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A Comparative Case Study on ChatGPT, Grammarly, and Quillbot in Enhancing the English Writing Skill of EFL Students at Universitas Negeri Semarang

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Abstract

The growing prevalence of artificial intelligence (AI) in language education has altered the academic writing habits, especially among English as a Foreign Language (EFL) students. The paper is aimed to examine the relative impacts of AI-based writing aids, ChatGPT, Grammarly, and Quillbot, on motivation enhancement and content-generation in EFL graduate student at Universitas Negeri Semarang. Using a qualitative comparative case study design, the data were gathered using interviews based on semi-structured interviews with the participants and academic writing samples of the students. The thematic analysis indicated that AI tools have had a substantial effect on the motivation of learners by eliminating anxiety about writing, enhancing confidence, and promoting them to continue academic writing activities. In addition to the superficial linguistic accuracy, the tools also facilitated the higher-order writing skills, such as idea generation, coherence, organization of arguments, and academic tone. The use of generative AI was especially useful in brainstorming and concept development, with grammar and paraphrasing tools helping to make it more clear and lexically diverse. Nevertheless, the results have also pointed at a conflict between greater learner agency and possible dependence, as it should be stressed that critical engagement and ethical use of AI-generated feedback should be considered important. The students also expressed a high level of awareness of academic integrity and perceived AI tools as supplementary scaffolds and not substitutions of autonomous thinking. The novelty of the given work is the establishment of the empirical evidence of the Indonesian graduate EFL setting and the incorporation of motivation and cognitive approaches to explain the development of AI-assisted writing. The findings indicate that AI-based writing tools have the potential to improve affective and cognitive aspects of academic writing, in the cases where these tools are used within guided and ethically informed pedagogical paradigms.

Keywords: AI-Based Writing Tools, EFL Academic Writing, Automated Feedback Systems, Content Development in Writing, Learner Motivation, Qualitative Case Study

1. Introduction

1.1 Background of the Study

In the era of globalization, English has become the dominant language of international communication in education, science, business, and diplomacy. As a result, proficiency in English, particularly in academic writing, has become an essential requirement for students in higher education worldwide (AL-Khalil, 2015; Mar & Nikolov, 2024) [3, 32]. In countries where English is taught as a foreign language (EFL), students are expected not only to master grammatical accuracy but also to express complex ideas clearly, coherently, and critically in written form. Academic writing therefore represents a core indicator of language competence and academic success (Ali & Diab, 2021) [4].

Among the four language skills listening, speaking, reading, and writing writing is widely recognized as the most challenging for EFL learners. Writing requires the integration of linguistic knowledge, cognitive processing, and rhetorical organization (Ken Hyland, 2023; Kravchenko, 2009) [26, 27]. English as a Foreign Language (EFL) students frequently encounter difficulties

in generating ideas, organizing arguments, selecting appropriate vocabulary, and maintaining grammatical accuracy (Rido *et al*., 2018; Sundari, 2022) [47, 54]. In the Indonesian context, several studies have reported that students struggle with coherence, academic style, and confidence in producing independent written texts (Insaniwati, 2023; Sujarwati, 2025) [25, 53]. These challenges often lead to low motivation, writing anxiety, and limited engagement in writing activities.

To address these difficulties, educational institutions have increasingly integrated digital technologies into language learning. One of the most significant developments in recent years is the emergence of Artificial Intelligence (AI)-based writing tools, such as ChatGPT, Grammarly, and QuillBot. These tools employ natural language processing (NLP) and machine learning algorithms to provide real-time feedback on grammar, vocabulary, structure, and content generation (Malik & Bilal, 2024; Özdere, 2023) [31, 39]. Grammarly primarily focuses on grammatical accuracy and stylistic refinement, QuillBot supports paraphrasing and lexical variation, while ChatGPT offers generative assistance such as idea development, text organization, and interactive feedback (Susiani *et al*., 2025; Widiati *et al*., 2023) [55, 60].

Previous research has shown that AI-based writing tools can positively influence EFL students' writing performance. Studies indicate that automated feedback enhances grammatical accuracy, fluency, and lexical diversity (EDEN, 2025; Syuhra *et al*., 2025) [20, 56]. Moreover, these tools provide immediate and individualized feedback, which supports learners' self-regulated learning and reduces dependence on delayed teacher correction (Wu *et al*., 2025) [61]. From a motivational perspective, AI tools have been found to reduce writing anxiety and increase learners' confidence and engagement by offering a non-judgmental and supportive learning environment (Sabourianzadeh & Ahmadi, 2025; Saha, 2025) [49, 50].

Beyond linguistic improvement, recent studies suggest that AI tools also contribute to higher-order aspects of writing, particularly content development and idea organization. ChatGPT, for example, enables learners to brainstorm topics, develop arguments, and explore alternative perspectives through interactive dialogue (Öksüz, 2025; Toosi, 2025) [38, 59]. QuillBot facilitates semantic expansion through paraphrasing and rewording, while Grammarly supports clarity and coherence through structural and stylistic suggestions (Aziza, 2025; Raheem *et al*., 2023) [8, 46]. These features allow students to focus more on meaning construction rather than solely on surface-level errors, which aligns with Cognitive Load Theory (Lukešová *et al*., 2026) [30].

However, the increasing use of AI-based writing tools also raises pedagogical and ethical concerns. Scholars have warned that excessive reliance on AI may reduce students' opportunities to develop independent writing skills, critical thinking, and originality (Chua & A, 2025; Öksüz, 2025) [15, 38]. Issues related to plagiarism, authorship, and academic integrity have become central in discussions of AI use in education (Aaron *et al*., 2025; Perkins, 2023) [1, 43]. Therefore, while AI tools offer substantial pedagogical benefits, their role in fostering genuine learning rather than replacing cognitive effort remains a critical question.

In the Indonesian EFL context, research on AI-assisted writing is still limited and fragmented. Existing studies mainly focus on single tools, particularly Grammarly or ChatGPT, and emphasize grammatical accuracy rather than motivational and content-related dimensions (Sujarwati, 2025; Syuhra *et al*., 2025) [53, 56]. Few studies have adopted a comparative approach that examines how different AI-based writing tools uniquely influence students' motivation, content development, and overall writing skills. Furthermore, little empirical evidence is available regarding graduate-level EFL students, whose academic writing demands are more complex and cognitively demanding.

Given these gaps, there is a need for a comprehensive investigation of how multiple AI-based writing tools ChatGPT, Grammarly, and QuillBot affect EFL students' writing development, particularly in terms of motivational enhancement and content enhancement. Understanding students' perceptions of these tools and identifying which tool is most preferred can provide valuable insights for educators and curriculum designers in integrating AI responsibly into writing instruction.

Therefore, this study aims to conduct a comparative case study on the use of ChatGPT, Grammarly, and QuillBot in enhancing the English writing skills of EFL students at Universitas Negeri Semarang, with specific attention to motivation and content development. The findings are expected to contribute to both theoretical understanding of AI-assisted language learning and practical guidance for the effective and ethical use of AI tools in EFL writing pedagogy.

1.2 Research Gap

A growing body of research has examined the role of Artificial Intelligence (AI)-based writing tools such as Grammarly, QuillBot, and ChatGPT in English as a Foreign Language (EFL) writing instruction. Most existing studies have reported positive effects on linguistic accuracy, particularly in grammar, vocabulary, and spelling (Mlakar *et al*., 2025; Özdere, 2023; Susiani *et al*., 2025) [33, 39, 55]. However, the majority of this research has concentrated on surface-level aspects of writing performance rather than on higher-order writing processes, such as idea development, coherence, and learner motivation.

Furthermore, previous studies have tended to investigate these tools in isolation. For instance, ChatGPT has been explored primarily in relation to interactive learning and engagement (Saha, 2025; Toosi, 2025) [50, 59], while Grammarly and QuillBot have been associated mainly with corrective feedback and paraphrasing functions (Nasher *et al*., 2025; Raheem *et al*., 2023) [36, 46]. Few studies have conducted a systematic comparative analysis of how different AI-based writing tools influence multiple dimensions of writing simultaneously, particularly motivational enhancement and content development within the same learning context.

In addition, although motivation has been recognized as a crucial factor in successful second language writing (Demirbulak, 2022; Listyani, 2022) [18, 29], empirical studies examining how AI-based feedback affects learners' intrinsic motivation, confidence, and engagement in writing tasks remain limited. Existing research often treats motivation as a secondary outcome rather than as a central analytical variable. As a result, the psychological and affective dimensions of AI-assisted writing are still underexplored in comparison to linguistic accuracy.

Another limitation of prior research concerns the lack of contextual diversity. Most studies on AI-assisted writing

have been conducted in Western or technologically advanced educational settings Malik & Bilal, (2024) [31]; Özdere, (2023) [39], where learners are assumed to possess high digital literacy and autonomous learning habits. In contrast, the Indonesian EFL context is characterized by teacher-centered instructional traditions and strong reliance on guided learning (Insaniwati, 2023; Sari & Sofeny, 2025) [25, 51]. Consequently, it remains unclear how AI-based writing tools function within this sociocultural learning environment and how they influence students' motivation and content development.

Moreover, research focusing on graduate-level EFL learners is still scarce. Most existing studies target secondary school or undergraduate students and emphasize short-term improvements in grammar or fluency Sujarwati., (2025) [53]; Syuhra *et al* (2025) [56]. Graduate students, however, face more complex academic writing demands that require higher levels of critical thinking, argumentation, and originality. There is therefore a need for empirical investigation into how AI tools support advanced academic writing among postgraduate EFL learners.

Taken together, these limitations indicate a significant research gap: there is insufficient comparative and context-sensitive research examining how multiple AI-based writing tools specifically ChatGPT, Grammarly, and QuillBot affect both motivational enhancement and content enhancement of EFL students' academic writing in Indonesian higher education.

1.3 Research Novelty

This study offers several novel contributions to the field of English language education and AI-assisted language learning.

First, the study adopts a comparative framework that simultaneously examines three widely used AI-based writing tools ChatGPT, Grammarly, and QuillBot rather than focusing on a single tool. By analyzing their distinct functions (generative support, corrective feedback, and paraphrasing assistance), this research provides a more comprehensive understanding of how different types of AI tools contribute differently to EFL students' writing development.

Second, unlike previous studies that emphasize grammatical accuracy and error reduction, this research foregrounds two underexplored dimensions of writing development: motivational enhancement and content enhancement. By integrating affective (motivation, confidence, engagement) and cognitive (idea development, coherence, and argument quality) perspectives, the study extends existing research beyond surface-level linguistic improvement toward deeper learning outcomes.

Third, this study contributes original empirical evidence from the Indonesian EFL context, particularly at the graduate level. While much of the existing literature is based on Western or undergraduate populations, this research focuses on master's-level EFL students at Universitas Negeri Semarang, whose academic writing needs involve advanced critical thinking and scholarly communication. This localized perspective adds contextual depth to global discussions on AI-assisted writing pedagogy.

Fourth, the study integrates multiple theoretical frameworks Self-Determination Theory, Cognitive Load Theory, and Sociocultural Theory to explain how AI tools influence both motivation and content development. This theoretical integration provides a more holistic explanation of AI-assisted writing as a cognitive, psychological, and socially mediated learning process, which has rarely been addressed in previous single-theory studies.

Finally, this research addresses the pedagogical tension between technological assistance and learner autonomy. By examining both the benefits and potential risks of AI use, the study offers practical insights into how AI tools can be incorporated responsibly into EFL writing instruction without undermining students' independent thinking and originality. In this way, the study contributes not only to theory but also to evidence-based guidance for teachers and curriculum designers in higher education.

1.4 Problem Formulation

Based on the identified research gap and the challenges faced by EFL students in developing academic writing skills, particularly in relation to motivation and content development through AI-assisted tools, this study is guided by the following research questions:

1. To what extent do ChatGPT, Grammarly, and QuillBot influence the English writing skills of EFL students at Universitas Negeri Semarang in terms of motivational enhancement and content enhancement?
2. How do EFL students perceive the use of AI-based writing tools (ChatGPT, Grammarly, and QuillBot) in supporting their academic writing development?
3. Which AI-based writing tool is most preferred by EFL students, and what factors (e.g., usability, feedback quality, motivational impact, and content support) influence their preference?

1.5 Research Objectives

In line with the research questions, this study aims to:

1. To examine the effects of ChatGPT, Grammarly, and QuillBot on EFL students' English writing skills, with specific emphasis on motivational enhancement and content enhancement.
2. To explore EFL students' perceptions of AI-based writing tools in relation to their usefulness, ease of use, and impact on motivation and writing content development.
3. To identify the most preferred AI-based writing tool among EFL students and to analyze the factors influencing their preference.

2. Literature review

2.1 AI-Based Writing Tools in EFL Education

The integration of Artificial Intelligence (AI) into language education has expanded rapidly with the development of AI-based writing tools such as Grammarly, QuillBot, and ChatGPT. These tools rely on natural language processing (NLP) and machine learning algorithms to provide automated feedback on grammar, vocabulary, coherence, and text generation Malik & Bilal (2024) [31]; Ozdere; (2023). Their increasing use in EFL contexts reflects a shift from teacher-centered feedback toward technology-mediated, learner-centered writing support.

Previous studies have consistently reported positive effects of AI-based writing tools on surface-level writing performance. Susiani *et al* (2025) [55], found that Grammarly significantly improved grammatical accuracy and reduced mechanical errors among Iranian EFL learners. Similarly, (Shi *et al*., 2025) [52], demonstrated that automated writing

evaluation systems enhanced fluency and lexical diversity in students' essays. These findings suggest that AI tools effectively function as corrective and diagnostic instruments that support linguistic accuracy.

However, scholars caution that these improvements are often limited to technical aspects of writing. Raheem *et al* (2023) [46] argue that AI feedback tends to prioritize form over meaning, which may encourage students to focus on error correction rather than idea development. This critique highlights a central tension in AI-assisted writing: while AI can improve linguistic accuracy, its role in fostering higher-order writing skills remains contested.

Recent research has expanded beyond grammar to explore AI as a cognitive and pedagogical scaffold. Toosi *et al*. (2025) reported that ChatGPT enabled learners to brainstorm ideas and organize arguments more effectively through interactive dialogue. In Oksuz., (2025) research, similarly found that generative AI facilitated deeper engagement with content by prompting learners to reconsider structure and coherence. These studies indicate that AI tools may support not only mechanical correction but also conceptual development when used interactively.

Despite these promising findings, concerns regarding overreliance and diminished learner autonomy persist. The research by (Octaberlina *et al*., 2024) [37] warn that excessive dependence on AI-generated text may weaken students' critical thinking and originality. Thus, existing literature presents a dual perspective: AI tools enhance writing efficiency and quality, yet they risk transforming learners into passive recipients if not pedagogically guided.

2.2 EFL Writing Challenges and the Role of Technology

Writing is widely regarded as the most demanding language skill for EFL learners due to its cognitive complexity and linguistic requirements Ken Hyland., (2023) [26]; Kravchenko, (2009) [27]. EFL students must integrate grammatical knowledge, vocabulary, rhetorical structure, and critical thinking while producing coherent texts. In many contexts, students struggle with idea generation, coherence, and confidence in academic writing (Ali & Diab, 2021; Romrome & Pegunungan, 2026) [4, 48].

In Indonesia, research has documented persistent difficulties in academic writing. Rido *et al*., (2018) [47] and Sari & Sofeny; (2025) [51] found that writing instruction remained largely product-oriented and teacher-centered, limiting students' opportunities for independent writing practice. More recent studies confirm that Indonesian EFL students experience challenges in coherence, argumentation, and academic style Sujarwati., (2025) [53]; and Insaniwati., (2023) [25]. These difficulties often result in low motivation and writing anxiety.

Digital tools have been introduced to address these limitations by providing immediate and individualized feedback. Wu *et al*., (2025) [61] demonstrated that automated feedback systems helped students revise more frequently and independently. Compared with traditional teacher feedback, AI tools offer constant accessibility and consistency, which supports self-regulated learning Eden., (2025) [20].

Nevertheless, some studies report that learners accept AI feedback mechanically without reflection. (Murtisari *et al*., 2025) [35], observed that Indonesian students using Grammarly improved accuracy but rarely questioned the correctness of suggestions. This indicates that technological support alone does not guarantee deeper learning; it must be integrated into pedagogical frameworks that promote critical engagement.

2.3 Motivational Enhancement through AI Tools

Motivation is a key determinant of successful second language writing (Dörnyei, 2005). Self-Determination Theory Listyani, (2022) [29] explains that learners' motivation increases when autonomy, competence, and relatedness are satisfied. AI-based writing tools have been found to influence these psychological needs through personalized and immediate feedback.

Several studies indicate that AI tools enhance learners' confidence and engagement. Tajik (2025) reported that EFL students experienced reduced anxiety and increased willingness to write when using Grammarly and ChatGPT. Saha, (2025) [50] similarly found that interactive AI platforms transformed writing from a stressful activity into a supportive learning experience. These findings suggest that AI tools can function as motivational scaffolds by offering non-judgmental feedback and continuous assistance.

From a cognitive perspective, Cognitive Load Theory Lukesova *et al*, (2026) [30] explains that AI tools reduce extraneous load by handling mechanical tasks such as grammar correction, allowing learners to focus on idea development. Research by (Thi *et al*., 2024) [57] showed that students using AI feedback demonstrated greater persistence in writing tasks because the workload became more manageable.

However, motivational benefits are not universal. A research by (Herdanu *et al*., 2025) [23], caution that students may become dependent on AI and lose confidence in writing without technological support. This paradox suggests that AI simultaneously increases short-term motivation while potentially undermining long-term autonomy if misused. Therefore, motivation should be examined not only as a positive outcome but also in relation to learner agency and independence.

2.4 Content Enhancement and Higher-Order Writing Skills

Beyond motivation, content development represents a crucial dimension of academic writing. Content enhancement involves idea generation, coherence, argumentation, and conceptual clarity Ken Hyland, (2023) [26]. Recent studies show that AI tools can contribute to these higher-order skills.

ChatGPT has been identified as particularly effective in idea development. Toosi *et al*. (2025) found that learners used ChatGPT as a brainstorming partner, enabling them to explore multiple perspectives and organize arguments more logically. Similarly, (Mohammad, 2025) [34], observed that students' essays exhibited improved coherence and thematic unity after interacting with generative AI prompts.

QuillBot supports content enhancement through paraphrasing and lexical diversification. (ARIMBI, 2025) [7], reported that students expanded their vocabulary and reduced redundancy by engaging with alternative sentence constructions. This aligns with Schema Theory (Aihua & Swanto, 2024) [2], which suggests that exposure to varied linguistic forms strengthens conceptual networks.

Grammarly, while primarily corrective, also contributes to clarity and readability. Aziza., (2025) [8] demonstrated that Grammarly's feedback improved paragraph coherence and

academic tone, indirectly supporting content quality.

Nevertheless, several scholars caution against uncritical acceptance of AI-generated ideas. Oksuz., (2025) argue that while AI improves structure, it may reduce originality if learners rely on generated content without reflection. This concern aligns with Critical Pedagogy (Patrick O. Akinsanya *et al*., 2022) [41], which emphasizes learners' active role in constructing knowledge rather than consuming it.

Thus, content enhancement through AI is not automatic; it depends on learners' critical engagement with feedback.

2.5 Comparative Studies on ChatGPT, Grammarly, and QuillBot

Comparative research reveals functional differences among AI tools. Research by Mlaker *et al*, (2025) found that Grammarly was more effective in improving grammatical accuracy, whereas QuillBot enhanced lexical variation. The study by (Chiarello *et al*., 2024; Dwivedi *et al*., 2024) [14, 19], showed that ChatGPT contributed more strongly to idea generation and text organization.

Motivational outcomes also differ. Nasher *et al* (2025) [36] reported that ChatGPT produced higher engagement due to its conversational interface, while Grammarly and QuillBot were perceived as technical editors. This distinction supports Sociocultural Theory (Pathan *et al*., 2018) [40], which views learning as mediated through interaction.

Indonesian studies confirm similar patterns. Research by (Anis, Namous, 2024) [6], found that students preferred ChatGPT for brainstorming, Grammarly for grammar, and QuillBot for paraphrasing. However, (Fathinah *et al*., 2025) [22], observed that some students copied ChatGPT outputs directly, indicating risks of dependency.

Despite these findings, most comparative studies focus on accuracy and fluency rather than on motivation and content simultaneously.

2.6 Synthesis and Research Gap

Overall, existing literature demonstrates that AI-based writing tools enhance grammatical accuracy, fluency, and short-term motivation. Emerging evidence also suggests benefits for content development and idea organization. However, four limitations are listed below:

1. Most studies examine single tools, not multiple tools comparatively.
2. Research emphasizes linguistic accuracy, not motivation and content together.
3. Few studies focus on Indonesian graduate-level EFL learners.
4. Limited attention is given to the balance between AI assistance and learner autonomy.

Therefore, there is a need for a comparative and context-sensitive investigation of ChatGPT, Grammarly, and QuillBot that integrates motivational and content dimensions within Indonesian higher education.

2.7 Conceptual Framework

This study is grounded in the assumption that Artificial Intelligence (AI)-based writing tools function as pedagogical mediators that influence EFL students' writing development through both cognitive and affective pathways. The conceptual framework positions ChatGPT, Grammarly, and QuillBot as independent variables that affect two primary dependent variables: motivational enhancement and content enhancement in English academic writing.

The framework is informed by three major theoretical perspectives: Self-Determination Theory (SDT), Cognitive Load Theory (CLT), and Sociocultural Theory (SCT). Together, these theories explain how AI-based writing tools can support students' engagement, idea development, and writing quality.

1. AI-Based Writing Tools as Learning Mediators

ChatGPT, Grammarly, and QuillBot are conceptualized as digital learning mediators that provide automated feedback and interactive support during the writing process. ChatGPT offers generative and dialogic assistance that enables learners to brainstorm ideas, structure arguments, and receive explanatory feedback (Toosi *et al*., 2025) and Ozdere. *et al*., (2023). Grammarly primarily provides corrective and stylistic feedback related to grammar, coherence, and clarity Susiani *et al*., (2025) [55], while QuillBot supports paraphrasing and lexical variation through reformulation of sentences Raheem *et al*, (2023) [46].

Within this framework, these tools are not treated as replacements for learners' cognitive effort but as scaffolding mechanisms that support writing development. This perspective aligns with Sociocultural Theory, which emphasizes that learning occurs through mediated interaction with tools and symbols (Bonk & Cunningham, 1998; Cong-Lem, 2023) [9, 16]. AI tools function as mediational artifacts that extend learners' capacity to perform writing tasks beyond their current level of competence.

2. Motivation as an Affective Outcome

Motivational enhancement is conceptualized as an affective outcome influenced by learners' interaction with AI-based writing tools. According to Self-Determination Theory Listyani., (2022) [29] motivation is strengthened when learners experience autonomy, competence, and relatedness. AI-based tools are expected to enhance:

- Autonomy, by allowing learners to write and revise independently without constant teacher intervention;
- Competence, by providing immediate and individualized feedback that helps learners recognize improvement;
- Relatedness, particularly in the case of ChatGPT, which offers conversational interaction that simulates social engagement saha *et al*., (2025).

As students receive supportive and non-judgmental feedback, their writing anxiety may decrease, and their confidence and engagement may increase Sabourianzadeh & Ahmadi., (2025) [49]. This motivational improvement is expected to encourage greater persistence in writing tasks and deeper involvement in the writing process.

3. Content Enhancement as a Cognitive Outcome

Content enhancement is conceptualized as a cognitive outcome related to idea generation, coherence, argumentation, and conceptual clarity. Cognitive Load Theory Lukesova *et al*, (2026) [30] posits that learning is optimized when extraneous cognitive load is reduced and cognitive resources are allocated to meaningful processing.

AI-based writing tools are expected to reduce extraneous load by handling mechanical aspects of writing, such as grammar correction and sentence reformulation. This allows learners to focus more on higher-order cognitive processes,

including organizing ideas, developing arguments, and refining content Thi *et al*., (2024) [57].
ChatGPT, in particular, facilitates idea expansion through dialogic prompts, enabling learners to explore multiple perspectives and restructure content logically Toosi *et al*., (2025). QuillBot supports lexical flexibility, which aids semantic elaboration, while Grammarly improves textual clarity and coherence Aziza *et al*, (2025). Together, these functions contribute to improved content quality rather than merely surface-level accuracy.

4. Interaction Between Motivation and Content Development

The framework further assumes a reciprocal relationship between motivation and content enhancement. As learners experience improvement in content quality, their sense of competence increases, which further strengthens intrinsic motivation Listyani *et al*, (2022). Conversely, higher motivation leads to greater engagement in revision and idea development, creating a positive feedback loop between affective and cognitive dimensions of writing.
This interaction reflects a dynamic learning process in which AI-based tools influence not only writing outcomes but also learners' attitudes toward writing. From a Sociocultural perspective, this process occurs within a mediated environment where tools, learners, and tasks interact to construct meaning Cong-Lem., (2023) [16] and Bonk & Cunningham., (1998) [9].

5. Pedagogical and Ethical Moderators

The framework also acknowledges moderating factors that influence the effectiveness of AI-based writing tools. These include:

- learners' digital literacy,
- instructional guidance from teachers,
- awareness of academic integrity, and
- degree of critical engagement with AI feedback.

Without pedagogical scaffolding, excessive reliance on AI tools may lead to reduced originality and weakened critical thinking Octaber lina *et al*., (2024) [37] and Oksuz., (2025). Therefore, the framework assumes that AI tools function most effectively when integrated into structured instructional practices that promote reflection, evaluation, and learner autonomy.

Summary of the Conceptual Framework

In summary, the conceptual framework proposes that the use of AI-based writing tools (ChatGPT, Grammarly, and QuillBot) influences EFL students' academic writing development through two interrelated pathways:

1. Affective pathway: AI tools enhance motivation by supporting autonomy, competence, and engagement (Self-Determination Theory).
2. Cognitive pathway: AI tools enhance content quality by reducing cognitive load and facilitating idea development (Cognitive Load Theory).

These processes occur within a mediated learning environment (Sociocultural Theory) and are moderated by pedagogical and ethical considerations.
This framework provides the theoretical foundation for examining how different AI-based writing tools affect EFL students' motivation and content enhancement and justifies the selection of variables and research questions in the present study.

3. Methodology

3.1 Research Design

This study employs a qualitative research design in the form of a comparative case study. Qualitative research is appropriate for this investigation because it seeks to explore learners' experiences, perceptions, and meaning-making processes regarding the use of AI-based writing tools in academic writing (Davis-bibb *et al*., 2025; Toncic, 2020) [17, 58]. Rather than measuring variables statistically, this study aims to gain an in-depth understanding of how ChatGPT, Grammarly, and QuillBot influence students' motivation and content development in English writing.
A case study approach is adopted because it allows for intensive examination of a bounded system namely, a group of EFL graduate students using three AI-based writing tools within a specific institutional context (Pratolo, 2025) [45] cited from Yin, (2018). The comparative dimension enables the researcher to identify similarities and differences in students' experiences with each tool.

3.2 Research Setting

The study will be conducted at Universitas Negeri Semarang, within the English Education graduate program. This setting is selected because students are required to produce academic texts such as essays, research proposals, and reflective writing in English, making it an appropriate context for investigating AI-assisted academic writing practices.

3.3 Participants

The participants will consist of approximately 20 EFL graduate students enrolled in the English Education Master's program at Universitas Negeri Semarang. This number is considered sufficient to generate rich qualitative data while allowing for in-depth analysis (Kruasom *et al*., 2025) [28]. Qualitative studies typically prioritize depth of insight over large sample size.
Participants will be selected using purposive sampling, based on the following criteria:

1. They are enrolled in a graduate-level English writing or research course.
2. They have experience using at least one AI-based writing tool (ChatGPT, Grammarly, or QuillBot).
3. They are willing to participate voluntarily and provide informed consent.

This sampling strategy ensures that participants possess relevant experience related to the research focus (Patton *et al*., 2015) [42].

3.4 Data Sources

This study exploits primary and secondary data sources, as well as relevant documents.

3.4.1 Primary Data

Primary data will be collected directly from participants through:
Semi-structured interviews.
Students' writing samples before and after using AI tools.
These data sources provide firsthand insights into students' motivation, perceptions, and writing development Davis-bibb *et al*, (2025) [17].

3.4.2 Secondary Data

Secondary data include:
Previous research articles related to AI-assisted writing;

Institutional documents (course syllabi, writing guidelines);
Policy documents related to academic integrity and technology use.
These documents help contextualize the findings and support data triangulation (Chand, 2025) [13] cited from Bowen, (2009).

3.5 Research Instruments
The main research instruments include:
3.5.1 Interview Guide
A semi-structured interview protocol will be developed to explore students' experiences with ChatGPT, Grammarly, and QuillBot. Interview questions will focus on:
- students' motivation and content development.
- perceived benefits and limitations of each AI tool
- influence of AI tools on idea generation and content organization
- concerns about dependency and originality

Semi-structured interviews allow flexibility while ensuring alignment with research objectives (Andersen & Andersen, 2019) [5].
3.5.2 Writing Tasks and Writing Samples
Participants will be asked to complete academic writing tasks using AI-based tools. Their writing outputs will be collected and analyzed to examine changes in:
- Idea development
- coherence
- clarity of content

These writing samples serve as qualitative evidence of content enhancement (Huang, 2020) [24].

3.6 Data Collection Procedures
Data collection will be conducted in several stages:
1. Writing Task Phase
Participants will use each AI tool to support their academic writing tasks over a specified period (e.g., 3–4 weeks).
2. Interview Phase
Semi-structured interviews will be conducted with each participant to explore their perceptions in depth.
3. Document Collection
Writing samples and related documents will be collected for analysis.
All interviews will be audio-recorded with participants' consent and transcribed verbatim for analysis.

3.7 Data Analysis Technique
This study employs manual thematic coding following the principles of qualitative content analysis (Braun *et al*., 2019; Byrne, 2022) [10, 12].
The data analysis process consists of the following steps:
1. Familiarization with the data
The researcher reads interview transcripts, and writing samples repeatedly to gain overall understanding.
2. Initial coding
Meaningful units of data are coded manually based on emerging concepts related to motivation and content enhancement.

Category development
Codes are grouped into broader categories such as:
1. motivational factors (confidence, anxiety reduction, engagement)
2. cognitive factors (idea generation, coherence, clarity)
3. tool-specific functions (ChatGPT, Grammarly, QuillBot)
4. ethical and pedagogical concerns
5. Theme generation
Categories are synthesized into major themes that answer the research questions.

Interpretation
Themes are interpreted using theoretical frameworks (Self-Determination Theory, Cognitive Load Theory, Sociocultural Theory).
Manual coding is selected to ensure close engagement with the data and deep interpretive analysis rather than automated processing Braun *et al*., (2019) [10].

3.8 Trustworthiness of the Study
To ensure rigor and credibility, this study applies the criteria of trustworthiness proposed by (Enworo, 2026) [21] cited from Lincoln and Guba (1985):
Credibility: achieved through data triangulation (interviews, reflections, writing samples).
Transferability: achieved through rich, thick descriptions of context and participants.
Dependability: achieved through clear documentation of research procedures.
Confirmability: achieved through reflexive notes and audit trails.
Member checking will be conducted by allowing participants to review interview summaries to ensure accuracy.

3.9 Ethical Considerations
Ethical principles will be strictly observed:
1. Participants will sign informed consent forms.
2. Participation will be voluntary.
3. Anonymity and confidentiality will be maintained through pseudonyms.
4. Data will be used only for academic purposes.
5. AI tool usage will follow institutional academic integrity guidelines.
These procedures align with standard qualitative research ethics (Pollock, 2012) [44] reference from Orb, Eisenhauer, & Wynaden, (2001).

4. Results
This section presents the findings derived from semi-structured interviews with ten graduate EFL students regarding their experiences using AI-based writing tools in academic writing. Thematic analysis revealed five major themes: (1) motivational enhancement through AI assistance, (2) content development and idea expansion, (3) increased efficiency and writing confidence, (4) autonomy and dependency tensions, and (5) ethical awareness and responsible use.

4.1 Motivational Enhancement through AI-Based Writing Tools
All participants reported that AI-based writing tools positively influenced their motivation to write in English. Students emphasized reduced anxiety, increased confidence, and greater willingness to engage in academic writing tasks.

Several respondents explained that the availability of immediate support made writing feel less overwhelming. One participant stated:

Respondent 1"*described emotional relief from writing anxiety. Previously, academic writing caused frustration due to linguistic limitations. With AI support available at any time, R1 felt reassured and more confident initiating and completing tasks.*

(Respondent 3) *highlighted increased writing frequency. Because AI reduced the cognitive burden of language correction, writing no longer felt exhausting, encouraging more consistent practice.*

For some students, motivation emerged from improved grammatical accuracy:

Respondent 2: *emphasized motivation derived from visible improvement in writing quality. The ability to produce grammatically accurate and well-structured texts increased their confidence in submitting academic work.*

Respondent 4*: reported that AI tools lowered fear of starting academic texts. The availability of prompts and examples made the writing process less intimidating.*

Respondent 6*: associated motivation with long-term confidence growth. They no longer felt afraid of writing extended academic papers.*

Respondent 9*: connected motivation to immediate feedback. Seeing instant improvements created satisfaction and reinforced continued effort.*

Respondent 10*: viewed AI as emotional support in the writing process, making academic writing feel manageable rather than overwhelming.*

Interpretation:

Motivation was enhanced through reduced anxiety, increased perceived competence, and easier task initiation. AI tools acted as psychological scaffolds that transformed writing from a stressful activity into an achievable process.

4.2 Content Enhancement and Idea Development

A prominent theme across interviews was the role of AI tools in supporting content development, particularly in brainstorming, organizing arguments, and expanding perspectives.

Participants frequently described using AI tools to generate ideas and structure academic texts:

Respondent 1: *Respondent 1 used AI to explore multiple perspectives and develop arguments more critically instead of focusing solely on grammar.*

Respondent 6: *emphasized logical connections between paragraphs, stating AI helped strengthen coherence and argument flow.*

Respondent 3*: found that AI-assisted outlining improved the clarity of thesis statements and supporting ideas.*

Several respondents highlighted the usefulness of AI in overcoming writer's block:

Respondent 4: *"When I feel stuck, I ask for examples or topic suggestions. It helps me start writing."*

Beyond idea generation, students noted improvements in coherence and academic tone:

Respondent 5: *"My essays feel more academic and better organized."*

Respondent 8*: used AI to reorganize complex arguments, making ideas more systematic.*

These findings indicate that AI-based writing tools contributed not only to surface-level corrections but also to higher-order cognitive processes related to content organization and conceptual clarity.

Interpretation:

AI tools supported brainstorming, argument organization, coherence, and academic tone demonstrating clear content enhancement beyond surface-level correction.

4.3 Increased Writing Efficiency and Confidence

Another recurring theme concerned improved efficiency in the writing process. Students reported that tasks such as revising, correcting grammar, and paraphrasing became faster and more manageable.

One respondent explained:

Respondent 3: *"Before, I had to revise many times because of grammatical errors. Now the process is faster and more efficient."*

Others emphasized the sense of achievement that resulted from immediate improvements:

Respendent 9: *"Seeing immediate improvement in my writing gives me motivation and satisfaction."*

This increased efficiency appeared to contribute directly to enhanced writing confidence:

Respondent 6: *"My confidence increased a lot. I'm no longer afraid of writing long academic texts."*

Respondent 2*: noted that paraphrasing and proofreading became much faster.*

Respondent 7*: reported smoother workflow when revising drafts independently.*

Interpretation:

AI tools streamlined mechanical aspects of writing, allowing learners to focus on idea development while simultaneously increasing confidence.

4.4 Autonomy versus Dependency in AI-Assisted Writing

While many participants viewed AI tools as empowering and supportive, several also expressed concerns about overreliance and reduced independence.

Some students felt more autonomous because they could revise independently without waiting for instructor feedback:

Respondent 7: *"It functions like a virtual supervisor. I can check my work anytime and anywhere."*

However, others acknowledged growing dependency:

Respondent 2: *"Sometimes I depend too much on it. I feel less confident correcting grammar manually."*

Respondent 6: *"If students just copy outputs, they won't develop real writing skills."*

Participants recognized that excessive reliance could weaken critical thinking and originality:

Respondent 3: *"When the writer only copy-pastes AI results, it reduces creativity and critical thinking."*

Respondent 5 expressed concern that reliance could make students passive learners.

Interpretation:

While AI increased learner autonomy in revision, uncritical use fostered dependency, highlighting the need for guided integration.

4.5 Ethical Awareness and Responsible Use of AI Tools

Students demonstrated strong awareness of the ethical implications of AI-assisted writing, particularly concerning originality and academic integrity.

Many emphasized that AI should function as a support tool rather than a replacement for thinking:

Respondent 10: *"They should support idea development and language improvement, not replace thinking."*

Others highlighted the importance of critical evaluation:

Respondent 8*: "Originality remains if we critically evaluate AI outputs instead of copying them."*

Participants also expressed concerns about overly general responses:

Respondent 5: *"Sometimes the answers are too general and not deep enough for graduate-level analysis." (R5)*

Respondent 1*: mentioned rewriting AI suggestions to fit personal academic voice.*

Respondent 6 insisted that learning occurs only when students modify AI outputs.

Interpretation:

Students recognized the importance of reflection, originality, and ethical boundaries, indicating readiness for responsible AI integration.

Overall, respondents advocated for responsible integration of AI tools within academic writing practices, stressing reflection, rewriting, and ethical awareness.

4.6 Tool Preference and Perceived Effectiveness

Most participants identified generative AI as the most comprehensive tool for academic writing, particularly for idea development and overall writing support.

Typical responses included:

Respondent 2: *"It's like a second supervisor. It helps with brainstorming, structure, and revision."*

Respondent 3: *"It is a complete package for academic writing."*

Grammar-focused tools were viewed as particularly useful for accuracy and clarity, while paraphrasing tools were mainly used to avoid plagiarism.

This suggests that students perceived different AI tools as serving complementary functions within the writing process.

Summary of Key Findings

The qualitative findings reveal that:

1. AI-based writing tools significantly enhance students' motivation by reducing anxiety and increasing confidence.
2. These tools support content enhancement through brainstorming, coherence improvement, and idea development.
3. Writing efficiency and self-confidence improved due to immediate feedback and streamlined revision.
4. A tension exists between increased autonomy and risks of dependency.
5. Students possess strong ethical awareness regarding responsible AI use.

5. Discussion

This study aimed to explore how AI-based writing tools influence EFL graduate students' academic writing in terms of motivational enhancement and content development. The findings reveal that ChatGPT, Grammarly, and QuillBot function not merely as technical editors but as cognitive and affective scaffolds that reshape students' writing experiences. Overall, the results support previous research while also extending understanding of AI-assisted writing within the Indonesian graduate-level EFL context.

5.1 AI Tools as Motivational Scaffolds in Academic Writing

One of the most significant findings is the strong motivational impact of AI-based writing tools. Participants consistently reported reduced anxiety, increased confidence, and greater willingness to engage in writing tasks. These outcomes align closely with Self-Determination Theory (Deci & Ryan, 2000), which emphasizes competence and autonomy as central drivers of intrinsic motivation.

Immediate feedback from AI tools appeared to enhance students' sense of competence. When learners could quickly correct grammar, improve structure, and refine academic tone, they perceived tangible improvement in their writing ability. This mirrors findings by Saha (2025) [50] and Sabourisnzadeh & Ahmadi., (2025) [49], who reported increased learner engagement and reduced writing anxiety through AI-supported feedback.

Moreover, the autonomy provided by constant access to AI tools allowed students to revise independently without waiting for instructor input. This supports Listyani's (2022) [29] assertion that learner control over the writing process fosters stronger intrinsic motivation. In this study, participants described AI tools as "virtual supervisors," suggesting that digital assistance can compensate for limited instructor availability in higher education contexts.

However, motivational gains were not unconditional. Some students reported dependence that reduced confidence in their own language judgment. This supports (Buijsman *et al*., 2025) [11], who caution that while AI increases short-term motivation, it may undermine long-term autonomy if overused. Thus, AI tools function as motivational enhancers only when learners remain active decision-makers in the writing process.

5.2 Content Enhancement Beyond Surface-Level Accuracy

The findings strongly indicate that AI-based writing tools contribute to higher-order writing development, particularly in idea generation, coherence, and argument organization. Students reported using AI to brainstorm topics, expand perspectives, and logically structure academic texts. This extends earlier research that focused primarily on grammatical accuracy Susiani *et al*., (2025) [55] and Mlakar *et al*., (2025) [33].

Generative AI, in particular, facilitated conceptual development through dialogic interaction. Participants described how prompts helped them rethink structure, refine arguments, and explore alternative viewpoints. This aligns with Toosi *et al*. (2025) and Öksüz (2025) [38], who found that interactive AI encourages deeper cognitive engagement with content.

From the perspective of Cognitive Load Theory (Sweller, 1988), AI tools reduced extraneous load by automating mechanical aspects of writing, such as grammar correction and paraphrasing. This freed cognitive resources for higher-level processes including idea development and critical reasoning. The present findings echo Thi *et al*. (2024) [57], who observed that AI-supported learners demonstrated greater persistence and conceptual focus.

Grammarly and QuillBot also contributed indirectly to content quality by enhancing clarity and lexical variation. Improved readability allowed students to express ideas more effectively, supporting Aziza's (2025) [8] conclusion that structural feedback enhances coherence and academic tone.

Nevertheless, participants warned that AI-generated content could become overly general or shallow if not critically evaluated. This confirms Raheem *et al.*'s (2023) [46] argument that AI feedback often prioritizes form over depth unless pedagogically guided.

5.3 Autonomy, Dependency, and the Sociocultural Perspective

The tension between empowerment and dependency emerged as a central theme. On one hand, AI tools enabled independent revision and continuous learning, supporting Sociocultural Theory's notion of mediated learning through tools Pathan *et al* (2018) [40]. AI acted as a mediational artifact extending students' writing capabilities beyond their current proficiency level.

On the other hand, some learners admitted overreliance, particularly in grammar correction and idea sourcing. When AI outputs were followed uncritically, students experienced reduced confidence in their own linguistic judgment and diminished critical thinking.

This dual role reflects the paradox identified by Chua and A (2025) [15] and Octaberlina *et al*. (2024) [37], who argue that AI can simultaneously support and weaken learner autonomy depending on usage practices. The present findings suggest that AI is most beneficial when used as a collaborative cognitive partner rather than a content generator.

5.4 Ethical Awareness and Responsible AI Integration

Encouragingly, participants demonstrated strong ethical awareness regarding originality, plagiarism, and critical engagement. Most viewed AI tools as supplementary aids rather than substitutes for thinking. This aligns with Perkins (2023) [43] and Aaron *et al*. (2025) [1], who emphasize the importance of academic integrity in AI-supported education.

Students' recognition that uncritical copying reduces learning supports Critical Pedagogy perspectives Patrick O. Akinsanya *et al*., (2022) [41], which advocate for active knowledge construction rather than passive consumption.

The findings suggest that ethical challenges associated with AI use are not inevitable but depend largely on instructional guidance. When learners are taught to evaluate, rewrite, and synthesize AI outputs, AI tools become instruments for learning enhancement rather than academic misconduct.

5.5 Comparative Functions of AI-Based Writing Tools

Consistent with earlier comparative studies Mlakar *et al*., (2025) [33] and Chiarello *et al*., (2024) [14], participants perceived distinct strengths among tools:

Generative AI supported idea development, structure, and conceptual clarity

Grammar-focused tools enhanced accuracy and coherence

Paraphrasing tools assisted lexical variation and plagiarism avoidance

However, students overwhelmingly preferred generative AI due to its multifunctionality and interactive nature. This supports Nasher *et al*. (2025) [36], who found that conversational interfaces produce higher engagement than corrective systems alone.

Importantly, students did not view these tools as competitors but as complementary components within the writing process, suggesting the value of integrated AI ecosystems in academic writing pedagogy.

5.6 Implications for EFL Writing Instruction

The findings carry several pedagogical implications:

1. AI tools should be integrated as learning scaffolds, not shortcut solutions.
2. Instruction should include AI literacy, focusing on prompting strategies, critical evaluation, and ethical use.
3. Writing pedagogy should balance automation and cognition, ensuring students remain active thinkers.
4. AI-assisted revision activities can enhance motivation and content development when guided properly.

Rather than banning AI tools, institutions should embed them within structured pedagogical frameworks that promote reflection, autonomy, and originality.

5.7 Contribution to Research and Theory

This study extends existing literature by:

1. Demonstrating that AI tools influence both motivation and higher-order content development, not only grammatical accuracy.
2. Providing empirical evidence from Indonesian graduate-level EFL learners, an underrepresented context.
3. Supporting a holistic theoretical integration of SDT, Cognitive Load Theory, and Sociocultural Theory.

The reciprocal relationship between motivation and content enhancement identified in this study strengthens theoretical models of AI-assisted writing as a dynamic cognitive-affective process.

Overall Interpretation

AI-based writing tools serve as powerful mediators of EFL academic writing development when used critically and ethically. They enhance motivation by reducing anxiety and increasing competence, while simultaneously supporting content quality through idea generation and structural refinement. However, their pedagogical value depends on learners' critical engagement and institutional guidance.

When positioned as collaborative learning partners rather than content producers, AI tools can significantly enrich graduate-level EFL writing instruction.

6. Recommendation

Based on the results of the comparative case study that was carried out among EFL graduate students at Universitas Negeri Semarang, the targeted recommendations are provided that would help make the involvement of AI-driven writing tools into the academic writing pedagogy effective and ethically justified.

To begin with, AI-based applications, such as ChatGPT, Grammarly, and QuillBot, are to be systematically incorporated in the EFL writing instructions as teaching aids, and not as tools that substitute the process of independent thinking. It is recommended that instructors create process-based writing tasks which will force students to critically evaluate and correct AI-generated feedback, thus strengthening student motivation and elaboration in the content.

Second, the learning on ethical and responsible use of AI should be explicitly taught in academic writing courses. This training ought to include guidelines on maintaining originality, discouraging unthinking copying, and using AI tools as a source of ideas and language aid instead of being a tool to create a final text.

Third, teachers must strive to adopt a complementary approach and match specific tools to specific instructional goals: generative AI to generate ideas and organize the content, grammar-oriented tools to achieve precision and clarity, and paraphrasing tools to refine the lexicon. This planned combination maximizes cognitive and motivational achievements.

Lastly, the education sector should be encouraged to develop clear policies outlining what AI-assisted writing practices can and can not do to help in promoting innovation and ensuring academic honesty.

Long-term effects of AI-assisted writing on the autonomy, critical thinking, and academic writing ability of learners in diverse educational settings were not adequately evaluated in this study; longitudinal and mixed-method studies are required in future studies.

7. Conclusion

This is a comparative case study analyzing the effect of AI-based writing aids on the academic writing process of EFL graduate students in Universitas Negeri Semarang with specific focus on motivational and content improvement. These findings prove that AI tools are not only technical tools that help students correct their language mistakes but cognitive and affective scaffolds that transform the writing experience of students.

All in all, the application of ChatGPT, Grammarly, and QuillBot demonstrated substantial improvements in the motivation of students through the elimination of anxiety about writing, instilling confidence, and the desire to write more and more academic assignments. The access to feedback and support made the learners more self-active and capable of writing more often and more often, thus, reinforcing their feeling of competence and autonomy.

In addition to motivational gains, AI tools were also helpful in the development of higher-order writing. The students claimed that idea generation, coherence, argument organization and academic tone had improved. AI generative was used to support brainstorming and concept development, and grammar and paraphrasing tools helped make the text more understandable and to be more precise. These results prove that AI-aided writing is not limited to the superficial accuracy but it helps to engage in deeper thought in academic writing.

But there was also a serious tension of autonomy and dependency that was discovered in the study. Although AI technologies allowed working independently and being efficient, careless use could lead to the erosion of originality and critical thinking. On a positive note, students were highly ethical in nature with reflection, rewriting, and responsible use being the key elements of meaningful learning.

To conclude, AI-based writing assistants have a valuable potential to increase motivation and content aspects of EFL academic writing provided that they are implemented in a thoughtful and ethical manner. They are not effective in the sense of substituting cognitive effort on the part of learners but rather work in conjunction with learners as scaffolding partners in idea development, revision and confidence. Through proper pedagogical direction and institutional implementation, AI-assisted writing may make a significant part of graduate-level EFL teaching to create inspired, independent, and critically reflective academic writers.

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