (Okai-Ugbaje, 2021; Qashou, 2021). This emergence can assist in improving learning processes and outcomes.

Employing automated systems for student progress evaluation and feedback provision is a growing trend for academic writing, as AI can introduce alternative teaching and learning experiences with technological advancements (González-Calatayud et al., 2021). Nevertheless, several challenges have been observed in applying AI to second language (L2) writing. Concurrently, relevant research on digital L2 writing applications was scarce, with educational psychology and other learning sciences garnering little interest. While certain scholars identified pertinent AI impacts on writing, the influences of AI on learning behavioural patterns remained underresearched (Zhai et al., 2021). Meanwhile, preliminary studies highlighted the efficacies of digital technologies in enhancing student engagement despite only several researchers conducting randomised and controlled experiments. Resultantly, limited empirical evidence is available to affirm the causation between digital technologies and learner engagement (Runge et al., 2023).

The impact of AI on writing warrants further investigation, particularly regarding grammatical feedback, as L2 writers often prioritize grammar while overlooking other aspects of writing. Research highlights AI's potential to enhance motivational engagement, affective support, plagiarism detection, analytical learning, and social interaction (Nazari et al., 2021; Tan & Maravilla, 2024), yet a gap remains in leveraging mobile tools to improve students' academic skills and well-being (Gui et al., 2023). Another challenge lies in integrating educational technology to engage learners with diverse self-concepts, attitudes, beliefs, emotions, and motivations. To address these gaps, this study examines ESL students' academic emotions, self-efficacy, and engagement as key constructs in educational psychology, with the following research questions guiding the inquiry:

1. How does Grammarly, as a digital writing assistant, influence engagement, motivation, and writing proficiency of ESL graduate students in academic writing?
2. What are the perspectives of ESL graduate students and writing instructors on the effectiveness of Grammarly in supporting self-regulated learning in academic writing?

2. LITERATURE REVIEW

2.1 Academic AI Writing Assistants

Higher traction in recent years has been garnered for incorporating AI writing assistants (AIWAs) into academic writing, which capitalises on advanced natural language processing (NLP) algorithms to offer instantaneous feedback on coherence, grammar, structure, and style (Nguyen et al., 2024; Punar Özçelik & Yangın Ekşi, 2024). Previous researchers discovered that AIWAs significantly improve learners' writing skills through constant, detailed, and personalised feedback compared to that provided by educators with time constraints (P. Wei et al., 2023). Nevertheless, AIWA's effectiveness in advancing critical thinking and deep learning was scarcely examined. Existing AIWAs may not effectively pinpoint the nuances in academic discourses and critical analyses, which are crucial for higher-level writing despite their high capability to provide accurate grammatical feedback (Ou et al., 2024; Rahmi et al., 2024).

Almulla (2024) revealed that students who used AI-enabled writing tools showed higher engagement and satisfaction than those taught through conventional pedagogy. In addition, AIWAs could decrease writing anxiety through a non-judgmental platform for practice and skill refinement (Fathi & Rahimi, 2024). The AIWAs can also offer scalable writing support, especially in large classrooms with limited individual feedback from educators. The AIWAs could efficiently manage high volumes of student work while offering consistent and objective feedback (Darvishi et al., 2024). Thus, AIWAs are instrumental in higher education with tight resources. Nevertheless, the long-term impact of AI-powered tools on L2 learners' writing development and critical thinking skills requires more empirical evidence (Law, 2024).

Dependence on AIWAs might lead to feedback depersonalisation and the potential decline in nuanced and context-specific guidance provided by human educators (Maphoto et al., 2024). A hybrid methodology consisting of human oversights and AI feedback can be the most effective approach in balancing personalised instruction and scalability. Furthermore, utilising AIWAs in academic writing engenders ethical considerations in terms of feedback accuracy, data privacy, and over-dependence on technologies (X. Wei et al., 2024). Technological tools should serve as supplementary equipment instead of substituting existing pedagogical approaches. The AIWA development and implementation should also be performed in accordance with established ethical standards, with a strong focus on students' learning and development (Akgun & Greenhow, 2022; Chaudhry & Kazim, 2022). Future scholars can develop relevant models for ethical AI usage in education to maintain the positive benefits while preventing negative impacts on academic writing.

2.2 Grammarly

Grammarly has become a prominent AIWA among academicians owing to robust features in improving writing quality via automated feedback and correction (Fitria, 2021). Grammarly was developed with advanced NLP algorithms to holistically support different writing aspects, such as style, punctuation, grammar, and clarity (Özer & Yükselir, 2023). Grammarly is highly valued in higher educational settings, where both native speakers and English language learners (ELLs) struggle with the complexities of academic writing. For instance, the AIWA can administer AWE to immediately determine and rectify grammatical mistakes, which assists in saving educators' time and empowering learners to revise and enhance writing continuously (Alharbi, 2023). The Automated Essay Scoring (AES) function also appraises students' writing through the overall structure and coherence according to the formative assessment principles (Myers & Wilson, 2023).

Grammarly supports students in developing personal writing style and clarity through suggestions for enhancing word choice, sentence structure, and tone to ensure high overall writing legibility and persuasiveness (Calma et al., 2022). The function is highly instrumental for ESL students experiencing challenges in academic vocabulary and idiomatic expressions. Moreover, the AI writing assistant (AIWA) allows automated writing feedback (AWF) to underline passive

voice constructions, repetitive words, and other common writing issues. Grammarly provides detailed explanations and examples to help learners identify areas for improvement, encouraging them to adopt self-regulatory strategies such as revising their writing independently, applying suggested edits, and reflecting on recurring errors to enhance their future writing efforts. Hence, Grammarly is a significant AI advancement in education, which provides scalable support for academic writing across different student populations (Nazari et al., 2021). Nevertheless, more investigations are necessary to corroborate the influence on higher-order writing skills. Potential ethical issues regarding data privacy and the AI role in educational evaluation also require further investigation among the continuous evolution of educational technologies.

2.3 Formative Feedback

Learners in conventional educational contexts do not frequently obtain formative feedback (Morris et al., 2021). Instructors often lack sufficient time owing to overloaded tasks or overcrowded classrooms. Moreover, educators might not possess the necessary skills to evaluate learners' progress (Jong & Tan, 2021). Studies highlighted that such limitations significantly hinder students' opportunities to receive timely and constructive formative feedback (Lee & Yuan, 2021; Morris et al., 2021). The gap in formative feedback is particularly concerning in L2 writing contexts, where tailored feedback could address linguistic and structural challenges unique to ESL learners (Rad et al., 2023).

Particularly, L2 writing educators possess limited professional developmental opportunities owing to limited resources and heavy workloads (Lee & Yuan, 2021). Hence, L2 learners must be intrinsically motivated, responsible, self-regulated, and proactively engaged in deep and meaningful learning. Deep and meaningful learning refers to an active, constructive, self-regulated, cumulative, goal-oriented, collaborative, and individual process of knowledge building and meaning construction based on prior knowledge and situated in a specific context (Nazari et al., 2021), grounded in constructivist principles. However, research has shown that when feedback is delayed, students struggle to sustain this level of engagement, leading to gaps in self-regulation and reduced learning outcomes (Leenknecht et al., 2021; Panadero & Lipnevich, 2022). Timely formative feedback is thus indispensable for bridging this gap.

Hence, delayed feedback is considered denied feedback (Panadero & Lipnevich, 2022), as formative feedback is required to be instantaneous to enhance student achievement, self-regulation, engagement, and motivation (Leenknecht et al., 2021). Grammarly demonstrates potential in this area by providing real-time, actionable feedback on grammar, structure, coherence, and even tone (Shen et al., 2023). For instance, recent studies indicate that using Grammarly significantly improves students' understanding of grammatical rules and sentence construction, reducing error rates by 30% after consistent use over a semester (Adhami & Taghizadeh, 2024). Such evidence underscores the transformative role of AI in formative assessment, particularly in enhancing ESL learners' writing quality.

Accordingly, AI can provide meaningful learning through instantaneous feedback on students' learning progress, enabling them to become more engaged, autonomous, and proactive in deepening their knowledge. The real-time formative feedback with practical and instructional instances offers various opportunities for students' more personalised experiences. For example, Zou et al. (2023) found that integrating Grammarly into academic writing courses not only improved students' writing proficiency but also fostered higher levels of critical thinking and metacognitive awareness as students reflected on AI-generated feedback. These findings are consistent with Gebremariam and Asgede (2023), who observed that learners using Grammarly exhibited greater confidence in their revision strategies.

Previous research revealed that instructional feedback significantly improved writing, problem-solving (Adhami & Taghizadeh, 2024; Zou et al., 2023), and self-regulation (Sherafati & Mahmoudi Largani, 2023; Yang & Zhang, 2023). Additionally, AI feedback is increasingly valuable in L2 writing when instructors are occupied with huge workloads (Rad et al., 2023; Shen et al., 2023). AI-powered tools like Grammarly have demonstrated particular effectiveness in reducing instructors' workload by automating error detection and generating instant feedback

aligned with instructional goals, as highlighted in [Shen et al. \(2023\)](#). This automation not only ensures consistency but also enables students to engage with feedback iteratively, resulting in measurable improvements in their academic writing.

More AI-enabled writing tools can offer accurate and reliable formative feedback and summative evaluation of students' learning, which serves as an authentic educational strategy by constantly monitoring students' knowledge acquisition ([Alharbi, 2023](#)). Authentic pedagogy is related to constructivism in fostering self-development and meaningful learning instead of memorisation or grading. In particular, [Lu et al. \(2024\)](#) reported that students who utilized AI tools like Grammarly as part of their formative feedback process demonstrated a 25% improvement in essay coherence and cohesion compared to those who relied solely on instructor feedback. This evidence further validates the importance of integrating AI tools in formative assessment frameworks to optimize learning outcomes. Resultantly, the self-evaluation process improves students' writing and revision skills ([Gebremariam & Asgede, 2023](#); [Lu et al., 2024](#)).

2.4 Theoretical Framework

The writer(s)-within-community (WWC) model was applied in this study as the theoretical foundation ([Graham, 2018](#); [Graham et al., 2024](#)). The model posits that writing and writing instruction are shaped both by the communities in which they occur and by the cognitive capabilities and resources of educators and writers. Within this framework, the researcher employ five production techniques, namely conceptualisation (creating a mental representation of the task), ideation (generating content from memory or external sources), translation (transforming content into sentences that convey intended meanings), transcription (transcribing printed or digital text), and reconceptualisation (engaging in revision), in the writing process ([Othman & Lo, 2023](#)). The WWC model is most suitable for this study as it addresses both cognitive aspects of writing and the social context in which writers operate that makes it particularly relevant for ESL graduate students using AI writing assistants. Unlike [Flower and Hayes's \(1981\)](#) cognitive process model or [Swales' \(1990\)](#) genre theory, which emphasize either cognition or genre conventions alone, the WWC model integrates both, and offers a comprehensive lens to examine how AI-mediated feedback and human instruction shape writing development. AIWAs such as Grammarly can support all five production techniques by suggesting clearer structures, prompting precise word choices, improving syntax, grammar, and style, and providing revision feedback that accommodates self-regulation and reduces writing anxiety. Grammar checkers, style analysers, and plagiarism detectors provide staged feedback aligned with the WWC model's recursive, socially mediated writing processes ([Guo et al., 2024](#); [Ibrahim, 2023](#); [McCarthy et al., 2022](#)).

Incorporating AIWAs in academic writing corresponds to the principles of formative assessment ([Tang et al., 2024](#)), which prioritizes continuous feedback to determine personal strengths and improvement areas for a thorough comprehension of the subject matter ([Imran & Almusharraf, 2023](#)). Specifically, formative assessment emphasizes timely, constructive, and individualised feedback that guides learners' progress, and AIWAs operationalise these principles by providing instantaneous, targeted suggestions that enable students to monitor, evaluate, and adjust their writing practices in real time. Moreover, AIWAs deliver real-time personalized feedback that raises self-regulation and autonomous learning, while simultaneously improving writing quality and enhancing learner motivation and engagement ([Guo et al., 2024](#)). Concurrently, instructors can overcome challenges of conventional approaches, such as subjectivity and time constraints, while enabling learners to receive objective, consistent feedback. The AIWAs also promote a student-centred setting, which motivates students to possess higher ownership of personal learning ([Chang et al., 2023](#)). This approach aligns with constructivism, where learners build knowledge through environmental interactions and integrating new with prior information. Scaffolded support and self-assessment boost problem-solving and critical thinking to strengthen academic writing and preparing learners for lifelong learning and professional success. Utilizing AIWAs in formative assessment can also reduce the gap between conventional pedagogy and the increasing demands of the digital era ([Kamalov et al., 2023](#)).

3. METHODS

3.1 Research Design

A qualitative research design was employed in this study to explore the application of Grammarly in the formative assessment of academic writing for ESL graduate students. This approach was selected to gain an in-depth understanding of both educators' and learners' perceptions, experiences, and attitudes towards the use of Grammarly in academic writing contexts. The data were collected through semi-structured interviews and focus group discussions (FGD). Specifically, semi-structured interviews were conducted with five writing instructors, each with over three years of experience teaching graduate-level writing at a Malaysian public university. These interviews aimed to understand instructors' insights on the role of Grammarly in supporting ESL students' academic writing development, self-regulated learning, and engagement.

Additionally, focus group discussions were held with 30 ESL graduate students to gauge their experiences and opinions on the use of Grammarly in enhancing their writing skills and motivation. The students were asked to reflect on how Grammarly's feedback influenced their writing proficiency, engagement with the writing process, and emotional responses to feedback. To ensure that the interviews and FGDs addressed the research questions comprehensively, a set of guidelines and instructions was provided (see Appendix A for the interview guidelines and Appendix B for the FGD instructions).

3.2 Research Context

The study was conducted at a Malaysian public university with a large population of English as a second language (ESL) learners. The research site was selected due to its strong emphasis on academic writing courses. The study was carried out during the second semester of the 2023 academic year, when academic writing courses were actively taught and integrated with digital writing tools, providing a relevant context for examining the role of AI writing assistants (AIWAs).

3.3 Research Participants

A total of 30 Master's degree students, enrolled in academic writing courses across the first and third semesters, participated in the study. Students were purposively selected based on the following criteria: (a) enrolment in graduate-level academic writing courses, (b) demonstration of English writing proficiency, and (c) prior or current use of AIWAs, specifically Grammarly. Proficiency levels were determined through the university's English entry requirements namely the International English Language Testing System (IELTS) for international students and the Malaysian University English Test (MUET) for local students, supplemented by students' performance in prior academic writing modules. This approach ensured representation of learners with lower, intermediate, and higher writing abilities. Most participants had prior experience with Grammarly through personal accounts, though the frequency and depth of use varied. This variation allowed exploration of both novice and more experienced AIWA users.

In addition, five writing instructors were recruited to provide complementary insights. Instructors were selected based on the following criteria: (a) a minimum of three years of teaching graduate-level academic writing, (b) regular use and familiarity with Grammarly, and (c) pedagogical approaches that integrated process-based writing instruction. Several instructors had also contributed to academic discourse through research on writing instruction, further enriching the study with both pedagogical and scholarly perspectives. Purposive sampling ensured that both groups were selected for their relevant experiences and perspectives, which were essential for understanding the impact of AIWAs on academic writing in a multicultural and multilingual educational context. To maintain confidentiality, participants are referred to using coded identifiers (e.g., L1, L2 for lecturers; S1, S2 for students) rather than actual names.

3.4 Research Instrument

The research instrument was structured into three main parts, namely interview guide development, pilot testing procedure, and instrument validation, as detailed in the subsections below. Each stage was designed to ensure the clarity, consistency, and reliability of the data collection process.

3.4.1 Interview guide development

The development of the instruments was grounded in both theoretical frameworks (self-regulated learning and formative assessment in higher education) and empirical studies on AI writing assistants (Nguyen et al., 2024; P. Wei et al., 2023). A set of open-ended questions was constructed to encourage participants to elaborate on their experiences. For writing instructors, the interview protocol (see Appendix A) emphasized their perceptions of Grammarly's impact on student engagement, motivation, writing proficiency, and higher-order academic skills such as argumentation and critical thinking. For ESL graduate students, the focus group guidelines (see Appendix B) centred on their direct use of Grammarly, including their perceived improvements in writing and challenges faced.

3.4.2 Pilot testing procedure

To ensure clarity and relevance, a pilot test was conducted with one writing instructor and two ESL graduate students. The pilot interviews helped refine the sequencing and wording of questions, minimizing ambiguity and ensuring that prompts aligned with the study's objectives. Feedback from participants suggested the need for shorter, more focused wording in some questions, as well as clearer differentiation between Grammarly's automated feedback and instructor-provided feedback. For instance, the original instructor interview question, 'Can you describe, in as much detail as possible, how you think your students are engaging with Grammarly in their writing process, and whether you believe this engagement has any observable effects on their motivation to write assignments or drafts in your class?' was revised to a more concise version: 'Can you describe how your students engage with Grammarly? Do you think it impacts their motivation to write? If so, in what way?'. Similarly, in the student focus group guide, the question 'Do you think the feedback you receive on your writing is useful for making improvements? Please explain why you find the feedback helpful or unhelpful' was revised to 'Do you find Grammarly's automated feedback useful in improving your writing? How does this compare to the feedback you receive from your instructors?'. A self-regulated learning question was also refined from 'How do you think Grammarly helps you in managing and organizing your writing assignments overall?' to 'How does Grammarly support you in taking control of your writing process? Does it help you with self-correction and revisions?'. These adjustments ensured shorter, clearer prompts, reduced ambiguity, and elicited more targeted insights on motivation, feedback, and self-regulation, which were then incorporated before proceeding with full data collection.

3.4.3 Instrument validation

To ensure methodological rigor, the instruments underwent expert validation and pilot testing. Two specialists in educational technology and academic writing reviewed the protocols for clarity, content coverage, and alignment with research objectives, emphasizing the need to capture nuanced reflections on self-regulated learning and to address both the affordances and constraints of Grammarly in relation to higher-order academic writing skills. Their feedback informed refinements that enhanced construct validity, comprehensiveness, and contextual sensitivity. Pilot testing further improved sequencing, wording, and flow, ensuring accessibility for ESL participants and addressing ambiguities. The finalized instruments, detailed in Appendices A and B, thus reflect a systematic, ethically sensitive process that strengthens

reliability and credibility, enabling the collection of meaningful and trustworthy data on Grammarly's impact on ESL learners' engagement, motivation, writing proficiency, and self-regulated learning.

3.5 Data Collection and Analysis

The data were collected from both educators and students in the second semester of the 2023 academic year at a Malaysian public university. Each semi-structured interview, conducted individually with educators, lasted approximately 45 minutes. Focus group discussions, designed for students, spanned 45 to 60 minutes to accommodate the interactive nature of the conversations. Focus group discussions were conducted exclusively among students to promote dynamic and interactive conversations about their personal experiences with AIWA, including Grammarly, and to gather qualitative and insightful findings regarding the impact of AIWA on their academic writing practices. All interviews with educators and focus group sessions with students were audio-recorded with participants' written consent before being transcribed verbatim, which ensured high response accuracy for detailed thematic analysis following [Braun and Clarke's \(2006\)](#) six-phase method.

To ensure a deep understanding of participants' AIWA perspectives, interview transcripts were transcribed with AI assistance, cross-checked for accuracy, and repeatedly reviewed to build familiarity with the data. A systematic manual coding process was applied, assigning initial codes to data segments, defining and labelling emerging themes, and synthesizing patterns across interviews and focus group discussions. Despite the modest dataset of five writing instructors, manual coding was feasible and enabled the identification of recurring challenges, efficacies, and impacts of AIWAs on academic writing. Thematic coding produced a cohesive narrative aligned with the study's aims, with findings substantiated by relevant quotations and examples to ensure depth, clarity, and credibility.

Table 1. Summary of the systematic approach taken during data collection.

Activity	Date	Process	Focus	Notes
Semi-structured interviews	16-17 Oct 2023 (Instructors)	Individual interviews	Experiences with AIWAs (Grammarly)	Conducted with the instructors
	23-31 Oct 2023 (Students)			Conducted with the students
Transcription phase 1- 4	18-19 Oct 2023	Verbatim transcription of recordings	Accuracy and completeness	Verbatim transcription of audio recordings to ensure data accuracy.
	21-22 Oct 2023			
	1-7 Nov 2023			
	23-30 Nov 2023			
Focus group discussion 1	20 Oct 2023	Interactive group discussion (5 instructors)	AIWA uses (Grammarly)	Interactive sessions with instructors to explore experiences with AIWAs (specifically Grammarly)
Focus group discussion 2 – 4	20-22 Nov 2023	Interactive group discussion (10 students)	Experiences with AIWAs (Grammarly and others)	Interactive sessions with students to explore experiences with AIWAs, focusing on Grammarly but including other applications (e.g., Turnitin and ProWritingAid)
Thematic coding	1-7 Dec 2023	Coding of qualitative data	Identification of emerging themes	The analysis process commenced to identify key themes from qualitative data.
Review and refinement	11-15 Dec 2023	Review of themes	Refinement and consolidation	Themes were reviewed and refined through collaborative discussions.

Table 1 continued...

Final data synthesis	18-22 Dec 2023	AI-assisted transcription + manual coding	Integration of findings	Themes were synthesized into a cohesive narrative using AI-assisted transcription and manual coding. AI tools transcribed interviews, cross-verified by the researcher for accuracy. Manual thematic coding ensured deeper engagement and accurate capture of contextual nuances.
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The systematic data collection method encompassing in-depth interviews, focus group discussions, transcription, and thematic coding is summarized in Table 1. The triangulation was employed by integrating data from multiple qualitative sources (interviews and focus group discussions) and perspectives (educators and learners), alongside researcher reflections and field notes. This multifaceted approach enhanced the reliability and validity of the findings by corroborating emerging themes across diverse datasets and methodological approaches.

4. FINDINGS

The current section discusses three major themes to thoroughly understand the positive impacts of Grammarly on higher-educational formative assessments based on educators' and learners' experiences and perspectives. The themes are (i) enhanced engagement and motivation, (ii) improvement in writing proficiency, and (iii) support for self-regulated learning. These themes provide a comprehensive view of how Grammarly contributes to the learning process.

4.1 Enhancing Engagement and Motivation

Employing Grammarly has significantly improved students' writing motivation and engagement. The majority of participants (25 out of 30) consistently expressed that Grammarly usage sustained their engagement throughout the writing journey. For example, this improved engagement was expressed by one of the students in Excerpt (1).

- (1) I feel less stressed about writing because Grammarly helps me catch my mistakes and I get to correct them before submission. It boosts my self-confidence and gives me some sort of inner strength and motivates me to improve my writing. (S1)

Excerpt (1) illustrates how Grammarly reduces affective barriers to writing, such as stress and anxiety, while simultaneously enhancing self-confidence. The sense of 'inner strength' mentioned suggests that the tool supports not only technical correction but also psychological empowerment, leading to more sustained motivation in the writing process. Other students ($n = 10$) also noted that the instantaneous feedback function in Grammarly was highly instrumental in sustaining motivation while decreasing anxiety. Excerpt (2) reflects the student's opinion regarding their improved motivation.

- (2) Can I tell you this? I actually take pleasure in knowing Grammarly can and will catch my mistakes. It takes a huge load of pressure off because I get to correct them. I also feel good to write freely. Somehow, I think I like writing more. (S2)

S2 highlights the affective shift from pressure to enjoyment, demonstrating how Grammarly transforms writing into a more approachable and intrinsically rewarding activity. The immediate corrective function appears to cultivate greater writing fluency and willingness to engage in repeated practice, thereby reinforcing long-term motivation. Resultantly, enjoyment and self-assurance were increased, which led to sustained engagement by transforming the writing task from a daunting obligation to a more enjoyable and manageable activity. Similarly, all five educators perceived Grammarly as a useful tool in promoting more responsive and interactive

learning environments, wherein students would be more proactive in gathering writing feedback for subsequent revisions. An educator expressed their opinion regarding this aspect in Excerpt (3).

- (3) My students ask me more specific questions after using Grammarly. They are more engaged in the tasks and writing process. Somehow, they want to know what and why something needs to be changed. This is a tremendous change in most of my students after using Grammarly. (L1)

This account illustrates how Grammarly encourages students to move beyond a passive reception of corrections toward an active inquiry and dialogue with instructors. The shift from surface-level revision to deeper questioning indicates heightened metacognitive engagement, aligning with the principles of self-regulated learning and responsive pedagogy.

Students' proactive attitude demonstrated a higher engagement with learning materials when students not only performed revisions but also actively learnt from the received feedback. Both educators and learners also emphasized the balanced use of technology, despite the benefits of instantaneous feedback. Grammarly should complement human feedback instead of playing a substituting role, as reflected in Excerpt (4).

- (4) Yes, no doubt that Grammarly is great for catching basic errors and helping my students stay engaged, but it can't replace the feedback that I provide on argumentation and critical analysis in the writing process. (L2)

This perspective reinforces the necessity of a balanced approach when Grammarly's corrective affordances are integrated with human feedback to address higher-order skills such as argumentation and critical reasoning. The educator's stance underscores the limitation of AI feedback when used in isolation, highlighting the continued importance of personalized academic mentoring. Therefore, the findings note the significance of a hybrid method by integrating AI feedback with personalized human guidance to provide holistic and meaningful learning experiences.

4.2 Improving Writing Proficiency

Instantaneous feedback on grammar and syntax was another benefit of Grammarly in enhancing writing proficiency. Grammarly not only underlined grammatical errors but also explicated the reasons, which assisted in comprehending grammatical rules. A student expressed their pinion on this aspect in Excerpt (5).

- (5) It looks like all correct to me, but within seconds, Grammarly catches mistakes I didn't even know I was making. It's like I own a grammar policeman that I can summon anytime I want. (S3).

This reflection illustrates how Grammarly functions as an immediate corrective mechanism, making learners aware of hidden errors that they might otherwise overlook. Importantly, the participant frames Grammarly as authoritative 'grammar police', underscoring the tool's perceived dependability and ease of access in providing feedback. Such perceptions suggest that the tool not only corrects but also reinforces attentiveness to linguistic accuracy, thereby strengthening students' internal monitoring of their writing. Hence, instantaneity allows a thorough comprehension of linguistic mechanisms, which aids learners in effectively internalizing and applying grammatical rules.

Continuous use of Grammarly contributed to significant improvement in writing quality, not only by providing grammar corrections but also by encouraging learners to become more confident and skilful writers. By offering real-time explanations for grammatical errors and stylistic suggestions, Grammarly facilitated a deeper understanding of language mechanics, leading students to apply these insights independently in future writing tasks. Furthermore, Grammarly enhanced the overall writing clarity and coherence enhanced by highlighting ambiguous sentences with suggested alternatives to improve personal ideas. One educator delineated their experience in Excerpt (6).

- (6) I had a session with my students for a hands-on practice, and I've seen my students transform their drafts with Grammarly in front of me. For a second, I was like a proud mom. Grammarly prompts them to rethink how they structure and present ideas logically. (L3)

This observation underscores the visible impact of Grammarly in real classroom contexts, where students demonstrated immediate structural improvements in their drafts. The educator's emotional response 'proud mom' reflects the perceived pedagogical value of Grammarly in fostering logical organization and coherence. Thus, Grammarly's scaffolding role goes beyond grammar correction, enabling learners to internalize structural awareness that aligns with academic discourse conventions. Resultantly, Grammarly could increase self-editing skills to generate more sophisticated writing while grasping effective writing techniques.

Grammarly assisted in producing a professional writing style and a higher academic writing standard through the suggestions of stylistic improvements and inconsistency detections in tone. One ESL learner reported their experience in using Grammarly in Excerpt (7).

- (7) Grammarly not only corrects my English but also helps me sound more academic-like. It's like having a personal tutor guiding my writing. (S4)

In Excerpt (7), the learner positioned Grammarly as a surrogate tutor, emphasizing its perceived role in elevating language to a more academic register. This suggests that the tool not only addresses surface-level correctness but also contributes to stylistic refinement. The 'personal tutor' metaphor highlights learners' reliance on Grammarly to bridge the gap between everyday English and academic discourse, reinforcing its perceived role in identity-building as a competent academic writer. Building on this perspective, Grammarly also functions as a linguistic support tool, capable of resolving linguistic barriers via grammar suggestions specific to ESL writing to reduce linguistic gaps. One educator underscored this aspect in Excerpt (8).

- (8) My students' confidence increases with the use of Grammarly. It gives them the tools to express complex ideas fluently, which is crucial for their academic writing success. (L4)

This testimony reveals how Grammarly supports not just technical proficiency but also psychological dimensions of learning, particularly confidence-building. By enabling students to articulate complex ideas more fluently, Grammarly enhances both communicative competence and academic self-efficacy. The statement links writing accuracy to broader academic success, positioning Grammarly as a catalyst for higher-order cognitive and linguistic outcomes.

Grammarly could also adapt feedback to learners from diverse linguistic backgrounds, which demonstrated the wide utility in multicultural educational contexts. Nevertheless, participants emphasized the need for human expertise in Grammarly feedback. This is reflected from one educator's opinion in Excerpt (9).

- (9) Grammarly is invaluable for catching errors, but it can't replace the nuanced feedback I provide on academic arguments and critical analysis. (L5)

This critical perspective introduces a balanced interpretation, acknowledging Grammarly's strength while reinforcing the indispensable role of human instruction. The distinction drawn here is between surface-level correction and higher-order thinking. This duality highlights the complementarity of AI tools and educators, suggesting that effective integration requires synergy rather than substitution.

In sum, Grammarly is a transformative tool that enhances writing proficiency by improving clarity, coherence, grammatical accuracy, and academic style while addressing linguistic barriers. Participant insights show it not only corrects mechanical errors but also builds academic confidence, refines style, and strengthens logical structuring, though human feedback remains essential for critical analysis and argumentation. The findings emphasize Grammarly's potential to support formative assessment in academic writing.

4.3 Supporting Self-Regulated Learning

Grammarly significantly supported self-regulated learning. Learners will take ownership of their personal learning processes and goals by regularly monitoring their progress. Accordingly, Grammarly provides real-time feedback for learners to independently evaluate and enhance personal writing, which corresponds to constructivism. A learner expressed their opinion on this role of Grammarly in Excerpt (10).

- (10) Grammarly helps me spot all my mistakes immediately, and I know how to correct them, which makes me feel more confident in my writing abilities. (S5)

Excerpt (10) illustrates that Grammarly not only provides corrective input but also enhances learners' confidence by enabling them to take direct responsibility for error correction. In this way, the tool does more than highlight mistakes. It builds learners' sense of self-efficacy and aligns with self-regulated learning theory, where confidence is both a motivator and an outcome of proactive learning behaviours. Resultantly, learners will be empowered to formulate self-correction methods and become more proactive and independent in enhancing personal writing skills with higher engagement and responsibilities. Moreover, Grammarly allows a structured environment for learners to perform self-evaluation and self-correction, which are the integral components of self-regulated learning. The instantaneous feedback on punctuation, grammar, and style assists learners in iteratively improving writing, as reported by one educator in Excerpt (11).

- (11) With Grammarly, big changes where many of my students submit their revised drafts as they have corrected many of the glaring errors themselves. (L1)

From Excerpt (11), the educator's observation reinforces the idea that Grammarly supports iterative learning. Instead of passively waiting for teacher corrections, students actively engage with the feedback loop. This demonstrates the shift toward learner autonomy, strengthening the construct of self-regulated learning. The iterative process not only improves writing proficiency but also increases self-assurance in independently managing and improving work. Thus, Grammarly equips learners with the necessary skills for academic success and lifelong learning.

Grammarly motivates learners to establish manageable and specific writing goals, in which received feedback is tailored based on respective objectives, such as technical, academic, or creative. Goal setting encourages a higher sense of ownership in the learning process. A learner elucidated this in Excerpt (12).

- (12) By setting goals in Grammarly, I can focus on improving specific areas of my writing, like clarity and conciseness, which helps me track my progress over time. (S6)

This excerpt underscores that Grammarly's goal-setting feature actively engages learners in the self-monitoring phase of self-regulated learning. By targeting specific writing dimensions, learners demonstrate metacognitive awareness of their strengths and weaknesses, while also fostering motivation to track progress longitudinally. This indicates that Grammarly functions not merely as a corrective device but as a scaffolding tool for structured self-improvement.

The feature also corresponds to self-regulated learning principles, in which learners proactively manage personal educational progress. Therefore, higher autonomy and self-efficacy will be developed. Additionally, Grammarly offers detailed suggestions for revision, which serves as an iterative feedback loop to enhance self-regulatory skills. Learners are motivated to revisit personal writing several times for a higher writing engagement. One educator expressed their opinion related to students' self-regulated learning, as shown in Excerpt (13).

- (13) Grammarly prompts students at their own space and time to think again about their writing and in the revisions stages, making them more thoughtful and deliberate in their writing choices. (L2)

The educator's perspective highlights the reflective dimension of self-regulated learning. Rather than encouraging superficial corrections, Grammarly facilitates deliberate, critical engagement with writing. This demonstrates how AI-based feedback can foster metacognitive skills such as planning, monitoring, and evaluating that are central to autonomous learning. It also shows the potential for students to transition from mechanical error correction to deeper analytical reflection.

The feature not only enhances technical writing dimensions but also encourages the development of self-evaluation skills. However, the guarantee of analytical reflection comes from the learner's active engagement with the feedback provided by Grammarly, as students are encouraged to review and reconsider their writing, allowing them to apply critical thinking and refine their work iteratively. This approach fosters a deeper reflection on their writing choices, promoting a more thoughtful and analytical writing process necessary for academic and professional success. Nevertheless, Grammarly usage should be balanced with human expertise to promote higher-order thinking. Human educators can supplement Grammarly functions by offering nuanced feedback on argumentation, critical analysis, and written content. A hybrid methodology is recommended to maximize AIWA benefits in promoting self-regulated learning, as indicated in Excerpt (14).

(14) Grammarly is an excellent tool for self-regulation, but it should complement, not replace, the detailed feedback that only a human can provide. (L4)

This reinforces the importance of balance between AI feedback and human instruction. While Grammarly provides structured, real-time support that enhances independence, its limitation in addressing higher-order cognitive skills requires complementary human guidance. The educator's perspective validates the need for hybrid pedagogy, combining AIWA-driven autonomy with educator-led critical insights to fully realize the goals of self-regulated learning.

5. DISCUSSION

The current study revealed the transformative potential of Grammarly in enhancing higher educational formative assessment practices, aligning with existing research (Nguyen et al., 2024; P. Wei et al., 2023). Specifically, Grammarly significantly improved student motivation and engagement through instantaneous and interactive feedback. Decreased anxiety was also revealed, leading to higher self-assurance in writing due to Grammarly's capability to precisely underline grammatical and syntactical errors with real-time suggested improvements (Almulla, 2024; Fathi & Rahimi, 2024). The study outcomes corresponded to constructivism, which postulates that effective learning environments will empower learners to embrace ownership of personal learning (Graham, 2018; Graham et al., 2024).

Empirical evidence from both student and educator interviews, as well as focus group discussions, highlighted Grammarly's significant role in improving ESL learners' writing proficiency. Participants noted that Grammarly's real-time grammar and syntax feedback not only helped students identify and correct mistakes but also enhanced their understanding of language mechanics, leading to measurable improvements in writing quality. Educators reported seeing noticeable progress in students' drafts, demonstrating the tool's effectiveness in fostering writing proficiency. Therefore, the data collected from both students and educators strongly supports the positive impact of Grammarly on writing skills. Furthermore, iterative feedback received from Grammarly motivated learners to perform multiple revisions, which facilitated analytical and reflective writing (Darvishi et al., 2024). Iterative feedback enhances technical writing skills and self-evaluation for academic and professional growth (Maphoto et al., 2024; Ou et al., 2024).

Grammarly was effective in pinpointing grammatical errors and suggesting improvements to enhance overall writing coherence and quality (Akgun & Greenhow, 2022; Chaudhry & Kazim, 2022; Darvishi et al., 2024). Prior scholars also demonstrated similar AIWA functions in offering objective and scalable feedback, which was instrumental in large classrooms with limited

personalized feedback from educators (Law, 2024). Thus, incorporating Grammarly into formative assessments not only addressed the practical challenges of conventional feedback approaches but also fulfilled constructivist learning principles by fostering self-regulation and proactive engagement among ESL learners. Moreover, the findings of this study demonstrated that self-regulated learning was significantly encouraged through Grammarly's personalized feedback, allowing students to engage in self-evaluation and self-correction. This structured feedback environment facilitated autonomy, enhanced academic writing abilities, and promoted lifelong learning, consistent with principles of self-regulated learning (Fathi & Rahimi, 2024).

However, Grammarly feedback, while essential for addressing technical errors and reducing linguistic barriers, cannot substitute the nuanced, higher-order thinking necessary for academic writing. Although students valued Grammarly's instantaneous corrections, educators and learners alike emphasized its limitations in supporting argumentation, critical analysis, and conceptual depth. Human guidance remained crucial in developing those higher-order skills. This finding aligns with existing literature (Ou et al., 2024; P. Wei et al., 2023), which underscores the need for human expertise to complement AI feedback. Consequently, Grammarly and similar AIWAs should be used in conjunction with instructor feedback to ensure a balanced, effective approach that strengthens both technical accuracy and higher-order writing skills.

6. CONCLUSION

This study provides empirical evidence on the significant role of Grammarly in enhancing ESL students' writing proficiency, motivation, and engagement. The results suggest that Grammarly's real-time, iterative feedback reduces writing anxiety, supports self-regulated learning, and improves both the coherence and technical accuracy of students' work. By integrating AI-assisted feedback with traditional teaching, learners benefit from a blended environment that fosters autonomy, resilience, and confidence in academic writing. Ultimately, Grammarly proves to be a valuable supplement in higher education, particularly for formative assessments, by addressing technical barriers and encouraging reflective learning practices.

Despite these contributions, the study has several limitations. First, the sample size was relatively small and drawn from a specific ESL learner group, which restricts the generalizability of the findings. Future research should investigate more diverse student populations across different educational contexts and disciplines. Second, the study focused exclusively on Grammarly; further research comparing multiple AIWA tools would provide a broader perspective on their relative effectiveness in enhancing different aspects of academic writing. Ultimately, longitudinal studies are necessary to investigate the sustained impact of AIWA integration on writing proficiency, critical thinking, and higher-order skills. Addressing these areas would deepen understanding of how AI tools can be systematically embedded into educational practices for long-term academic development.

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APPENDICES

Appendix A

Interview Protocol for Writing Instructors

This interview is designed to explore the experiences and perspectives of writing instructors on the use of Grammarly as a Digital Writing Assistant (DWA) in formative assessments for ESL graduate students. The focus is on understanding the impacts on engagement, motivation, writing proficiency, and self-regulated learning.

Table A1. Interview protocol for writing instructors.

No.	Focus	Questions
1	Impact on Engagement and Motivation	<ul style="list-style-type: none"> • Can you describe how your students engage with Grammarly? Do you think it impacts their motivation to write? If so, in what way? • Have you observed any changes in students' writing behavior or attitudes toward writing after using Grammarly?
2	Impact on Writing Proficiency	<ul style="list-style-type: none"> • In your opinion, how has Grammarly contributed to students' writing proficiency, particularly in grammar and sentence structure? • Can you provide examples where students' writing quality improved significantly after using Grammarly?
3	Self-Regulated Learning	<ul style="list-style-type: none"> • Do you think Grammarly promotes self-regulated learning among your students? How does it support them in managing their writing process and revisions? • Have you noticed any changes in students' ability to set and meet writing goals or improve their drafts independently?
4	Effectiveness in ESL Writing	<ul style="list-style-type: none"> • As ESL students face unique challenges, how well do you think Grammarly addresses these challenges, such as syntax, grammar, or tone? • Are there any specific ESL-related areas where you think Grammarly is particularly helpful or insufficient?

Table A1 continued...

5	Perceived Limitations	<ul style="list-style-type: none"> • While Grammarly can catch basic errors, do you think it is adequate for providing detailed feedback on academic arguments or critical analysis in academic writing? • How do you balance Grammarly's feedback with your own, particularly regarding higher-order writing skills such as argumentation and analysis?
6	Overall Perspective on Grammarly	<ul style="list-style-type: none"> • In your experience, do you see Grammarly as an essential tool for ESL academic writing, or do you think there are limitations to its effectiveness? • Do you recommend integrating Grammarly into the writing curriculum? Why or why not?

Appendix B

Focus Group Discussion Guidelines for ESL Graduate Students

This focus group discussion aims to gather insights into the experiences of ESL graduate students using Grammarly as a Digital Writing Assistant (DWA) for academic writing. The discussion will focus on the impact of Grammarly on engagement, motivation, writing proficiency, self-regulated learning.

Table B1. Focus Group Discussion guidelines for ESL graduate students.

No.	Focus	Questions
1	Engagement and motivation	<ul style="list-style-type: none"> • How do you feel about using Grammarly in your writing process? Does it make you feel more confident or motivated to write? • Have you noticed any changes in your writing habits or the amount of time you spend on writing tasks since using Grammarly?
2	Writing proficiency	<ul style="list-style-type: none"> • In what ways has Grammarly helped you improve your writing proficiency, particularly with grammar, syntax, or sentence structure? • Can you recall a specific instance where Grammarly helped you improve an important aspect of your writing?
3	Self-regulated learning	<ul style="list-style-type: none"> • How does Grammarly support you in taking control of your writing process? Does it help you with self-correction and revisions? • Have you set specific writing goals in Grammarly, and how has it helped you achieve them?
4	Effectiveness for ESL writers	<ul style="list-style-type: none"> • Do you feel that Grammarly is particularly helpful for ESL learners? • If yes, how does it help address language barriers such as grammar or tone? • If no, how do you think Grammarly could be improved to better assist ESL learners? • Are there any specific features of Grammarly that are more useful to you as an ESL writer?
5	Limitations of Grammarly	<ul style="list-style-type: none"> • While Grammarly provides instant feedback, do you feel it addresses the more complex aspects of academic writing, like argumentation and critical analysis? • If yes, how do you feel Grammarly addresses complex aspects of academic writing, such as argumentation and critical analysis? • If no, how do you think Grammarly could improve in addressing these more complex aspects of academic writing? • Are there areas in your writing where you feel Grammarly's feedback is not sufficient? If so, which areas?
6	Overall experience with Grammarly	<ul style="list-style-type: none"> • Do you feel that Grammarly has improved your overall writing proficiency? Why or why not? • Would you recommend Grammarly to other ESL students? • What do you think it could improve in the future to better support your academic writing?