



Peoples' Democratic Republic of Algeria
Ministry of Higher Education and Scientific Research
University of Chadli Bendjedid – El Tarf



Faculty of Letters and Languages

Department of English

**Investigating the Effectiveness of Grammarly in Improving
EFL Learners' Paragraph Writing: A Case Study of Second
Year EFL Students at Chadli Bendjedid University**

**Dissertation submitted to the Department of English in Partial Fulfillment of the
Requirements for the Master Degree in “Didactics of English”**

SUBMITTED BY:

Aya Bakhouché

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Academic Year

2025/2026



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Declaration

We declare that the present dissertation entitled “Investigating the Effectiveness of Grammarly in Improving EFL Learners’ paragraph writing” is the result of our own research and academic effort carried out in partial fulfillment of the requirements for the degree of Master in English Didactics. All sources of information, ideas, and quotations used in this work have been properly acknowledged and referenced. We further declare that this dissertation has been submitted, wholly or partially, either for any other degree or for qualification at any institution.

Students’ names: Hafsi Souha and Bakhouché Aya

Signed:

Date:

Students’ number:

Dedication

And the last of their prayer is: All praise is due to Allah, Lord of the worlds.

Great goals make the path easier, and the joy of arrival erases the hardship of years.

We dedicate this graduation first to ourselves, to those souls that struggled, were patient, and believed that after sleepless nights comes joy, and after hardship comes success worthy of dreams, and that every effort has its reward.

We dedicate it to our dear parents, who adorned our names with the most beautiful titles, and who were our support in every stage of our lives, always encouraging us unconditionally and without limits. May Allah preserve them and grant them lasting health and happiness.

To the source of tenderness, the pride of the heart and the light of the eyes, our beloved mothers, may Allah reward them with the best reward in this life and the Hereafter, and grant them health, well-being, and faith.

To our grandparents, may Allah have mercy on those who passed away and protect those who are still alive, who left in our hearts unforgettable love and prayers.

To our kind families who supported us from the beginning of this journey and never spared any help or support, even with a kind word or sincere gesture.

To our unshakable support, our brothers and sisters, companions of our lives and beautiful days, each by their name and place in our hearts. May Allah keep you a lasting blessing and preserve the love between us for as long as we live.

To our friends of the journey and success, who shared the hardship before the joy, May Allah preserve our friendship and always gather us in goodness and success.

To all those we hold love and appreciation for, and everyone who encouraged us even with a kind word that became a source of hope during this journey.

Finally, we extend our deepest gratitude to everyone who taught us a lesson and planted in us ambition and hope, and to all the teachers who passed through our academic journey. May Allah bless you and reward you greatly on our behalf.

We also extend our sincere thanks and appreciation to our supervisor for her valuable guidance, continuous support, and advice, which had a great impact on the completion of this work.

Special Dedication

Souha's

To my beloved parents, to the two people I wish could see this the most. Thank you for paving the way for me, for planting the seeds of every dream I dared to pursue, and for shaping the person I have become. Though you are not here to witness the end of this journey, your presence has accompanied me through every step. This achievement is as much yours as it is mine. May Allah bless your souls and grant you Jannah.

Aya's

To the cherished memory of my beloved grandmother, who left this world but whose love, kindness, and precious memories remain forever alive in my heart. May Allah bless your soul with His infinite mercy and grant you the highest place in Paradise. This work is lovingly dedicated to you, and I pray that it may be counted among your good deeds.

To my dear aunt, "Assia" whose love, support, and encouragement have always meant so much to me, I dedicate this work with sincere gratitude and affection. Thank you for always being a source of strength and inspiration.

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Abstract

This study investigates the effectiveness of Grammarly, an AI-powered Automated Writing Evaluation (AWE) tool, in improving the paragraph writing skills of English as Foreign Language (EFL) learners. Despite the growing popularity of such tools in educational settings, empirical research on their impact on higher-order writing skills including coherence, lexical diversity, and overall writing quality remains limited. The research addresses that gap by examining the extent to which Grammarly improves EFL learners' grammatical accuracy, lexical diversity, and coherence, as well as learners' perceptions of the tool and whether its sustained use leads to improvement in independent writing. A mixed-methods design was adopted, combining quantitative and qualitative data collected from 40 second-year EFL students at Chadli Bendjedid University during the academic year 2025/2026. Data were gathered through a questionnaire and a paragraph-writing test. Quantitative data were analyzed using descriptive statistics, while qualitative data were examined through thematic analysis. The findings resulted shed light on the pedagogical potential of integrating AI writing tools into EFL instruction, offering evidence-based recommendations for educators and curriculum developers. The study ultimately advocates for a balanced approach that combines automated and human feedback to maximize EFL learners' writing development.

Keywords: AI in education, Automated Writing Evaluation, Grammarly, EFL Writing, , Written Corrective feedback, Paragraph Writing.

ملخص

تهدف هذه الدراسة الى فحص مدى فعالية أداة (Grammarly)، وهي أداة تقييم كتابي آلي مدعومة بالذكاء الاصطناعي، في تطوير مهارات كتابة الفقرة لدى متعلمي اللغة الإنجليزية كلغة أجنبية. وعلى الرغم من الاهتمام المتزايد بهذه الأدوات في السياقات التعليمية، يظل البحث في تأثيرها على المهارات الكتابية العليا، كالتماسك والتنوع المعجمي والجودة الكتابية الشاملة، محدوداً. وانطلاقاً من هذه الفجوة البحثية، تسعى الدراسة إلى استكشاف أثر هذه الأداة على الدقة النحوية والتنوع المعجمي والتماسك في كتابات المتعلمين، فضلاً عن تقصي تصوراتهم حولها، ومعرفة ما إذا كان استخدامها المستمر ينعكس إيجاباً على أدائهم الكتابي المستقل. اعتمدت الدراسة منهجاً مختلطاً يجمع بين البيانات الكمية والنوعية، وشملت عينتها أربعين طالباً من السنة الثانية في جامعة الشاذلي بن جديد خلال السنة الجامعية 2026/2025. واستُخدم كل من الاستبيان واختبار كتابة الفقرة كأدوات لجمع البيانات، إذ حلت البيانات الكمية بالإحصاء الوصفي، في حين اعتمد التحليل الموضوعي لمعالجة البيانات النوعية. وتسعى نتائج هذه الدراسة إلى توجيه القرارات التربوية المتعلقة بدمج أدوات الكتابة الذكية في تعليم اللغة الإنجليزية كلغة أجنبية، وتقديم توصيات عملية للمعلمين ومصممي المناهج الراغبين في تحقيق توازن فعال بين التغذية الراجعة الآلية والبشرية في تعليم الكتابة.

الكلمات المفتاحية: غرامارلي، كتابة اللغة الإنجليزية كلغة أجنبية، التقييم الكتابي الآلي، التغذية الراجعة التصحيحية الكتابية، كتابة الفقرة، الذكاء الاصطناعي في التعليم.

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List of Acronyms and Abbreviations

AI: Artificial Intelligence

ART: Article Error

AWE: Automated Writing Evaluation

CALL: Computer-Assisted Language Learning

CAP: Capitalization Error

CEFR: Common European Framework of Reference for Languages

COH: Coherence/Cohesion Error

EFL: English as a Foreign Language

ESL: English as a Second Language

GR: Grammatical Error

IH: Interaction Hypothesis

LEX: Lexical Error

M: Mean

ORG: Organization Error

POSS: Possessive Error

PREP: Preposition Error

PUNC: Punctuation Error

SCT: Sociocultural Theory

SD: Standard Deviation

SE: Standard Error

SLA: Second Language Acquisition

SPSS: Statistical Package for the Social Sciences

SS: Sentence Structure Error

SVA: Subject-Verb Agreement Error

VT: Verb Tense Error

WCF: Written Corrective Feedback

ZPD: Zone of Proximal Development

Chapter One

Introductory Chapter

Introduction

Academic writing is one of the most valued and difficult skills for learners of English as a foreign language (EFL), requiring considerable effort and time to master. The main challenges learners face include weak basic English skills, over-reliance on their native language, limited opportunities for practice, and difficulties in expressing their ideas clearly.

This study endeavors to gain insights into EFL students' attitudes towards AI writing tools: particularly Grammarly, and the extent to which this application influences their writing skills. As such, this introductory chapter encompasses the statement of the problem, the aims of the study and its significance. In addition, it provides the research questions along with the hypotheses and the research design. It concludes with the structure of the dissertation.

Statement of the Problem

The challenges of academic writing present significant hurdles for English as Foreign Language (EFL) learners, impeding their ability to convey complex ideas effectively. While tools like Grammarly are increasingly popular among educators seeking to support these learners, there is ongoing debate about their long-term impact on writing proficiency. Existing research has largely focused on the tool's effectiveness in correcting surface-level errors, such as spelling and grammar, but there is a notable lack of evidence regarding its influence on higher-order writing skills, including content quality, coherence, and overall organization.

Moreover, investigations into how learners engage with AI-generated feedback remain limited, particularly concerning the cognitive processes involved in assessing, accepting, or modifying suggestions from such tools. This raises questions about how these interactions affect learners' academic voice, levels of independence in writing, and their self-editing

capabilities. Therefore, there is an existence of a critical gap in empirical research that explores not only the role of Grammarly in enhancing writing organization and quality but also how it shapes EFL learners' decision-making during the writing process in real classroom settings.

Research Questions

To carry out the current study, the following research questions have been formulated:

Q1: To what extent does the use of Grammarly improve EFL learners' paragraph writing performance in terms of grammatical accuracy, lexical diversity, and overall coherence?

Q2: What are EFL learners' perceptions of Grammarly's usefulness and its integration of automated feedback during the writing process?

Q3: Does the sustained use of Grammarly lead to improvement in independent writing without relying on the assistant tool?

Research Hypotheses

In light of the above raised questions of our research, we hypothesize that:

H1: EFL learners using Grammarly will demonstrate improved grammatical accuracy, lexical diversity and coherence in their paragraph writing.

H2: EFL learners perceive Grammarly as a useful writing tool and successfully integrate its automated feedback into their writing process, with higher rates of feedback acceptance observed for grammatical corrections.

H3: The sustained use of Grammarly leads to a significant improvement in EFL learners' independent writing skills, even without relying on the assistant tool.

Aims of the Study

The main aim of the present study is to inspect the effectiveness of Grammarly, an AI-Assistant writing tool, in enhancing the paragraph writing skills of EFL learners. Specifically, it focuses on assessing the tool's impact on the accuracy and overall quality of learners' writing, including improvements in grammar, mechanics, and vocabulary usage. Additionally, the research seeks to explore EFL learners' perceptions of Grammarly and its role in supporting their paragraph writing development. It also aims to identify the types of writing errors most effectively addressed by Grammarly and determine whether the improvements gained through tool-assisted writing can be carried over to independent writing tasks. Ultimately, the study aspires to offer insights into the pedagogical potential of incorporating AI-based writing tools into EFL paragraph writing.

Significance of the Study

This study is significant because it contributes a clear understanding of how automated written feedback affects paragraph writing in FL, especially when it comes to AI programs like Grammarly. By examining the role of automated feedback in conjunction with human feedback in EFL environments, this research broadens the scope of existing studies on textual corrective feedback. The findings of this study have implications that extend to curriculum development and institutional decisions regarding technology investment.

Additionally, they offer EFL instructors' evidence-based recommendations for the effective integration of Grammarly into writing courses. This research thus helps teachers in identifying optimal strategies for leveraging automated tools while achieving a balanced interplay between human and automated feedback in language acquisition. Ultimately, this study contributes valuable insights into maximizing learning outcomes associated with automated feedback mechanisms, paving the way for improved pedagogical practices in the

domain of language education. The outcomes advocate for a nuanced approach that recognizes the complementary roles of technology and human interaction in enhancing the writing proficiency of EFL learners.

Research design

Method and participants

This study investigates the effectiveness of Grammarly, an Automated Writing Evaluation (AWE) tool, on the paragraph writing skills of EFL learners, specifically focusing on EFL Second year students at Chadli Bendjedid University during the academic year 2025/2026. A sample of 40 participants was involved in assessing whether Grammarly has an impact on the accuracy and overall quality of students' writing. The research follows a descriptive approach, utilizing a mixed methods design to collect data.

Data Gathering Tools

To collect the required data for this study, two research instruments were employed: a questionnaire and a paragraph-writing test. The questionnaire aimed to capture EFL learners' perspectives on Grammarly and its effectiveness in enhancing their writing process. Meanwhile, the paragraph-writing test was employed to evaluate learners' writing skills, specifically focusing on grammatical accuracy, lexical variety, and overall coherence, and the role of Grammarly in evaluating their writing.

Employing both tools facilitated the collection of comprehensive data, encompassing both qualitative and quantitative insights aligned with the study's objectives.

Data Analysis

Quantitative data were analyzed using descriptive statistics and presented in tables, while visualizations in the form of bar graphs. Thematic analysis was employed to analyze the qualitative data, which encompassed the data obtained from the writing tests and the open-ended responses provided by the students in the questionnaire. This comprehensive approach facilitated an in-depth understanding of the participants' experiences and perspectives.

The mixed methods approach, combining qualitative and quantitative methods within a single study, allows for a more holistic examination of the effectiveness of Grammarly on EFL learners' paragraph writing skills. The qualitative component focuses on understanding how EFL learners perceive and interpret their writing experiences. In contrast, the quantitative component generalizes findings across different groups or explain specific phenomena. By integrating these methodologies, this research aims to provide comprehensive insights into the effectiveness of Grammarly in improving EFL learners' paragraph writing.

Structure of the study

The present dissertation consists of five chapters. The first chapter is an introductory chapter that deals with the statement of the problem, research questions and hypotheses, aims and significance of the study. It also highlights the research design and the structure of the dissertation.

The second chapter demonstrates the literature review related to academic writing challenges of EFL learners and automated writing evaluation system.

The third chapter is concerned with the methodology adopted in the research. It presents the research design and the description of the carried writing test and questionnaire. Moreover, the fourth chapter is devoted to showcase the research results.

Finally, the last chapter is related to the discussion and interpretation of the results to answer the research questions and prove or disprove the hypotheses. It also entails some

pedagogical implications, recommendations, limitations of the study and suggestions for further research related to the topic of the dissertation

Conclusion

This chapter has introduced the context and rationale of the present study, highlighting the challenges that EFL learners face in developing their writing skills and the potential role of AI assistant tools, particularly Grammarly, in addressing these challenges. The problem statement identified the need to explore not only the tool's effectiveness in improving grammatical accuracy and coherence. The research questions and hypotheses were formulated to guide this investigation. Furthermore, the aims and significance of the study were presented emphasizing the pedagogical value of integrating automated writing tools into EFL instruction. Finally, the research design, including the mixed-methods approach, participants, data-gathering instruments, and analysis procedures, was outlined, along with an overview of the dissertation structure. This sets the stage for the following chapter, which presents a comprehensive review of the literature related to EFL academic writing challenges and the role of automated writing evaluation system.

Chapter Two

Literature Review on Grammarly and EFL Academic Writing

Introduction

This chapter is divided into five major sections that provide a comprehensive overview of the theoretical and empirical background of the present study. In the first section, the concept of EFL academic writing is introduced. In the second section, the concept of written corrective feedback is explored in terms of the forms of corrective feedback and their effectiveness in the process of learners' revision. In the third section, the theoretical frameworks of the present study are explored in terms of sociocultural theory, the Noticing Hypothesis, the Interaction Hypothesis, and Skill Acquisition Theory. In the fourth section, the issues of technology-enhanced writing and AWE tools are explored with special reference to the features of Grammarly and the previous studies on the effectiveness of the tool. Finally, the fifth section identifies the existing gaps in the literature and provides the rationale for conducting the present study.

Section one: EFL Academic Writing in EFL Contexts

Defining Academic Writing in EFL Contexts

Academic writing is a socially and cognitively complex practice in which learners construct knowledge, communicate findings, and negotiate meaning within specific disciplinary communities (Flowerdew & Peacock, 2013, p. 9). In EFL contexts, it requires not only control over grammar, vocabulary, and mechanics but also mastery of rhetorical conventions, coherence, and argumentation strategies that align with academic expectations (Hyland, 2003; Swales & Feak, 2004).

Learners are expected to produce texts that are logically organized, stylistically appropriate, and persuasive to an academic audience, often involving the synthesis of multiple sources, the development of evidence-based arguments, and the use of a formal register (Leki, Cumming & Silva, 2008; Bailey, 2015). Unlike ESL learners, who may acquire these skills incidentally through immersion, EFL learners typically rely on explicit instruction to internalize genre conventions and rhetorical structures, highlighting the unique challenges of academic writing in foreign language contexts (Swales & Feak, 2004; Leki, Cumming & Silva, 2008).

In addition, learners often face limitations in lexical range and syntactic complexity, which may restrict their ability to express ideas accurately. Differences between first language (L1) rhetorical patterns and English academic conventions can also lead to difficulties in organization and coherence (Matsuda, 2003; Mu & Carrington, 2007). The challenges of academic writing are further shaped by the learning context. While ESL learners benefit from natural exposure to English through immersion, EFL learners depend primarily on classroom instruction, with limited opportunities to engage with authentic language use (Hyland, 2003; Swales & Feak, 2004).

As a result, writing instruction in EFL contexts must be explicit and systematic, focusing on genre structures, coherence, and argumentation strategies. Without such support, learners may produce texts that are grammatically accurate but lack coherence and rhetorical effectiveness due to the transfer of L1 writing patterns to L2 contexts (Leki, Cumming & Silva, 2008; Matsuda, 2003). Academic writing in EFL contexts is not merely a matter of linguistic accuracy but a multifaceted competence involving linguistic, cognitive, and social dimensions, requiring structured guidance and deliberate practice.

Paragraph Writing as a Foundational Academic Writing Skill

In academic writing, the construction of paragraphs plays a crucial role. As the essential unit of academic discourse, a well-structured paragraph facilitates the development, substantiation, and effective communication of ideas tailored to a target audience (Oshima & Hogue, 2006). This skill holds even greater importance in EFL contexts, where the capacity to produce coherent and systematically organized paragraphs serves as a key indicator of learners' proficiency in managing both linguistic competencies and rhetorical strategies.

A standard academic paragraph typically consists of three essential components: a topic sentence that introduces the main idea, supporting sentences that develop and substantiate the argument with evidence or examples, and a concluding sentence that reinforces the paragraph's central point or provides a transition to the following paragraph (Hyland, 2003; Leki, Cumming & Silva, 2008). Mastery of these components requires not only grammatical accuracy but also coherence, which refers to the logical flow of ideas, and cohesion, which involves the use of appropriate linking devices and transitional expressions (Halliday & Hasan, 1976).

EFL learners frequently experience difficulty at the paragraph level, struggling to maintain unity the principle that all sentences in a paragraph relate to a single controlling idea and to produce adequate development through relevant and specific supporting details (Ferris & Hedgcock, 2014). These difficulties are compounded by the influence of L1 rhetorical patterns, which may differ significantly from English paragraph conventions in terms of organization, directness, and the relationship between general claims and specific evidence (Matsuda, 2003).

Given the central role of paragraph writing in academic literacy development, the present study focuses specifically on EFL learners' paragraph writing performance as the primary unit of analysis. This focus allows for a more targeted examination of how automated feedback tools such as Grammarly can address both surface-level linguistic errors and higher-order organizational features within a clearly bounded writing unit.

Challenges Faced by EFL Learners in Academic Writing

Academic writing represents a complex and demanding task for learners of English as a Foreign Language (EFL). Producing effective academic texts requires the integration of linguistic competence, cognitive strategies, and an understanding of rhetorical conventions.

Research has consistently identified that EFL learners encounter multidimensional difficulties, which can be categorized as linguistic, rhetorical/organizational, and cognitive/metacognitive challenges (Hyland, 2003; Silva, 1993). These challenges are particularly salient when students attempt to write under academic constraints, as they must simultaneously manage language accuracy, logical development, and coherence, which often leads to increased cognitive load and writing anxiety.

Linguistic Challenges

Linguistic challenges constitute a major barrier for EFL learners in academic writing, encompassing grammar, vocabulary, syntax, and mechanics. Silva (1993) emphasizes those second language writers often produce texts with “less fluency, less lexical diversity, and more errors” compared to first language writers, which constrains the expression of complex ideas.

Hyland (2003) further notes that sentence structure, punctuation, and lexical choice are frequent sources of difficulty, affecting the clarity and precision of arguments. Vocabulary limitations, in particular, restrict the learner’s ability to convey nuanced academic meaning (Nation, 2001). First-language interference also exacerbates these difficulties, with learners transferring syntactic patterns from their native language, producing awkward or incorrect English constructions (Ferris, 2002).

Rhetorical and Organizational Challenges

Beyond linguistic issues, EFL learners face substantial difficulties with rhetorical organization and text structure. English academic writing relies on coherent argumentation, clear thesis statements, and structured paragraphs, which may differ from rhetorical norms in

learners' first languages. Matsuda (2003) highlights that contrastive rhetoric the variation in textual organization across cultures often leads EFL students to produce texts that appear disorganized or incoherent in English academic settings.

Hyland (2004) also emphasizes the importance of genre awareness, noting that learners may lack familiarity with disciplinary writing conventions, causing difficulties in structuring essays and maintaining logical progression of ideas.

Cognitive and Metacognitive Challenges

Academic writing imposes significant cognitive and metacognitive demands, including planning, drafting, revising, and self-monitoring. Cumming (2001) explains that second language writers must coordinate multiple cognitive processes simultaneously, such as generating ideas while monitoring linguistic accuracy, which often increases cognitive load.

Flower and Hayes (1981) describe writing as a recursive process in which planning, translation of ideas into text, and revision occur iteratively; novice writers frequently struggle to manage these stages effectively. Cumming (2001) emphasizes that limited metacognitive strategies hinder learners' ability to evaluate their own writing critically, often resulting in superficial revisions focused only on surface errors.

Approaches to Teaching Academic Writing

Product-Based Approach

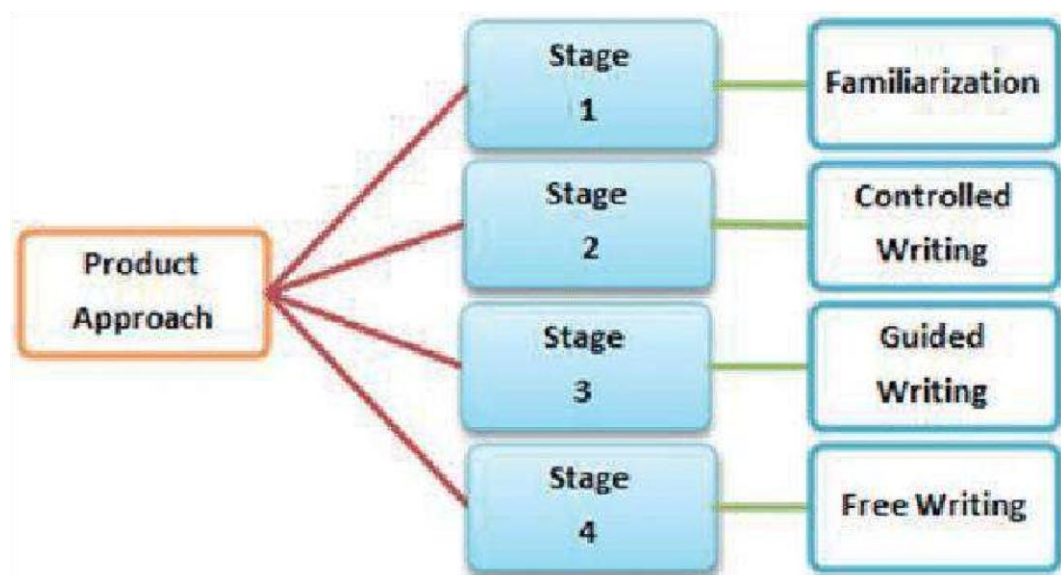
The product-based approach to teaching academic writing emphasizes the final written product and focuses primarily on linguistic accuracy, including grammar, vocabulary, and sentence structure. In this approach, learners often imitate model texts provided by teachers to produce correct and well-structured compositions. Pincas (1982) describes this method as a controlled composition approach that prioritizes mastery of language structures through guided exercises, while Brown (1994) comments on it for being rigid, treating writing as a linear accumulation of skills rather than a communicative act.

Although effective for reinforcing linguistic accuracy and building foundational writing skills, the product-based approach often neglects the cognitive and rhetorical demands of authentic academic writing, leaving EFL learners ill-prepared for higher-order writing tasks.

There are four stages in the Product Approach Model (Steele, 2004). Figure 1 below depicts the stages involved:

Figure 1

Product Approach Model (Steele, 2004)



Reproduced from “The product approach to teaching writing,” by V. Steele, 2004, *Modern English Teacher*, 13(4), p. 2

Steele (2004) proposes a four-stage product approach to teaching writing. In the first stage, students analyze model texts to identify genre-specific features, such as paragraph structure in formal letters and engaging techniques in stories. The second stage involves practicing these features, like the phrase “I would be grateful if you would...” in formal letter writing. The third stage emphasizes organizing ideas, equating organization with language control and idea generation. Finally, students select a writing task to

independently apply the skills and vocabulary learned, demonstrating their fluency and competence. This method is effective in enhancing the writing skills of EFL learners, particularly in accuracy and correctness.

Process-Based Approach

The process-based approach shifts the focus from the final product to the stages of writing, emphasizing planning, drafting, revising, and editing. Writing is treated as a recursive and reflective activity, allowing learners to refine ideas and language through multiple drafts.

Murray (1980) famously stated, “Writing is a process, not a product,” highlighting the importance of iterative development. Tribble (1996) further emphasizes that the process approach enables learners to cultivate their writer’s voice, critical thinking, and problem-solving skills by focusing on how writers write rather than solely on correctness. In EFL contexts, process-based strategies encourage students to plan, monitor, and reflect on their writing, enhancing both cognitive and linguistic skills. However, without explicit instruction in genre conventions, learners may produce drafts that are linguistically correct but fail to meet academic standards.

The table below shows a simple comparison between the product and the process writings:

Table 1

Product and Process Writing: A Comparison

Process Writing	Product Writing
Text as a resource for comparison	Imitate model text
Ideas as starting point	Organization of idea are more important than ideas themselves
More than one draft	One draft
More global, focused on purpose, theme, text type i.e. reader is emphasized	Features highlighted including controlled practice of those features
Collaborative	Individual

Emphasis on creative process	Emphasis on end product
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Adapted from “Approaches to writing instruction,” by T. Hedge, 2005, Writing, Oxford University Press, p. 56.

Genre-Based Approach

The genre-based approach emphasizes writing as a socially situated and purposeful activity, focusing on the communicative purpose, audience, and structural conventions of specific text types. According to Swales (1990), texts belong to discourse communities and share common moves and structures that fulfill specific communicative goals. Hyland (2004) extends this view, arguing that genre-based instruction helps learners make implicit academic writing conventions explicit, thereby providing a roadmap for participating in academic discourse.

Genre pedagogy typically involves analyzing model texts, practicing writing within the genre, and producing original texts, giving EFL learners the skills to navigate rhetorical expectations in English academic writing. While highly effective in fostering awareness of audience, purpose, and text organization, genre-based instruction can be demanding in terms of teacher guidance.

Pedagogical Implications for Automated Feedback Tools

The intersection of linguistic, rhetorical, and cognitive challenges highlights the potential benefits of automated writing evaluation (AWE) tools in EFL contexts. Such tools provide timely, detailed feedback on grammar, mechanics, vocabulary, and style, helping learners identify errors they might overlook during self-editing and fostering greater learner autonomy (Stevenson & Phakiti, 2014; Ranalli, 2018).

AWE platforms can complement different teaching approaches effectively: in product-based instruction, they reinforce linguistic accuracy; in process-based instruction, they support

iterative drafting and revision; and in genre-based instruction, they allow learners to focus on content, structure, and audience while managing lower-level language concerns.

Integrating automated feedback tools into EFL writing instruction can therefore reduce cognitive load, address linguistic and organizational challenges, and enhance overall writing development, supporting learners in producing coherent, rhetorically effective, and academically appropriate texts (Cumming, 2001; Silva, 1993; Hyland, 2004).

Section Two: Written Corrective Feedback (WCF) in Second Language writing

Defining Written Corrective Feedback (WCF)

Written corrective feedback (WCF) refers to pedagogical responses provided to learners to address errors in their written production and improve their linguistic accuracy. As defined by Russell and Spada (2006) and Ellis (2009), WCF involves teachers' responses to learners' errors, which may vary in form and focus depending on instructional objectives. Similarly, Bitchener and Ferris (2012) emphasize that WCF plays a crucial role in language development by helping learners identify and revise their errors. Overall, WCF can be understood as an instructional practice aimed at enhancing the accuracy and development of second language writing.

Direct vs. indirect feedback

Researchers have identified different types of written corrective feedback, and each type varies in how errors are indicated and corrected. A fundamental distinction in the literature on written corrective feedback concerns the difference between direct and indirect feedback. Chandler (2003) states that direct feedback occurs when the teacher provides the correct language form for each identified error.

According to Ellis (2009), direct written corrective feedback involves the explicit provision of the correct linguistic form by the teacher. In this type of feedback, the teacher

identifies the error and provides the correct form. Direct feedback therefore minimizes ambiguity, as learners are provided with the correct form. Ky (2023) explains that direct teacher corrective feedback involves explicit responses to students' writing, including the identification of errors and the provision of corrections. Because the correction is explicit, there is little ambiguity regarding the appropriate structure or word choice.

Unlike direct feedback, indirect feedback occurs when the teacher indicates the presence of an error without providing the correct language form, leaving the learner responsible for correcting it. This type of feedback promotes problem solving (Lalande, 1982) and encourages learners to reflect on language forms (James, 1998; Reid, 1998; Ferris & Roberts, 2001). However, findings from studies comparing direct and indirect feedback have been inconsistent. Some studies suggest that indirect written correction is more effective (Lalande, 1982; Ferris & Helt, 2000), while others report no significant difference (Robb et al., 1986; Frantzen, 1995), and some indicate that direct feedback can be more effective (Chandler, 2003).

Direct and indirect written feedback differ mainly in terms of clarity and learner involvement. While direct feedback provides the correct language form, indirect feedback requires learners to generate the correction themselves. Despite theoretical arguments supporting indirect feedback, empirical findings remain inconclusive.

Focused vs. Unfocused Feedback

Recent research has increasingly supported the use of targeted written corrective feedback. Some researchers argue that targeting specific language features can be more beneficial for learners, as different categories of errors involve different learning processes (Ferris, 2001; Ferris & Roberts, 2001). Focused feedback typically targets specific grammatical forms and allows the learner to focus on selected language structures.

Another important distinction concerns the difference between focused and unfocused feedback. Unfocused feedback addresses a broad range of errors in learners' writing, while focused feedback targets specific linguistic features and ignores others (Ellis, 2009). However, empirical findings remain mixed. Some studies report no statistically significant differences (Frear, 2010; Rouhi & Samiei, 2010), while others indicate that focused feedback can be more effective in improving grammatical accuracy (Farrokhi, 2011; Farrokhi & Sattarpour, 2012).

Sheen (2007) examined focused direct written corrective feedback on ESL learners' use of English articles and found that learners who received focused feedback demonstrated greater improvement. The results also suggested that individual differences might influence the effectiveness of focused feedback.

Explicit vs. implicit feedback

Another important distinction concerns the difference between explicit and implicit feedback. Explicit feedback occurs when the correct form is clearly provided or explained. According to Kim and Mathes (2001), explicit corrective feedback involves clear indications of the correct linguistic form. In contrast, implicit feedback signals the presence of an error without directly providing the correct form. Lochtmann (2002) explains that implicit feedback encourages learners to notice and correct errors independently, which may promote deeper cognitive processing.

The distinction is important because each type requires different levels of learner involvement. While explicit feedback provides clear guidance, implicit feedback requires learners to reflect on their language use. These three dimensions of written corrective feedback—direct versus indirect, focused versus unfocused, and explicit versus implicit—collectively inform the design and evaluation of automated feedback tools such as Grammarly, which simultaneously provides explicit corrections, targets specific linguistic features, and encourages learner reflection and self-correction (Link et al., 2019; Ranalli, 2018).

Effectiveness of WCF: The Truscott–Ferris Debate

Truscott (1996) contended that correcting grammar in second language writing is not effective and should be discontinued. He argued that written corrective feedback does not necessarily lead to improved grammatical accuracy and may be detrimental to learners.

He also critically assessed previous research, suggesting that studies focused on short-term improvements rather than long-term acquisition, and that observed gains were often due to superficial revisions rather than genuine language development. Consequently, he concluded that grammar correction lacked sufficient empirical and theoretical support.

Ferris (1999) countered these claims, arguing that abandoning grammar correction was premature and not sufficiently supported by evidence. She emphasized the need for more carefully designed research to determine when and how corrective feedback can be effective, rather than eliminating it. In 2004, Ferris further argued that the issue is complex and cannot be reduced to a simple “for or against” position. She maintained that written corrective feedback can improve accuracy in certain contexts and called for more pedagogically informed research. Subsequent studies examined the effectiveness of written corrective feedback through experimental designs. Bitchener, Young, and Cameron (2005) found that learners who received focused feedback showed greater improvement in grammatical accuracy. Similarly, Sheen (2007) reported that students who received corrective feedback demonstrated significantly better results.

These findings suggest that the effectiveness of written corrective feedback depends on factors such as the type of feedback and the linguistic features targeted. The debate remains relevant with the emergence of automated writing evaluation tools such as Grammarly, which provide corrective feedback through digital platforms. This highlights the importance of examining whether such feedback can improve EFL learners’ writing

Timing of Feedback: Immediate vs. Delayed

Recent studies highlight that the timing of its delivery influences the effectiveness of written corrective feedback. Scholars argue that timing (immediate vs. delayed) plays a critical role in learning outcomes (Ellis, 2009; Bitchener & Ferris, 2012). Delayed feedback is given after a time gap and may promote deeper cognitive processing by encouraging learners to reflect on their performance (Kulhavy & Anderson, 1972). In writing, it can help learners recognize recurring error patterns.

Immediate feedback, on the other hand, helps prevent the reinforcement of errors and allows learners to correct mistakes as they occur. Shute (2008) argues that timely feedback reduces ambiguity and supports correct performance, although it may sometimes lead to superficial revisions. Ellis (2009) suggests that immediate feedback helps learners connect corrections to their original output, while delayed feedback may support long-term retention by reducing cognitive overload.

The distinction between immediate and delayed feedback has gained increasing importance with the development of automated writing evaluation tools in language education. Grammarly provides real-time corrective feedback while learners are composing their texts, allowing them to identify and revise linguistic errors during the writing process. This type of instant feedback closely resembles immediate corrective feedback and may help learners notice and correct errors more effectively. Therefore, examining the timing of feedback offers important insights into how automated feedback systems can support the development of EFL learners' academic writing skills.

As shown in Table 2 (created by the author). Written corrective feedback can be categorized into several types based on how errors are treated and the level of learner engagement required. Direct and indirect feedback differ in whether the correct form is provided or merely indicated, while focused and unfocused feedback vary in the scope of error correction. Additionally, explicit and implicit feedback reflect the degree of clarity and

explanation given to learners. These distinctions highlight how feedback can support language development either by promoting learner autonomy and deeper processing or by providing clear and immediate correction.

Table 2

Types of Written Corrective Feedback in Second Language Writing

Type	Definitions	Characteristics
Direct feedback	The teacher provides the correct linguistics form directly	• Errors are corrected explicitly • Learners receive the correct answer • Useful for beginners
Indirect Feedback	The teacher indicates that an error exists but does not provide the correction	• Underlining, circling, or coding errors • Encourages self-correction • Promotes deeper processing
Focused Feedback	Feedback targets on only specific types of errors	• Selective correction • Reduces cognitive overload • More effective for accuracy in specific forms
Unfocused Feedback	Feedback addresses a wide range of error types	• Comprehensive correction • Covers, grammar, vocabulary, mechanics • May overwhelm learners
Explicit Feedback	The error and the correct form are clearly explained	• Clear correction + Explanation • Often includes metalinguistic comments • High learner awareness
Implicit Feedback	The error is indicated without direct explanation	• Recasts, reformulation • No over explanation • Learners infer correction

Learner Uptake and Revision Behavior

Learner uptake refers to a learner's response to corrective feedback. Lyster and Ranta (1997) define it as the learner's reaction, which may result in repair or needs repair. Some researchers view uptake as evidence of noticing and learning (Lightbown, 1998; Ellis et al., 2001). However, other studies suggest that learning can occur without immediate uptake (Mackey & Philp, 1998; Loewen, 2004).

In writing, uptake is closely related to revision, which involves modifying a text after feedback. Writing models (Flower & Hayes, 1980; Bereiter & Scardamalia, 1987) consider

revision a key stage in writing. Research shows that learners often focus on surface-level revisions, while strategy-based instruction can improve revision quality (Cho & MacArthur, 2011; Sengupta, 2000). Goal setting and audience awareness also contribute to more effective revision (De La Paz & Sherman, 2013; Rijlaarsdam & Van den Bergh, 2005).

Research indicates that uptake and revision both contribute to language learning, although their relationship with long-term acquisition remains unclear. In the context of the present study, learner engagement with revision and improvement of written texts is particularly relevant in relation to automated writing evaluation tools. Digital platforms such as Grammarly provide real-time corrective suggestions that prompt learners to revise their writing during the composition process. By helping users notice linguistic errors and encouraging modifications to their sentences, automated feedback systems may increase learners' engagement in revision and self-correction, which are key processes in improving the academic writing performance of English as Foreign Language (EFL) learners.

Section three: Theoretical Frameworks Underpinning the Study

Sociocultural Theory and Learning through Social Interaction

Sociocultural Theory (SCT), developed by Vygotsky (1978), conceptualizes learning as a socially mediated and culturally situated process, in which cognitive development emerges through interaction with others and is shaped by social, cultural, and psychological factors (Hodges, 2017).

Unlike purely cognitive approaches that focus on individual mental processes, SCT emphasizes the centrality of social interaction, motivation, and affect in learning. Human intelligence, according to Vygotsky, originates in society, and individuals rely on cultural and psychological tools particularly language to regulate thinking, construct meaning, and engage in higher-order cognitive activity.

A core construct in SCT is the Zone of Proximal Development (ZPD), defined as the distance between a learner's actual developmental level, determined through independent problem-solving, and their potential level, achievable through guidance or collaboration with more knowledgeable others (Vygotsky, 1978, p. 86).

Within the ZPD, learners perform more complex cognitive and linguistic tasks with assistance, gradually internalizing knowledge and strategies for independent functioning (Vygotsky, 1978, p. 87). Learning, from this perspective, is a co-constructed process in which meaning is negotiated and developed through dialogue (Bakhtin, 1981). Knowledge moves from the interpsychological (social) plane to the intrapsychological (individual) plane, often mediated by private speech, which learners use to regulate cognition and internalize shared meanings.

In the context of second language (L2) writing, SCT suggests that development is optimized through mediated, collaborative, and interactive activities. Writing is not an isolated cognitive task but a socially situated practice, where learners construct meaning, refine linguistic forms, and develop rhetorical strategies via interaction with teachers, peers, and tools.

Empirical research supports this view: Donato (1994) shows that collaborative writing enables learners to scaffold each other's performance, co-construct language, and solve linguistic problems jointly. Similarly, Lantolf and Thorne (2006) highlight that mediated interaction enhances not only linguistic competence but also metacognitive awareness, allowing learners to regulate their writing processes more effectively.

Sociocultural Theory (SCT) views L2 writing as a socially mediated process in which learning occurs through interaction and the use of mediational tools within the learner's Zone of Proximal Development (ZPD).

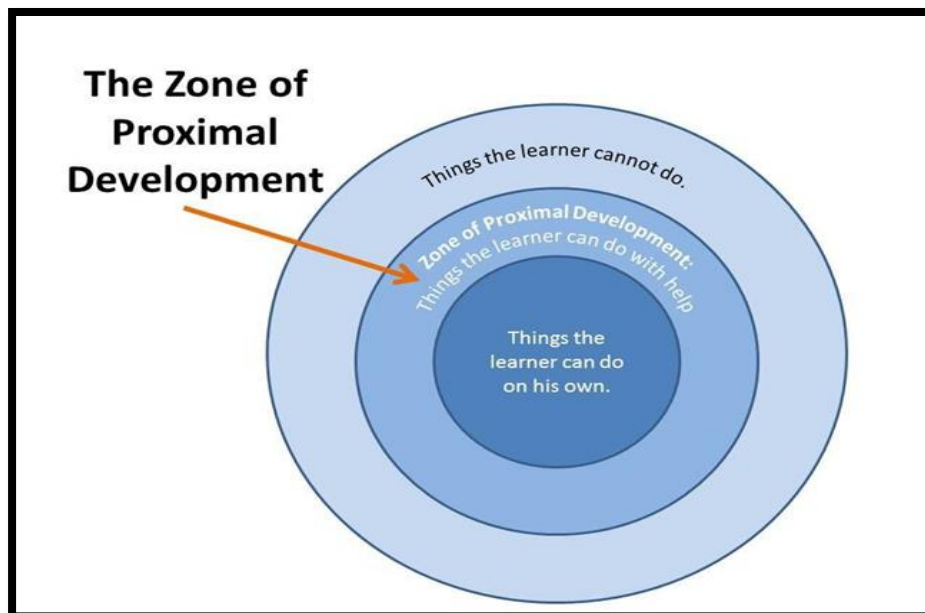
Technological tools, such as Grammarly, act as mediators by providing real-time feedback that guides attention, supports problem solving, and scaffolds learners beyond

their independent abilities. Through repeated engagement, learners internalize linguistic forms, gradually moving from external support to self-regulation and independent writing competence.

The diagram illustrates Vygotsky's Zone of Proximal Development (ZPD), showing that learners perform some tasks independently, others with guidance from a more knowledgeable other, and some are too difficult even with help. It highlights that learning is most effective within the ZPD, where support enables gradual skill development toward independent performance.

Diagram 1

The Zone of Proximal Development



Based on the concept of the Zone of Proximal Development described in *Mind in Society: The Development of Higher Psychological Processes*, by L. S. Vygotsky, 1978, Harvard University Press, p. 86.

Scaffolding in L2 Writing: From Human to Digital Mediation

Scaffolding, rooted in Vygotsky's (1978) concept of the Zone of Proximal Development (ZPD), refers to the temporary, adaptive, and goal-oriented support provided to

learners to enable them to accomplish tasks beyond their current independent abilities (Wood, Bruner, & Ross, 1976).

Although Vygotsky did not explicitly use the term, scaffolding has become central to Sociocultural Theory (SCT), representing the practical mechanisms through which mediation occurs within the ZPD. It is dynamic and contingent, with the type and level of support continuously adapted to learners' needs, abilities, and progress, and involves strategies such as modeling, prompting, questioning, cueing, explanation, and corrective feedback.

A key feature is gradual withdrawal or fading, whereby support is progressively reduced as learners gain competence, eventually enabling independent performance (Van Lier, 1996; van de Pol, Volman, & Beishuizen, 2010). Effective scaffolding follows several principles: contextual support (providing a safe yet challenging learning environment), continuity (repeated engagement over time), intersubjectivity (shared understanding between participants), flow (natural, meaningful interaction), contingency (responsive adaptation), and handover (transition from assisted to independent performance) (Van Lier, 1996).

In L2 writing, scaffolding supports both micro-level linguistic skills such as grammar, vocabulary, and sentence structure and macro-level processes, including organization, coherence, and argumentation, reducing cognitive load and facilitating skill integration (Ellis, 2008; Hyland & Hyland, 2006). While scaffolding traditionally occurs through teacher or peer interaction, digital tools have extended this concept into technology-mediated learning environments. Within SCT, such tools function as mediational artifacts, enabling learners to interact with knowledge, negotiate meaning, and perform tasks beyond their independent abilities (Lantolf & Thorne, 2006).

Grammarly, as an Automated Writing Evaluation (AWE) system, functions as a digital scaffold by providing immediate, adaptive, and context-sensitive feedback that models correct forms, prompts self-correction, and supports iterative learning.

It engages learners in noticing errors, negotiating meaning, and experimenting with language, fostering internalization and the gradual shift from guided to independent writing. Through repeated cycles of feedback, reflection, and revision, Grammarly promotes metacognitive awareness, learner autonomy, and self-regulation. Overall, Grammarly exemplifies how digital scaffolds complement traditional mediation, enabling learners to perform beyond their current abilities while supporting long-term writing development.

The Noticing Hypothesis

The Noticing Hypothesis, first introduced by Schmidt in 1990, is a fundamental theory in second language acquisition that suggests that conscious awareness of the input is a necessary condition in language acquisition. This theory suggests that in order to acquire a language, the learner must first consciously notice the input provided. Schmidt explicitly states this: “people learn about the things that they attend to and do not learn much about the things they do not attend to” (Schmidt, 1990, p. 132). This theory suggests that it is not enough to simply be exposed to a language; the learner must consciously become aware of certain aspects of the language in order to acquire it.

Schmidt also distinguishes between input and intake, and suggests that only the input that is consciously noticed by the learner becomes the intake, which is then processed and stored in the learner’s developing linguistic system. Thus, the process of noticing acts as a filter in language acquisition. Schmidt argues that subliminal language acquisition is not possible; stating, “Subliminal learning is impossible,” and that attention and awareness are necessary conditions for language acquisition.

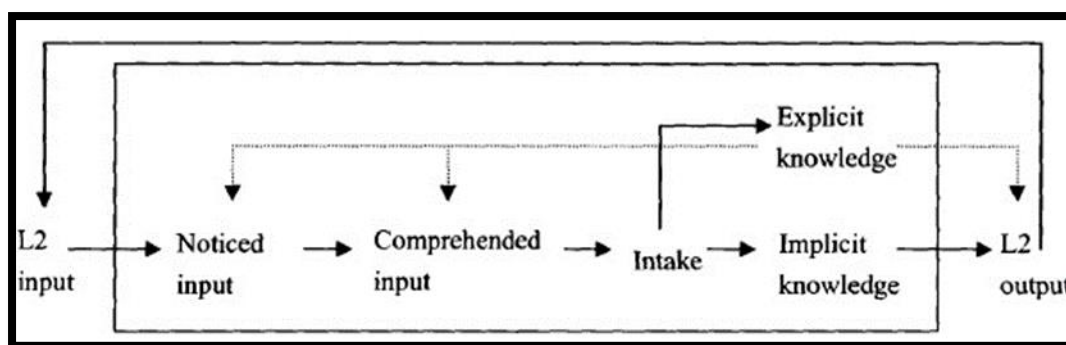
Schmidt (1995, 2001) further develops this point by clarifying that noticing involves the conscious perception of surface features in language, while deeper levels of understanding, like metalinguistic awareness, may not necessarily be required. However, it is also important to highlight that the process of noticing is an essential element in this

context because it allows learners to become aware of the discrepancy between their own interlanguage and the target language.

The Noticing Hypothesis also points out that learning is not an automatic process but rather depends on the learner's ability to consciously process the input in language, making it an essential element in second language acquisition. Ellis (1999) provides a model of cognitive process in second language acquisition where the role of noticing was given great importance. This model tries to investigate the cognitive progress in which the input occurs. Based on this model, noticing plays a vital role. Noticed input is the input in which learners absorb language features into their short-term memories while comparing them to features produced as output. If learners do notice and comprehend the input, intake either explicit knowledge or implicit, the output will be created in which the absorbed intake forms part of the learner's interlanguage system and changes only occur when language features become part of long-term memory.

Figure 2

The Role of Noticing from Cognitive Perspective



Adapted from "The role of noticing from a cognitive perspective," by R. Ellis, 1999, *Learning a Second Language through Interaction*, John Benjamins, p. 349.

Noticing as a Prerequisite for Language Acquisition and Feedback Processing

The Noticing Hypothesis, proposed by Schmidt (1990), represents a pivotal shift in second language acquisition (SLA) theory by emphasizing the central role of conscious awareness in learning. According to Schmidt, language input alone is insufficient for acquisition; learners must actively notice specific features of the input for it to be internalized. He asserts that “noticing is the necessary and sufficient condition for converting input into intake” (Schmidt, 1990, p. 130).

Intake refers to the subset of language input that is consciously registered by the learner and has the potential to be incorporated into the developing interlanguage system, although it may not yet be fully internalized (Leow, 1993). Schmidt (1995, 2001) distinguishes noticing from understanding: noticing involves the conscious registration of linguistic forms, such as grammatical structures, vocabulary items, or phonological patterns, whereas understanding requires deeper cognitive engagement, including recognition of rules, patterns, or general principles. Noticing operates at a surface level of awareness and is considered the gateway to acquisition, while understanding marks a more complex, analytical stage of learning.

Empirical support for noticing comes from Schmidt’s diary studies during his Portuguese learning (Schmidt & Frota, 1986), which demonstrated that consciously attended forms are more likely to be learned, while unnoticed forms remain unacquired. This underscores Schmidt’s claim that subliminal or fully implicit learning is insufficient for SLA: learners cannot acquire linguistic structures unless they are aware of them.

Operationally, Schmidt identifies three levels of consciousness in SLA: perception (initial detection of linguistic stimuli), noticing (conscious registration of forms), and understanding (higher-order analysis and hypothesis testing regarding linguistic rules) (Schmidt, 1990; Jordan, 2004).

Attention plays a crucial mediating role in this hierarchy; learners who focus attention on linguistic input are more likely to notice relevant forms, influenced by factors such as

frequency, salience, task demands, expectations, and proficiency (Schmidt, 1990). Essentially, “those who notice most, learn most” (ibid.), highlighting the active role of learners in directing attention to meaningful linguistic patterns.

The link between noticing and feedback has been extensively examined in SLA research. Scholars such as Ferris (2006), Ellis (2009), and Loewen (2015) emphasize that corrective feedback is effective only when learners consciously attend to and process it. Ferris (2006) argues that written corrective feedback (WCF) improves accuracy when learners notice gaps between their output and target forms, enabling them to restructure interlanguage. Similarly, Ellis (2009) highlights that feedback effectiveness depends on cognitive engagement: direct, indirect, and metalinguistic feedback must prompt learners to attend to errors, while interactive or negotiated feedback fosters deeper noticing.

Loewen (2015) situates noticing within a broader cognitive-interactionist framework, stressing that attention, awareness, and memory are central to encoding, storing, and retrieving linguistic forms. Feedback, whether oral or digital (e.g., Grammarly), functions optimally when it draws learners’ attention to salient forms and requires active processing, linking noticing directly to long-term retention and interlanguage development.

Research further demonstrates that noticing is selective and guided. Learners are more likely to attend to frequent, salient, or highlighted errors (Ferris, 2006), and metalinguistic explanations or prompts help focus attention (Ellis, 2009). Cognitive load and working memory constraints influence the amount of feedback that can be effectively processed (Loewen, 2015). Thus, feedback alone is insufficient for language learning; it must be consciously noticed and cognitively processed to transform input into intake.

In practice, Schmidt’s Noticing Hypothesis informs pedagogical approaches that scaffold learner attention. Activities that highlight grammatical contrasts, vocabulary use, or syntactic patterns, combined with timely corrective feedback, enhance conscious noticing,

fostering effective second language acquisition (Schmidt, 1993, p. 209). By integrating attention, awareness, and active engagement, learners convert input and feedback into meaningful, internalized language knowledge

Noticing in Written Feedback: Identifying Gaps between Learner Output and Target Form

The concept of noticing extends naturally to written feedback, where learners are provided with corrections, comments, or suggestions on their written production.

According to Schmidt's Noticing Hypothesis (1990), learning occurs when learners consciously register linguistic forms. In the context of writing, this process is triggered when learners detect discrepancies between their output and the target language norms, commonly referred to as "noticing the gap" (Schmidt, 1990; Ferris, 2006).

Noticing the gap involves learners comparing their written production to the correct forms provided by teachers, peers, or automated tools. This comparison allows learners to recognize errors in grammar, vocabulary, syntax, or discourse organization and to focus their attention on specific forms that require modification (Ellis, 2009). The process is essential because, without awareness of mismatches, learners are unlikely to restructure their interlanguage or correct recurring errors. As Schmidt (1994) emphasizes, noticing is "the registration of the occurrence of a stimulus event in conscious awareness and subsequent storage in long-term memory," indicating that written feedback must capture learners' attention to be effective.

Empirical studies support the importance of noticing in written feedback. Ferris (2006) found that students are more likely to improve grammatical accuracy and syntactic complexity when feedback draws attention to recurring errors, particularly when learners actively engage with the corrections.

Similarly, Ellis (2009) asserts that feedback only facilitates learning when learners consciously process the corrective input, linking noticing directly to successful acquisition.

Loewen (2015) reinforces this perspective from a cognitive-interactionist viewpoint, emphasizing that attention and awareness enable learners to encode, store, and retrieve linguistic information, making noticing a critical mediator between feedback and learning outcomes. In practical terms, written feedback provides multiple opportunities for noticing.

For instance, marginal comments, error highlights, and underlined text all act as signals that draw learners' attention to problematic forms (Hyland&Hyland, 2006). Through cycles of revision, learners must actively compare their output with the feedback, reflect on the errors, and make conscious adjustments. This dialogic engagement between the learner and the feedback transforms the written interaction into a cognitive mechanism for noticing, effectively operationalizing Schmidt's hypothesis in writing contexts.

Research also emphasizes that noticing in written feedback is not immediate, unlike spoken negotiation of meaning, but delayed noticing still contributes to language development. Revision cycles allow learners to repeatedly engage with errors, gradually increasing their awareness of form-function relationships and reinforcing long-term retention (Nassaji, 2011). In this sense, the written medium serves as a scaffold environment where noticing can be practiced repeatedly and consciously, enhancing accuracy and linguistic competence over time.

Moreover, the notion of noticing the gap in writing underscores the importance of explicit feedback design. Feedback must be clear, focused, and comprehensible to draw learners' attention effectively. Ambiguous or overly general comments may fail to trigger noticing, while targeted corrections especially those highlighting patterns of error promote

focused attention and encourage learners to integrate corrective input into their interlanguage system (Ferris, 2006; Ellis, 2009).

Noticing in written feedback involves the learner's conscious registration of differences between their written production and the target form. It represents the mechanism through which feedback leads to language development, bridging the gap between input, learner awareness, and acquisition. By actively engaging with corrective feedback, learners can identify specific linguistic errors, reflect on patterns of mistakes, and gradually restructure their interlanguage, thus aligning pedagogical practice with the principles of the Noticing Hypothesis.

How Grammarly's Corrections Direct Learner Attention to Linguistic Errors

Automated writing tools like Grammarly offer a practical application of Schmidt's Noticing Hypothesis by guiding learners' attention to specific linguistic forms in their written output. The tool identifies grammatical errors, spelling mistakes, punctuation issues, stylistic inconsistencies, and vocabulary misuses, effectively highlighting areas where learners' interlanguage deviates from target language norms (Schmidt, 1990; Ellis, 2009).

Grammarly operationalizes the concept of "noticing the gap" in a digital context, providing immediate and explicit cues that can trigger conscious attention. The corrections provided by Grammarly serve as visual and cognitive signals that direct learners' focus to errors that might otherwise go unnoticed.

Therefore, underlined text, color-coded highlights, and explanatory suggestions act as external markers of discrepancy, enabling learners to detect patterns of mistakes and reflect on their writing strategies (Ferris, 2006). This process aligns with Schmidt's assertion that "input does not become intake unless it is noticed" (Schmidt, 1990, p. 130), emphasizing that learning requires conscious engagement with linguistic forms rather than passive exposure.

In addition, Grammarly supports iterative revisions and self-correction, which are crucial for the noticing process. When learners interact with feedback by reviewing suggestions, selecting corrections, or modifying sentences, they engage in active comparison between their output and the target forms.

This mirrors the mechanisms described by Ferris (2006) and Ellis (2009), who emphasize that feedback effectiveness depends on learners' ability to consciously process corrective input. By prompting learners to reflect on their errors and consider alternative forms, Grammarly fosters deeper cognitive processing, which is essential for long-term retention and interlanguage development (Loewen, 2015).

Grammarly also contributes to metalinguistic awareness, as the tool often provides brief explanations for errors, clarifying grammar rules, word choice, or syntactic structure. These explanations not only highlight the error but also engage learners in understanding why a correction is necessary, thereby linking noticing to understanding (Schmidt, 1995).

This scaffolding effect allows learners to internalize linguistic patterns more effectively, reinforcing the connection between attention, awareness, and language acquisition.

Empirical and theoretical studies support the integration of automated tools in EFL contexts. Research indicates that learners who receive immediate, explicit feedback whether from teachers or digital tools are more likely to notice their errors and modify their language output (Ferris, 2006; Ellis, 2009).

Grammarly, by delivering timely, targeted, and actionable feedback, creates an environment where noticing becomes systematic and continuous, helping learners to gradually reduce recurring errors and enhance linguistic accuracy.

In practical classroom or self-study settings, Grammarly can be seen as a technological mediator that bridges the gap between learner output and target norms. By

providing consistent and explicit error signals, it directs attention to specific features of language that learners may otherwise overlook, ensuring that noticing occurs even in independent learning contexts. The tool thus exemplifies how digital feedback mechanisms can operationalize the principles of the Noticing Hypothesis in contemporary EFL writing instruction.

Grammarly directs learner attention to linguistic errors through explicit, immediate, and informative feedback. Its corrections function as external cues that trigger noticing, foster reflection, and promote active engagement with language forms. By combining error detection, metalinguistic explanations, and iterative revision opportunities, Grammarly serves as an effective digital application of Schmidt's Noticing Hypothesis, supporting the development of accuracy and awareness in second language writing.

The Interaction Hypothesis and Learner–Tool Interaction

The Interaction Hypothesis (IH), proposed by Long (1983, 1996), asserts that second language acquisition (SLA) is facilitated through interaction, particularly when learners negotiate meaning to resolve communication breakdowns. Interaction enables learners to notice linguistic gaps, modify output, and internalize language forms (Hatch, 1978; Ellis, 2003; Long, 1981). In traditional contexts, this involves spoken communication with interlocutors, where negotiation occurs through strategies such as clarification requests, repetition, and reformulation.

Although the (IH) was originally developed for face-to-face interaction, some principles can be extended to written contexts, especially when learners engage with written corrective feedback (WCF). In such settings, learners undergo iterative cycles of noticing, revising, and self-correcting, which function as delayed forms of negotiation of meaning (Mackey & Gass, 2006; Nassaji, 2011).

Automated writing evaluation tools like Grammarly can be conceptualized as “digital interlocutors” that provide immediate, context-sensitive feedback. Through this interaction, learners notice errors, evaluate alternatives, and revise output, engaging in cognitively demanding processes that mirror negotiation of meaning. Grammarly offers explicit corrections, reformulations, and prompts, creating a continuous feedback loop that fosters noticing, modified output, and gradual internalization of linguistic rules (Li & Li, 2015; Warschauer & Ware, 2006).

While extending the IH to learner–software interaction is theoretically limited since no human interlocutor is involved—this perspective highlights how automated feedback can still support essential SLA mechanisms: attention, noticing, revision, and self-regulation. Iterative engagement with Grammarly not only improves linguistic accuracy but also promotes learner autonomy and metacognitive awareness, aligning with broader interactionist and sociocultural principles (Vygotsky, 1978).

In sum, although IH’s original scope concerns spoken interaction, its core ideas can provide context for understanding how written corrective feedback human or automated facilitates noticing, engagement, and the development of second language writing proficiency.

Feedback Strategies and Learner Self-Correction

Within the interactionist framework of second language acquisition, feedback plays a central role in facilitating learning, particularly when it encourages learners to engage cognitively with their errors and actively participate in the correction process. From the perspective of the Interaction Hypothesis (Long, 1983, 1996), corrective feedback is most effective when it emerges during interaction and contributes to negotiation of meaning, thereby directing learners’ attention to problematic linguistic forms and promoting language development.

A key contribution to understanding feedback in interaction comes from Lyster and Ranta (1997), who identified several feedback strategies that vary in their degree of explicitness and their impact on learner uptake and self-correction. These include:

Explicit correction, where the correct linguistic form is directly provided to the learner, ensuring clarity and immediate access to the target structure.

Recasts, which involve the implicit reformulation of the learner's incorrect output while preserving its original meaning, allowing learners to compare their production with the correct form.

Prompts, which include strategies such as clarification requests, elicitation, repetition, and metalinguistic cues that encourage learners to self-repair rather than providing the answer directly.

These strategies are particularly significant because they create opportunities for noticing, a process central to SLA, whereby learners become aware of the gap between their interlanguage and the target language.

According to Long (1996), such moments of feedback, especially when triggered by communication difficulty, represent optimal conditions for learning, as they connect input (feedback), attention (noticing), and output (self-correction).

Subsequent research has emphasized the importance of learner engagement with feedback. Bitchener and Ferris (2012) and Sheen (2011) argue that feedback is most beneficial when it requires learners to process linguistic information deeply, rather than simply accept corrections passively.

In this sense, prompts are often considered particularly effective, as they push learners to reflect on their errors, test hypotheses, and produce modified output, thereby strengthening language acquisition.

From a broader perspective, feedback strategies function as a form of interactive scaffolding, consistent with Vygotsky's (1978) sociocultural theory. Through feedback, more knowledgeable agents whether teachers, peers, or digital tools provide temporary support that helps learners move beyond their current level of competence. Over time, this support is gradually internalized, enabling learners to develop greater independence and accuracy in their language use.

These feedback strategies are not limited to traditional classroom interaction but are also evident in automated feedback environments, particularly in learner interaction with tools such as Grammarly.

Grammarly implements multiple feedback strategies, including explicit corrections, recasts, and prompts, allowing learners to actively interpret, evaluate, and apply suggestions. This interactive feedback aligns with the Interaction Hypothesis by creating opportunities for negotiation of meaning, even without a human interlocutor. Repeated engagement with Grammarly helps learners recognize error patterns, anticipate corrections, and apply rules in new contexts, promoting self-correction and metalinguistic awareness.

The immediacy and consistency of automated feedback facilitate multiple cycles of revision, leading to deeper processing and more durable learning outcomes. Overall, Grammarly supports linguistic accuracy, learner autonomy, and long-term writing proficiency by making feedback a dynamic, cognitively engaging process.

Skill Acquisition Theory

The basic claim of Skill Acquisition Theory, according to Dekeyser (2007b), "is that the learning of a wide variety of skills shows a remarkable similarity in development from initial representation of knowledge through initial changes in behavior to eventual fluent, spontaneous, largely effortless, and highly skilled behavior, and that this set of

phenomena can be accounted for by a set of basic principles common to acquisition of all skills” (p. 97).

In sum, as mentioned by Speelman (2005), skill acquisition can be considered as a specific form of learning, where learning has been defined as “the representation of information in memory concerning some environmental or cognitive event” (p. 26).

Therefore, according to him, skill acquisition is a form of learning where “skilled behaviors can become routinized and even automatic under some conditions” (p.26). In other words, this theory assigns roles for both explicit and implicit learning in SLA, and, as a general theory of learning, it claims that adults commence learning something through largely explicit processes, and with subsequent sufficient practice and exposure, move into implicit processes. Development, within this theory, entails the utilization of declarative knowledge followed by procedural knowledge, with the latter’s automatization (Vanpatten & Benati, 2010).

According to Richards & Schmidt (2010), declarative knowledge is conscious knowledge of facts, concepts or ideas that can be stored as propositions. In addition, procedural knowledge refers to unconscious knowledge of how an activity is done.

As elaborated by Vanpatten & Benati (2010), using declarative knowledge involves explicit learning or processes; learners obtain rules explicitly and have some type of conscious awareness of those rules. The automatization of procedural knowledge entails implicit learning or processes; learners begin to proceduralize the explicit knowledge they own, and through situational suitable practice and use, the behavior becomes second nature.

Declarative to Procedural Knowledge and the Role of Grammarly

John R. Anderson’s Adaptive Control of Thought (ACT) model (1983) provides a foundational framework for understanding how learners progress from knowledge of

language rules (declarative knowledge) to their effective use in real-time communication (procedural knowledge), ultimately achieving automaticity.

Skill acquisition occurs in three stages: declarative, procedural, and automatic. At the declarative stage, learners consciously acquire explicit knowledge of linguistic rules, such as grammar, syntax, vocabulary, and stylistic conventions. This knowledge is retrieved from long-term memory and processed in working memory, making initial language production slow and effortful (Anderson, 1983; O'Malley, Chamot, & Walker, 1987).

Through repeated practice and guided application, declarative knowledge gradually transforms into procedural knowledge, allowing learners to apply rules automatically without conscious retrieval. In writing, this proceduralization occurs as learners repeatedly construct sentences, paragraphs, and essays, internalizing grammatical patterns and lexical combinations. Procedural knowledge is represented as “if-then” production rules, enabling learners to select correct forms based on context rather than explicit rule consultation (Anderson, 1982).

The final stage, automaticity, allows rapid, low-effort language production, freeing cognitive resources for higher-order processes such as organization, argumentation, and style (Anderson, 1983; DeKeyser, 2007; Schmidt, 1990). Automated Writing Evaluation (AWE) tools, particularly Grammarly, operationalize these principles by providing repeated, immediate, and context-sensitive feedback, which supports the transition from declarative to procedural knowledge. Learners receive real-time correction of grammar, syntax, vocabulary, and style errors, reinforcing cognitive pathways and strengthening procedural routines.

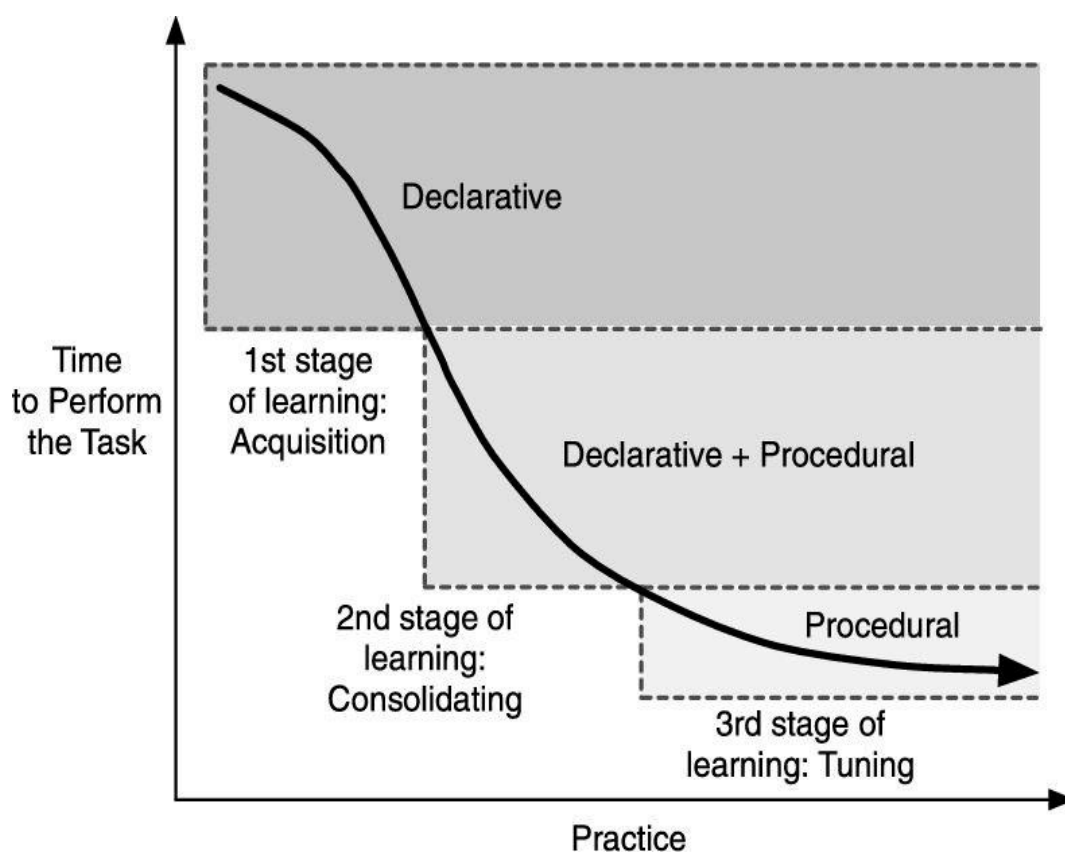
The iterative cycles of drafting, receiving feedback, revising, and internalizing corrections simulate deliberate practice, promoting both proceduralization and automatization (Bitchener & Ferris, 2012; DeKeyser, 2007). Grammarly promotes learner

autonomy and metacognitive engagement by enabling users to analyze corrections, reflect on errors, and experiment with alternatives, turning feedback into an active learning process. This enhances the transfer of linguistic rules to new contexts and supports long-term retention.

By reducing cognitive load on lower-level language decisions, learners can focus on higher-order writing processes, producing coherent and fluent texts while building confidence. Overall, Grammarly exemplifies how technology can operationalize skill acquisition, fostering proceduralization, automaticity, and sustained L2 writing development.

Figure 3

Three Stages of Skill Anderson's ACT model



Adapted from “The architecture of cognition,” by J. R. Anderson, 1983, Harvard University Press, p. 39; and “Human performance,” by P. M. Fitts and M. I. Posner, 1967, Brooks/Cole, p. 12.

Practice, Feedback, and Automatization in L2 Writing

Automatization in L2 writing occurs when procedural knowledge becomes efficient, fast, and minimally demanding of conscious attention, allowing learners to focus on higher-order processes such as content development, organization, and stylistic choices (DeKeyser, 2007; Anderson, 1983).

This transformation requires deliberate, repeated practice in meaningful contexts, which strengthens stimulus–response connections in memory, reduces cognitive load, and enables fluent and coherent language production (Kormos & Smith, 2012; Byrnes, 2013).

Feedback plays a critical complementary role, providing corrective guidance, highlighting errors, and encouraging noticing and reflection. Direct, indirect, and metalinguistic feedback help learners internalize rules, adjust strategies, and consolidate procedural knowledge across multiple writing tasks, while also promoting learner autonomy and self-regulation (Bitchener & Ferris, 2012; Schmidt, 1990; Hyland & Hyland, 2006).

The iterative cycle of practice and feedback allows learners to move from conscious, effortful application of rules to automatic execution, freeing cognitive resources for higher-order writing processes, including rhetorical organization, argumentation, and stylistic sophistication. Digital tools such as Grammarly can support this process by providing immediate, context-sensitive feedback that scaffolds practice, reinforces proceduralization, and encourages self-correction, facilitating the development of fluent, accurate, and independent L2 writers.

Taken together, the four theoretical frameworks reviewed in this section — Sociocultural Theory, the Noticing Hypothesis, the Interaction Hypothesis, and Skill

Acquisition Theory — converge on a shared understanding of L2 writing development as a mediated, cognitively active, and practice-driven process. Each framework highlights a distinct but complementary mechanism through which corrective feedback supports language learning: SCT emphasizes social mediation and scaffolding within the ZPD; the Noticing Hypothesis foregrounds conscious attention to linguistic form; the Interaction Hypothesis underscores negotiation of meaning and output modification; and Skill Acquisition Theory traces the progression from explicit knowledge to automatized performance. These frameworks collectively provide a principled theoretical basis for evaluating automated feedback tools such as Grammarly, whose capacity to scaffold learning, direct attention, prompt revision, and reinforce repeated practice align directly with the learning processes described above.

Section Four: Technology-Enhanced Writing Feedback and Automated Writing Evaluation (AWE)

Computer-Assisted Language Learning (CALL) and Writing

Computer-Assisted Language Learning (CALL) refers to the use of computer technologies in language education. As noted by Warschauer and Healey (1998), CALL has evolved from drill-based applications to more interactive uses that support authentic language use.

In writing, CALL enables the use of digital tools to support drafting and revising, helping learners improve grammatical structure, vocabulary, and accuracy. As a result, digital feedback has become increasingly common in second language writing instruction.

Chapelle (2001) notes that CALL environments provide opportunities for learners to engage in writing activities, receive feedback, and revise their work, which supports the development of writing skills.

More recent developments highlight the integration of intelligent tools that provide automated feedback on grammar and vocabulary (Godwin-Jones, 2018), allowing learners to

revise their writing and remain engaged in the process. However, Hyland (2019) points out that while such tools provide immediate feedback, they may not address more complex aspects of writing such as organization and argumentation, and are therefore most effective when combined with teacher support.

The increasing integration of digital feedback tools in language education has led to the development of automated writing evaluation systems that provide learners with immediate feedback during the writing process. These systems represent a significant advancement in technology-enhanced writing instruction and have become an important area of research in second language writing. As illustrated in Table 3, Computer-Assisted Language Learning (CALL) has evolved through three major phases, each characterized by distinct technological developments and pedagogical approaches.

Table 3

The development phases of the CALL Mark Warschauer and Deborah Healey (1998).

Stages	1970-1980 St/B CALL	1980-1990 Communicative CALL	21 st Century Interactive CALL
Technology	Mainframe Computers	Personal Computers (P.C)	Multimedia & Internet
English Teaching Paradigm	Grammar Trans. & Audio Lingual	Communication & Language Teaching	Content Based ESP/EAP
View of Language Nature	Structural/Beh. (Formal St.sys) of Drill & Practice	Cognitive (Mental Constructive Sys) Communicative Exercises	Scio-Ling (Development of Social Interaction) Authentic Discourses
Computers			
Main Objectives	Accuracy	Accuracy & Fluency	Accuracy, Fluency & Activity

Adapted from “Computers and language learning: An overview,” by M. Warschauer and D. Healey, 1998, *Language Teaching*, 31(2), p. 58.

Automated Writing Evaluation (AWE) Tools: An Overview

Automated Writing Evaluation (AWE) refers to computer-based systems designed to assess and provide feedback on written texts using computational algorithms. As outlined by Dikli (2006), AWE applications scrutinize the linguistic components of written works

and produce automated critiques concerning elements such as syntax, lexicon, structure, and general writing proficiency. The primary objective behind the development of these mechanisms is to aid educators and students alike by furnishing prompt assessments of writing aptitude and facilitating the process of revision.

Types of AWE tools

Various AWE platforms are used in educational settings, with Criterion being among the earliest systems. Developed by Educational Testing Service, it provides automatic feedback on grammar, usage, and mechanics, helping students improve their writing through revision (Warschauer & Ware, 2006). Another platform, Write To Learn, combines automated evaluation with instructional support, allowing students to practice writing and receive feedback for revision (Stevenson & Phakiti, 2014).

Online tools such as PaperRater offer automated proofreading services that assess grammar, spelling, and word choice, and can be used independently outside the classroom.

More recently, tools like Grammarly provide immediate feedback, vocabulary suggestions, and guidance on clarity and tone, and are increasingly studied in technology-enhanced writing contexts.

Automated Writing Evaluation systems rely on computational methods to analyze written language. Many tools use natural language processing to examine sentence structure, grammatical patterns, and lexical choices (Stevenson & Phakiti, 2014). In addition, machine-learning algorithms enable systems to identify patterns and improve feedback over time.

Rule-based analysis is also used, where predefined grammatical rules help detect errors in spelling, punctuation, and sentence structure (Dikli, 2006). A key advantage of AWE systems is their ability to provide immediate and consistent feedback. Ranalli (2018) notes that such feedback allows learners to revise their writing more frequently and supports independent learning.

However, these systems often focus on surface-level features such as grammar and vocabulary, and may struggle with deeper aspects like argumentation and cohesion (Stevenson & Phakiti, 2014). Hyland (2019) emphasizes that automated feedback should complement, not replace, teacher feedback.

Grammarly: Features, Functions, and Feedback Mechanisms

The integration of digital technologies in language education has led to the emergence of intelligent writing aids such as Grammarly, an online platform designed to help users identify and correct linguistic errors. Studies (Cavaleri & Dianati, 2016) highlight the role of automated writing tools in providing prompt feedback that supports revision and improves writing accuracy.

Grammarly identifies grammatical errors, spelling issues, punctuation mistakes, and vocabulary misuse, and provides suggestions to improve clarity and readability. Students often use it during the editing phase to detect errors that may otherwise be overlooked (Karyuatry et al., 2018). Grammarly provides both free and premium versions, with advanced features supporting vocabulary, clarity, and formality (Ebaid, 2020).

The system relies on artificial intelligence and computational models to analyze language patterns and provide corrective suggestions (Ebaid, 2020). From an educational perspective, Grammarly provides both explicit and implicit feedback, encouraging learners to engage in revision (Karyuatry et al., 2018). However, while effective for grammatical accuracy, it may be limited in addressing complex aspects such as argumentation and organization. Therefore, it is best used as a supplement to teacher feedback (Ebaid, 2020).

In this study, Grammarly represents an automated feedback tool that provides immediate corrective feedback, potentially enhancing learners' engagement in revision and self-editing (Cavaleri & Dianati, 2016; Karyuatry et al., 2018).

Empirical Research on Grammarly's Effectiveness in L2 Writing

Recent research has examined the impact of automated writing tools on writing accuracy, revision practices, and learner engagement. Cavaleri and Dianati (2016) found that students perceived Grammarly as useful for identifying grammatical errors and improving clarity, and that it supported revision through immediate feedback. Karyuatry et al. (2018) reported improvements in grammatical accuracy among students using Grammarly during revision. Ebaid (2020) found that Grammarly improved writing accuracy in grammar, spelling, and punctuation, but was less effective for complex aspects such as organization and argumentation. Ranalli (2018) notes that automated feedback encourages multiple revisions and greater attention to language accuracy, although teacher support remains important.

Overall, studies suggest that Grammarly can enhance grammatical accuracy and revision engagement, but its limitations in addressing complex writing skills highlight the need for further research.

Beyond measurable accuracy gains, research has increasingly attended to EFL learners' attitudes and perceptions toward Grammarly as an automated feedback tool, recognizing that affective and motivational dimensions play a significant role in determining how consistently and effectively learners engage with its suggestions. Link et al. (2019) found that learners generally held positive perceptions of Grammarly, viewing it as a convenient and accessible resource that supported their writing process and increased their confidence in self-editing. Similarly, Cavaleri and Dianati (2016) reported that students appreciated the immediacy and specificity of the tool's feedback, particularly for grammar and punctuation errors, though some expressed uncertainty about how to interpret or apply more complex stylistic suggestions. Karyuatry et al. (2018) further noted that learners who perceived the feedback as comprehensible and relevant were more likely to engage in deeper revision, underscoring the importance of learner agency in the feedback process. Taken together, these findings suggest that while learners' perceptions of Grammarly are largely favorable, variability in their ability

to critically evaluate and selectively apply automated suggestions warrants instructional guidance to maximize the tool's pedagogical benefits.

Human vs. Automated Feedback: Complementarity and Controversy

Human feedback remains essential in second language writing. Ferris (2003) emphasizes that teachers help learners improve accuracy and provide guidance on complex aspects such as coherence and audience awareness. Research suggests that automated feedback is most effective as a complement rather than a replacement for teacher feedback. Ranalli (2018) notes that it increases opportunities for revision, while teacher support helps learners interpret feedback.

However, reliance on automated tools may reduce learners' engagement in revision processes. Chukharev-Hudilainen and Saricaoglu (2016) warn that excessive dependence may limit the development of writing autonomy. Despite this, combining automated and human feedback is beneficial. Automated tools address surface-level errors, allowing teachers to focus on higher-level writing skills. Ferris (2003) and Ranalli (2018) suggest that this combination provides both immediate correction and deeper guidance.

Section Five: Research Gap and Rationale for the Study

Synthesis of the Literature

Written Corrective Feedback (WCF) is essential in second language writing, helping learners identify errors and improve linguistic accuracy through various modalities, such as direct versus indirect and explicit versus implicit feedback.

Research remains inconclusive regarding the effectiveness of these feedback types, with notable discourse between John Truscott, who argues against grammatical correction, and Dana Ferris, who supports its benefits under specific conditions.

Contemporary studies lean towards Ferris's perspective, emphasizing that the effectiveness of WCF relies on factors like feedback type, learner characteristics, and targeted linguistic features. Immediate feedback aids quick corrections, while delayed feedback promotes long-term retention. Learner engagement with feedback is crucial for maximizing its effectiveness.

Automated writing evaluation tools like Grammarly provide instant feedback and hold the potential to improve error recognition and self-correction, though their success depends on learners' ability to understand and apply the feedback, highlighting the need for instructional support. Theoretical frameworks suggest that tools like Grammarly enhance grammatical accuracy and encourage self-correction through ongoing engagement with feedback, ultimately supporting learner autonomy and continuous practice in language acquisition. Research indicates that consistent interaction with feedback through tools like Grammarly enhances learner engagement and self-regulation in writing (Ranalli, 2018; Karyuatry et al., 2018).

Automated Writing Evaluation (AWE) systems provide immediate feedback on grammar and vocabulary, enabling students to quickly identify errors and revise their texts. These tools foster learner autonomy by allowing independent feedback access and encouraging self-directed learning. However, limitations exist, as AWE systems often focus on surface-level issues and struggle with deeper writing elements such as organization and argumentation. Therefore, they should complement, not replace, instructor feedback.

Identified Gaps in the Literature

Grammarly's effectiveness in enhancing academic writing among English, as a EFL learners is under-researched, with most existing studies emphasizing English as a Second Language (ESL) contexts.

EFL learners have restricted language exposure, limiting their ability to benefit from automated feedback. Traditional teaching methods further inhibit their self-directed learning, leading to potential overreliance on tools without a deep understanding of language principles.

There is a notable lack of studies evaluating long-term effects of Grammarly, as current research focuses predominantly on short-term assessments. This gap in literature prevents the development of informed recommendations for integrating automated tools in teaching and understanding their impact on writing skill independence and retention over time.

Many studies have evaluated text quality improvements, emphasized grammar but neglected other linguistic aspects like academic style and coherence. Systematic reviews show Grammarly effectively reduces grammatical errors but falls short in higher-order skill feedback. In EFL contexts, feedback primarily addresses mechanical errors, leading to misconceptions of overall text quality improvements among learners. Unique challenges exist in EFL environments, contrasting ESL immersion experiences, necessitating context-specific studies to understand the tool's impact on language learners.

These studies should consider learners' linguistic backgrounds, cultural teaching methods, and local academic standards, aiming to enhance instructional strategies and reduce overreliance on technology. This approach will help better adapt Grammarly's usage, fostering academic writing skills among EFL students while ensuring they can critically engage with feedback.

A further and particularly salient gap concerns the near-total absence of studies conducted in North African and Arab EFL contexts, including the Algerian higher education setting in which the present study is situated. EFL learners in Algeria face a distinctive set of challenges that differentiate their context from both ESL and other EFL environments: instruction is largely confined to formal classroom settings with limited authentic exposure to English; learners navigate the influence of multiple languages including Arabic and French

alongside English; and writing pedagogy has historically prioritized grammatical accuracy over process-oriented or genre-based approaches (Benmoussat, 2012; Moussaoui, 2012). To date, no published study has examined the use of Grammarly specifically within Algerian university writing courses, and research on automated feedback tools in the broader Arab EFL context remains scarce. This contextual gap not only limits the generalizability of existing findings to locally relevant instructional realities, but also underscores the importance of the present study in generating context-sensitive evidence on the role of automated feedback in supporting EFL paragraph writing development.

Conclusion

The present chapter has reviewed the literature related to EFL academic writing, written corrective feedback, theory, and technology-based writing tools. It began by introducing academic writing in EFL contexts and describing its nature and challenges that EFL writers' encounter. Moreover, this chapter presented some of the most important theories that explain how EFL learners benefit from feedback and interaction. Finally, the chapter identified some gaps in the current literature and how this research on Grammarly in EFL academic writing contexts will address these gaps. In the next chapter, the research design and methodology that this research adopted will be explained.

Chapter Three

Method

Introduction

This chapter presents the methodological framework underpinning the present study, which investigates the role of Grammarly feedback in enhancing EFL students' paragraph writing skills. Specifically, it provides a detailed account of the research design, the study population, and the instruments employed for data collection. Furthermore, the chapter elaborates on the writing task and questionnaire designed to assess students' paragraph writing performance and to gauge their perceptions of Grammarly as an Automated Writing Evaluation (AWE) tool. It also delineates the procedural steps followed throughout the data collection process and specifies the analytical methods applied to interpret the gathered data. The justifications for the methodological choices made are provided to ensure the transparency and replicability of the research.

Research Design

To address the research questions, the present study employs a quasi-experimental descriptive research design; a mixed-methods approach. As defined by Creswell (2014), a mixed-methods design integrates both quantitative and qualitative data to provide a more complete understanding of a research problem. This design is appropriate as it enables the researcher to examine both the effectiveness of Grammarly, an Automated Writing Evaluation (AWE) tool, on students' paragraph writing performance and their perceptions of its use.

The quantitative strand involved the analysis of students' written paragraphs before and after feedback, while the qualitative strand drew on questionnaire responses to capture learners' subjective evaluations of the tool.

Participants

The target population of the current study comprises second-year students of English at the University of Chadli Bendjedid, El Tarf. A total of 40 students participated in the study; their ages ranged from 18 to 24 years. The participants were selected through convenience sampling, as they constituted a readily accessible intact class enrolled during the academic year under investigation. These students share a relatively similar level of English proficiency, which ensures consistency in analyzing the effectiveness of Grammarly on their writing performance. Their proficiency level was estimated to correspond to a B1–B2 level on the Common European Framework of Reference for Languages (CEFR), based on their academic standing and performance in prior coursework.

This sample was selected because second-year students are at a critical stage in developing their academic writing skills. At this level, learners are expected to produce more structured paragraphs and demonstrate greater control over grammatical and organizational aspects of writing. Therefore, they represent an appropriate population for examining the effectiveness of Grammarly in enhancing paragraph writing skills. Furthermore, the homogeneity of the group in terms of academic background and institutional context enhances the internal consistency of the findings.

The 40 participants were divided into two groups: Group One ($n = 20$) and Group Two ($n = 20$). Group one was assigned a writing prompt related to the use of artificial intelligence in the learning-to-write process, while Group Two addressed the topic of birthdays. This division was intended to examine the applicability of Grammarly-assisted feedback across different writing topics.

Data Gathering Tools

The study combines quantitative and qualitative data collection tools to provide a comprehensive analysis. Quantitative data were used to assess improvements in the accuracy

and overall quality of students' writing, while qualitative data helped explore learners' experiences and attitudes toward Grammarly. This combination allows for a deeper understanding of how automated feedback contributes to the development of EFL writing skills.

The present study employed two main data collection instruments: a writing task and a questionnaire. These instruments were selected based on their complementarity: the writing task generated objective linguistic data, while the questionnaire captured subjective learner perspectives. Together, they support the mixed-methods orientation of the study.

The writing task required participants to produce a paragraph in the target language in order to compare two types of correction: manual correction and Grammarly-assisted correction. Students first completed the writing task, after which their texts were revised either manually or with the assistance of Grammarly. This allowed the researcher to examine differences in grammatical accuracy and error correction between the two approaches.

The questionnaire was administered to gather data on students' use of Grammarly. It aimed to explore learners' attitudes toward automated feedback, their level of engagement with the tool, and their perceptions of its effectiveness in improving their writing.

Description of the Writing Task

The writing task (see Appendix A) was designed to assess students' writing performance and to compare manual correction with Grammarly-assisted correction (free version). Participants were asked to produce a paragraph in the target language: Group One was assigned the topic of artificial intelligence in language learning, while Group Two addressed the topic of birthdays. This task design allowed participants to demonstrate their command of grammar, vocabulary, and sentence structure.

After completing the task, the paragraphs were collected and revised by the researcher using two different approaches: manual correction and correction with the assistance of

Grammarly. This process enabled the identification of common linguistic errors and allowed for a comparison between the two correction methods in terms of grammatical accuracy and error reduction. A scoring rubric was applied to evaluate the written paragraphs along the following dimensions: grammatical accuracy, lexical range, coherence, and overall paragraph organization. The use of a standardized rubric ensured consistency and objectivity in the assessment process.

Description of the Students' Questionnaire

The questionnaire (see Appendix B) was designed to collect data on students' use of Grammarly and their perceptions of its effectiveness in improving their writing. It consisted of 17 questions organized into five sections. The questions aimed to gather information about learners' attitudes toward automated feedback, their frequency of using Grammarly, and their evaluation of its usefulness in the writing process.

Different types of questions were included, such as closed-ended questions (e.g., yes/no and multiple-choice) as well as open-ended questions, allowing participants to provide more detailed responses when necessary. The inclusion of both closed- and open-ended items reflects the mixed-methods design of the study, enabling both statistical analysis and thematic interpretation of learner responses.

Prior to its administration, two specialists in applied linguistics to assess its content validity reviewed the questionnaire. Minor adjustments were made based on their feedback to ensure the clarity and appropriateness of the items.

Section One: Background Information (Questions 1–2)

This section comprised two questions designed to identify the students' previous experience with Grammarly and the version of the tool they most frequently used. It also provided basic contextual information on the familiarity of the participants with the application prior to participating in the study.

Section Two: Grammarly Usage Habits (Questions 3–5)

This section consisted of three questions that explored students' habits of using Grammarly in the writing process.

Question 3 investigated how frequently students used Grammarly when writing paragraphs, in order to determine their level of reliance on the tool.

Question 4 focused on the stage at which students used Grammarly — whether during writing, after completing the paragraph, or both — to understand how the tool was integrated into their writing process.

Question 5 examined the specific aspects of writing that Grammarly mainly supported, such as grammar, spelling and punctuation, vocabulary choice, sentence structure, and organization.

Section Three: Interaction with Grammarly Feedback (Question 6)

This section consisted of one question that focused on how students responded to Grammarly's suggestions during the writing process. Question 6 investigated whether learners accepted, rejected, modified, or ignored the feedback provided by Grammarly, in order to understand their level of engagement with the tool and their control over the revision process.

Section Four: Grammarly and Writing Independence (Questions 7–9)

This section contained three questions designed to evaluate the influence of Grammarly on students' writing independence.

Question 7 featured a series of Likert-scale statements aimed at assessing whether Grammarly aided students in learning from their mistakes, enhanced self-editing abilities, boosted confidence, and whether they felt reliant on the tool.

Question 8 examined how students' self-editing skills had evolved because of regular Grammarly use.

Question 9 focused on students' writing habits when Grammarly was unavailable, including their ability to spot errors, apply grammar rules, structure paragraphs, and any shifts in their confidence levels.

Section Five: Overall Attitudes and Evaluation (Questions 10–17)

This section included eight questions designed to assess students' overall perceptions of Grammarly as a tool for writing support.

Question 10 focused on how students rated Grammarly's overall effectiveness in enhancing their writing.

Questions 11 through 17 are open-ended and sought to collect more in-depth feedback about students' experiences. These questions examined whether Grammarly contributes to fostering independence as writers, its primary strengths and weaknesses, its influence on their writing process, reasons for dismissing specific suggestions, any shifts in their writing autonomy, and their views on incorporating Grammarly into EFL writing courses.

Data Analysis

This section describes the analytical procedures applied to the data collected through the writing task and the questionnaire.

Quantitative Analysis

The written paragraphs produced by participants were analyzed using an error analysis framework adapted from Corder (1974) and James (1998). Errors were categorized according to type (grammatical, lexical, orthographic, and syntactic) and tallied to compare the frequency and nature of errors identified by manual correction versus those detected by Grammarly. Descriptive statistics, including means and standard deviations, were computed to quantify differences in error frequency across the two correction methods. A paired samples t-test was employed to determine whether the differences were statistically significant ($p < .05$).

Qualitative Analysis

The open-ended responses from the questionnaire (Questions 11–17) were subjected to thematic analysis following the six-phase procedure outlined by Braun and Clarke (2006). Recurring themes pertaining to learners' attitudes, perceived benefits, and limitations of Grammarly were identified, coded, and organized into thematic categories. The closed-ended responses were analyzed using descriptive statistics and presented in the form of frequency tables and percentages.

Research Procedure

The data collection process was carried out in the following stages. In the first stage, participants were briefed on the objectives of the study and completed the writing task individually during a scheduled class session. Each student was given 30 to 45 minutes to produce a paragraph on their assigned topic without access to any correction tools. In the second stage, the collected paragraphs were corrected through two methods: the researcher and the other half were processed through Grammarly (free version) corrected half of each group's scripts manually. In the third stage, the questionnaire was administered to all participants at the end of the semester, after they had had sufficient exposure to Grammarly as part of their writing practice. Participants completed the questionnaire individually and were encouraged to respond candidly.

Reliability and Validity

To enhance the reliability of the study, consistent procedures were followed during both data collection and analysis. The same writing prompts, time constraints, and correction criteria were applied uniformly across both groups. The Likert-scale items in the questionnaire were designed using clear and unambiguous language to minimize the risk of misinterpretation. Content validity was ensured through expert review of the questionnaire, as noted above. With respect to the analysis of written paragraphs, an inter-rater reliability check was conducted by

having a second researcher independently code a 20% random sample of the scripts. Cohen's kappa coefficient was calculated to assess the level of agreement between the two raters, and a kappa value above .80 was considered acceptable.

Ethical Considerations

Prior to data collection, participants were informed of the voluntary nature of their involvement and assured of the confidentiality of their responses. Written or verbal consent was obtained from all participants. No personally identifiable information was retained in the data analysis process, and participants were free to withdraw from the study at any time without consequence.

Paragraph Analysis: Criteria, Procedure, and Worked Example

A Comparative Study: Manual Correction vs. Grammarly (Free Version)

Overview of the Paragraph Analysis

This section outlines the methodological framework designed to systematically analyze and compare two correction approaches: manual correction conducted by the researcher and automated correction performed using Grammarly (free version). It includes the following components: (1) well-defined analysis criteria accompanied by explicit scoring descriptors, (2) an annotated error-coding system, (3) a detailed systematic procedure, and (4) a comprehensive worked example illustrating the application of each method to actual EFL students' written paragraphs.

Purpose of the analysis: To determine whether and to what extent each correction method improves grammatical accuracy, lexical range, coherence, and paragraph organization in EFL student writing.

Analysis Criteria and Scoring Rubric

Both manually corrected and Grammarly-corrected paragraphs were evaluated using a standardized scoring rubric. This approach ensures objectivity, consistency, and a direct comparison between the two correction methods. The rubric includes five criteria, each rated on a scale from 1 to 4, allowing for a maximum score of 10 points per paragraph.

Scoring Scale: 4 = Excellent | 3 = Good | 2 = Fair | 1 = Poor

Table 4

Scoring Rubric for the Evaluation of Corrected Paragraphs

Criterion	Description	Score Descriptors	Manual Correction Score	Grammarly Score
1. Grammatical Accuracy	Correctness of verb forms, tense, subject-verb agreement, articles, prepositions, sentence boundaries	4 – Excellent: Virtually no grammatical errors; structures are accurate and varied	/ 2	/ 2
		3 – Good: Minor errors that do not impede meaning; mostly accurate		
		2 – Fair: Several noticeable errors; meaning partially unclear in places		
		1 – Poor: Frequent, serious errors that significantly hinder comprehension		
2. Lexical Range	Diversity, precision, and appropriateness of vocabulary; avoidance of repetition and direct translation	4 – Excellent: Wide range; precise and contextually appropriate word choices	/ 2	/ 2
		3 – Good: Generally appropriate vocabulary; some repetition or imprecision		
		2 – Fair: Limited vocabulary; noticeable		

Criterion	Description	Score Descriptors	Manual Correction Score	Grammarly Score
		repetition or awkward word choices 1 – Poor: Very restricted vocabulary; frequent inappropriate or inaccurate words		
3.Coherence & Cohesion	Logical flow of ideas; effective use of transitional phrases and cohesive devices	4 – Excellent: Ideas flow logically; cohesive devices used skillfully throughout 3 – Good: Generally clear progression; some weak transitions 2 – Fair: Ideas sometimes disconnected; limited or repetitive cohesive devices 1 – Poor: No logical flow; cohesive devices absent or misused	/ 2	/ 2
4.Paragraph Organization	Presence of a clear topic sentence, adequate supporting details, and a logical concluding sentence	4 – Excellent: Clear topic sentence, well-developed support, effective conclusion 3 – Good: Topic sentence present; support adequate but uneven; conclusion attempted 2 – Fair: Topic sentence weak or missing; support minimal; conclusion absent 1 – Poor: No identifiable structure; ideas random and undeveloped	/ 2	/ 2

Criterion	Description	Score Descriptors	Manual Score	Correction Score	Grammarly Score
5. Mechanics	Spelling, punctuation, and capitalization accuracy	4 – Excellent: Virtually no mechanical errors			
		3 – Good: Occasional minor errors; do not impede readability			
		2 – Fair: Several mechanical errors that sometimes reduce clarity	/ 2		/ 2
		1 – Poor: Pervasive errors seriously reducing readability			
	Sum of all criteria (max = 10)			/ 10	/ 10

Error Annotation and Coding System

Before evaluation, each original student paragraph underwent annotation using a standardized error-coding system. This process enabled the researcher to pinpoint specific errors and determine whether each was resolved through manual correction, Grammarly, either methods, or neither. Error codes were placed in square brackets directly after the identified issue within the text.

Table 5

Error Categories, Definitions, and Examples

!	Error Type	Definition	Example
[GR]	Grammatical Error	Incorrect verb form, tense, subject-verb agreement, article, or preposition	"AI help students" → should be "AI helps students"

!	Error Type	Definition	Example
[VT]	Verb Tense Error	Inconsistent or incorrect verb tense within context	"She has became" → should be "has become"
[ART]	Article Error	Missing, added, or wrong article (a/an/the)	"become essential part" → "become an essential part"
[PREP]	Preposition Error	Wrong or missing preposition	"search information" → "search for information"
[SS]	Sentence Structure	Fragment, run-on, or incorrect word order	"Because AI is useful. Students use it." (fragment + run-on)
[LEX]	Lexical Error	Inaccurate, inappropriate, or repeated word choice	"virtual rule" → should be "vital role"
[SP]	Spelling Error	Misspelled word	"larning" → "learning"; "performance" → "performance"
[PUNC]	Punctuation Error	Missing or incorrect punctuation marks	Missing period at sentence end; comma splice
[CAP]	Capitalization Error	Incorrect use of uppercase/lowercase letters	"english" → "English"; "i" → "I"
[COH]	Coherence/Cohesion	Weak transition; ideas disconnected; missing linking device	No transition between ideas; abrupt shift in topic
[ORG]	Organization	Weak topic sentence, missing support, or no conclusion	Paragraph lacks a clear topic sentence

Example of annotated sentence: "AI help [GR/SVA] students to search [PREP]

information because it has become [VT] essential part [ART] of our life."

Step-by-Step Analysis Procedure

The following procedure was followed to ensure consistency, replicability, and methodological transparency in the data analysis process. Each step was applied uniformly to all 40-participant scripts.

Table 6

Overview of the Data Analysis Procedures

Step	Phase	Action
1	Data Collection	Administer the writing task. Participants write a paragraph (30–45 min) without correction tools. Collect all scripts.
2	Transcription	Transcribe handwritten paragraphs into a digital document. Number each script (e.g., P01–P40).
3	Original Paragraph Analysis	Read each original paragraph carefully. Identify and annotate errors using the error codes ([GR], [VT], [LEX], etc.). Count total errors per category.
4	Manual Correction	Apply manual corrections to the original texts. Focus on SVA, verb tense, articles, prepositions, sentence structure, word choice, and clarity. Record each correction made.
5	Grammarly Correction	Paste each original paragraph into Grammarly (free version). Accept only suggestions flagged by the tool. Do NOT add any manual changes. Screenshot or record the corrections applied.
6	Post-Correction Scoring	Score each corrected version (Manual and Grammarly) using the 5-criterion rubric (max = 20 points each). Use the scoring sheet provided in Appendix C.
7	Error Frequency Count	Create a tally sheet listing: error type, whether caught by Manual, whether caught by Grammarly. Calculate frequency and percentage for each error type per method.
8	Comparison	Compare Manual vs. Grammarly scores per criterion and per participant. Compute mean scores for each method. Run a paired-samples t-test to test significance ($p < .05$).

Step	Phase	Action
9	Interpretation	Write an interpretive commentary for each student paragraph. Note what each method corrected, missed, or partially addressed. Relate findings to research questions.

Worked Example: Applying the Analysis Framework

This section illustrates the practical application of the analysis framework. It begins with a representative student paragraph in its original form, followed by an annotated version, a manually corrected version, and one corrected using Grammarly. Each method's contributions and oversights are then explained. Lastly, both corrected versions are evaluated and scored based on the rubric.

Original Student Paragraph (Group One — Topic: AI in Language Learning)

Original Student Paragraph (P07 — unedited)

AI help students to search information and answer their questions quickly. It has became essential part of our life. AI introduce workload because it provides many features. Students' performance improved because they use informations online. In conclusion, AI is useful. It forward platform for students.

Annotated Paragraph (Error Identification)

Annotated Paragraph — Error codes inserted

AI **help** [GR/SVA] students to **search** [PREP] information and answer their questions quickly. It **has became** [VT] **essential part** [ART] of our life. AI **introduce** [GR/SVA] **workload** [LEX]. **Because it provides many features.** [SS – fragment] **students** [CAP]

performance **[POSS]** improved because they use **informations [LEX/morph]** online. In conclusion, AI is useful. It **forward platform [LEX – unclear]** for students.

Errors identified: SVA ×2 | VT ×1 | ART ×1 | PREP ×1 | SS ×1 | LEX ×3 | CAP ×1 | POSS ×1 — Total: 11 errors

Sentence-by-Sentence Comparison: Manual vs. Grammarly

The table below displays each sentence from the student's paragraph, along with the corrections provided by the teacher (manually) and those generated by Grammarly (free version). Adjustments are highlighted in green, while unresolved errors are indicated in italics beneath each cell.

Table 7

Sentence by Sentence Comparison of Manual and Grammarly Correction

#	Original Sentence (Student Writing)	Manual Correction	Grammarly Correction (Free Version)
1	AI help [GR/SVA] students to search [PREP] information and answer their questions quickly.	AI helps students to search for information and answer their questions quickly. ✓ SVA corrected; preposition added	AI helps students to search information and answer their questions quickly. ✓ SVA corrected X Missing preposition "for" not detected
2	It has become [VT] essential part [ART] of our life.	It has become an essential part of our life. ✓ Verb tense + article corrected	It has become an essential part of our life. ✓ Both errors detected and corrected

#	Original Sentence (Student Writing)	Manual Correction	Grammarly Correction (Free Version)
3	AI introduce [GR/SVA] workload [LEX]. Because it provides many features. [SS – fragment]	AI reduces workload because it provides many features. ✓ SVA, word choice, fragment all corrected	AI introduces workload. Because it provides many features. ✓ SVA corrected X "workload" (wrong word) not changed X Fragment not resolved
4	Students' performance [POSS] improved because they use informations [LEX/morph] online.	Students' performance improved because they use information online. ✓ Possessive + uncountable noun corrected	Students' performance improved because they use information online. ✓ Both errors detected and corrected
5	In conclusion [COH – no transition device to main ideas], AI is useful. It forward platform [LEX – unclear meaning] for students.	In conclusion, AI is a useful tool for students, helping them [improved clarity] . ✓ Lexical/semantic clarity improved ✓ Cohesion strengthened	In conclusion, AI is useful. It forward platform for students. X Semantic error "forward platform" not corrected X Cohesion issue not addressed

Scoring the Corrected Versions (Rubric Application)

Using the standardized five-criterion rubric, the researcher evaluated both corrected versions of Paragraph P07 and assigned scores accordingly. The table below outlines the scores along with the justification provided for each criterion.

Table 8

Rubric-Based Comparison of Manual and Grammarly Scores for Paragraph P07

Criterion	Manual Score	Grammarly Score	Justification
1. Grammatical Accuracy	1.5 / 2	1.5 / 2	Both corrected major SVA and tense errors. Manual also addressed missing preposition

Criterion	Manual Score	Grammarly Score	Justification
			(Sentence 1) and fragment (Sentence 3); Grammarly missed these.
2. Lexical Range	1.5 / 2	1 / 2	Manual corrected semantic errors ('workload', 'forward platform'); Grammarly left them unchanged. Basic word errors corrected by both.
3. Coherence & Cohesion	1.5 / 2	0.5 / 2	Manual improved concluding idea flow; Grammarly made no changes to discourse-level structure.
4. Paragraph Organization	1 / 2	0.5 / 2	Manual provided some structural guidance. Neither method added a topic sentence or conclusion; Grammarly made no organizational changes.
5. Mechanics	1.5 / 2	2 / 2	Grammarly excelled at spelling, capitalization, punctuation. Manual corrected selectively.
TOTAL	7 / 10	5.5 / 10	Manual correction addresses a wider range of error types, particularly at discourse and semantic levels.

Interpretation: The manual correction (7/10) outperforms Grammarly (5.5/10) for this paragraph, particularly in lexical range, coherence, and paragraph organization. Grammarly performed best in mechanics but left semantic and discourse-level errors unresolved. This pattern is consistent with the broader findings of the study: Grammarly is highly effective at surface-level correction but limited in handling meaning-dependent and higher-order writing features.

Known Limitations of Each Method

Manual Correction — Strengths and Limitations

Strengths:

1. Context-sensitive: understands student intention and meaning
2. Addresses discourse-level issues: coherence, organization, academic style
3. Pedagogically selective: prioritizes errors that most impact comprehension

Limitations:

4. Inconsistency across raters (inter-rater reliability must be checked)
5. Does not correct all errors systematically — may overlook minor mechanical errors
6. Limited in addressing academic style and lexical sophistication

Grammarly (Free Version) — Strengths and Limitations**Strengths:**

7. Highly efficient at spelling, capitalization, and punctuation correction
8. Systematic: applies rule-based corrections uniformly across all scripts
9. Immediate, consistent feedback with no rater fatigue

Limitations:

10. Cannot resolve semantic errors requiring contextual understanding
11. Does not address coherence, paragraph organization, or academic style
12. May partially correct errors in a way that alters the student's intended meaning
13. Free version lacks advanced style, tone, and clarity suggestions available in premium

Conclusion

This chapter offers a comprehensive and methodologically rigorous framework for the paragraph analysis component of the study. By employing a five-criterion scoring rubric, an

error annotation system, a step-by-step procedure, and a detailed worked example, the analysis process comparing manually corrected with Grammarly-corrected paragraphs is presented as systematic, replicable, and anchored in established practices of writing assessment.

The worked example illuminates the significant disparities between the two correction methods in terms of scope and depth. While Grammarly demonstrates superior performance in addressing surface-level mechanical errors, manual correction proves more effective in identifying a broader range of linguistic issues, particularly those related to semantics and discourse structure. Nonetheless, both approaches exhibit notable deficiencies in tackling higher-order writing features such as paragraph organization and adherence to academic style. These limitations carry critical pedagogical implications, which are further explored in Chapter Five.

Chapter Four

Results

Analysis of Students' Questionnaire

Introduction

The findings rely on a convenience sample of 40 students from a single institution, so caution should be exercised when attempting to generalize the results to broader contexts. Future research is encouraged to replicate this study with larger and more diverse populations. Following the collection of data, several outcomes were ready to be evaluated and assessed in order to answer the study questions and test hypotheses. These findings are analyzed both qualitatively and quantitatively, and they are separated into two categories based on the study instruments: students' Tests and questionnaire.

Students' Questionnaires Analysis

Section 1: Background Information

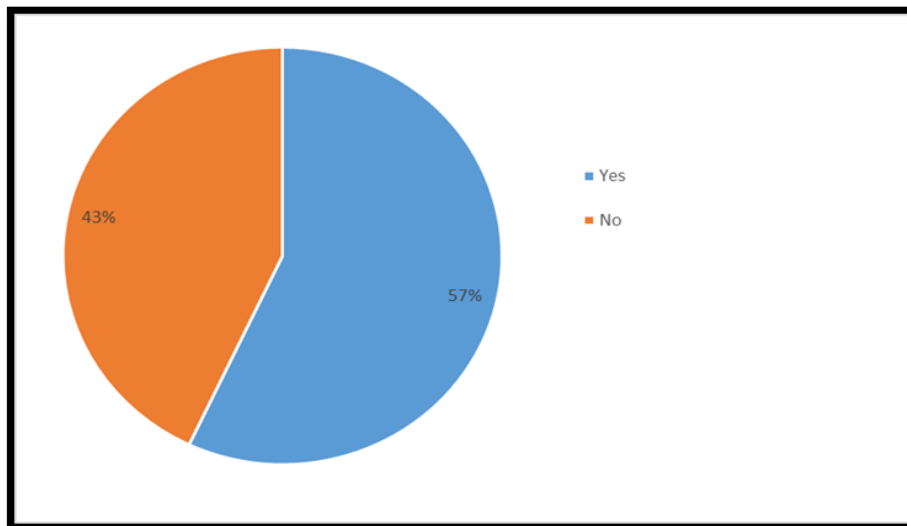
Question 1. Have you used Grammarly before this academic year?

☐ Yes

☐ No

Figure 4

Prior Use of Grammarly Before the Academic Year



As shown in Figure 4, the majority of the participants (57%) stated that they had used Grammarly before this academic year, whereas a considerable proportion (43%) reported that they had not used it previously. This indicates that more than half of the students are already familiar with Grammarly, while a significant number of them still lack prior experience with this digital writing tool.

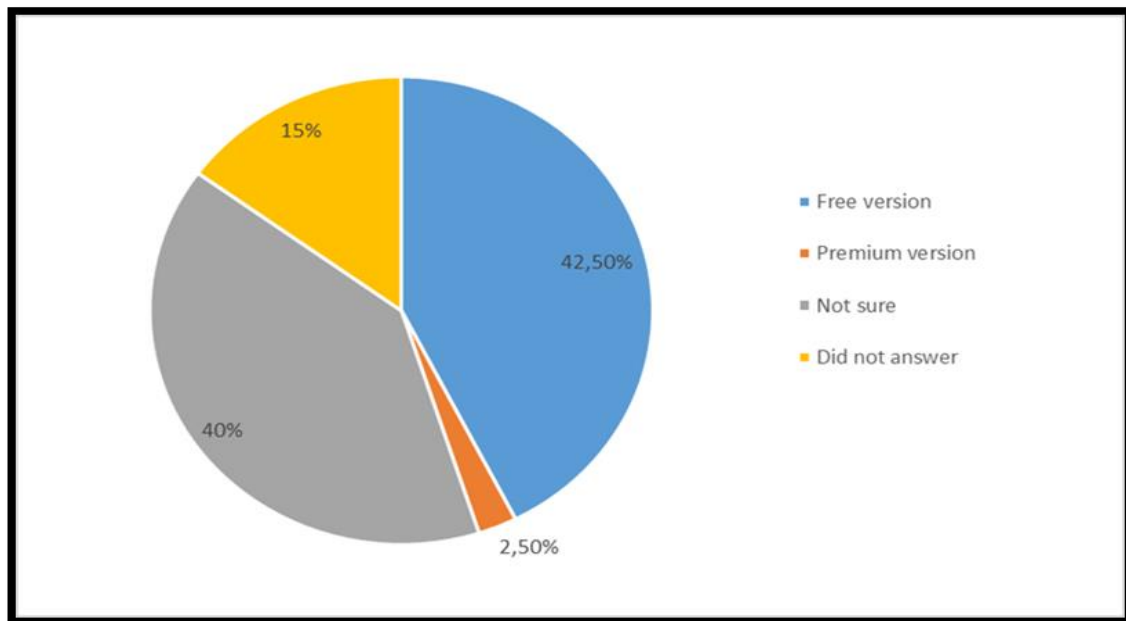
A significant percentage of first-time users (43%) indicates that these students might have been unfamiliar with AI writing tools, potentially shaping their initial perceptions of Grammarly throughout the study.

Question 2. Which version of Grammarly do you mainly use?

- ☐ Free version
- ☐ Premium version
- ☐ Not sure

Figure 5

Type of Grammarly Version Used



The above Figure displays that (42.5%) of the respondents reported using the free version of Grammarly. In contrast, only a very small proportion (2.5%) indicated that they use the premium version. Meanwhile, a considerable number of respondents (40%) stated that they are not sure which version they use, while (15%) did not provide an answer.

The high "not sure" rate of 40% holds notable pedagogical importance. It suggests that students who are uncertain about which version they are using may lack critical awareness of the tool's limitations. This is particularly significant given that the free version provides substantially fewer features compared to the premium version.

This distribution suggests that most students rely on the free version of Grammarly, whereas very few invest in the premium version, and a notable proportion lack awareness about the version they are using.

Section 2 : Grammarly Usage Habits

Question 3. How often do you use Grammarly when writing paragraphs in English?

☐ Always

☐ Often

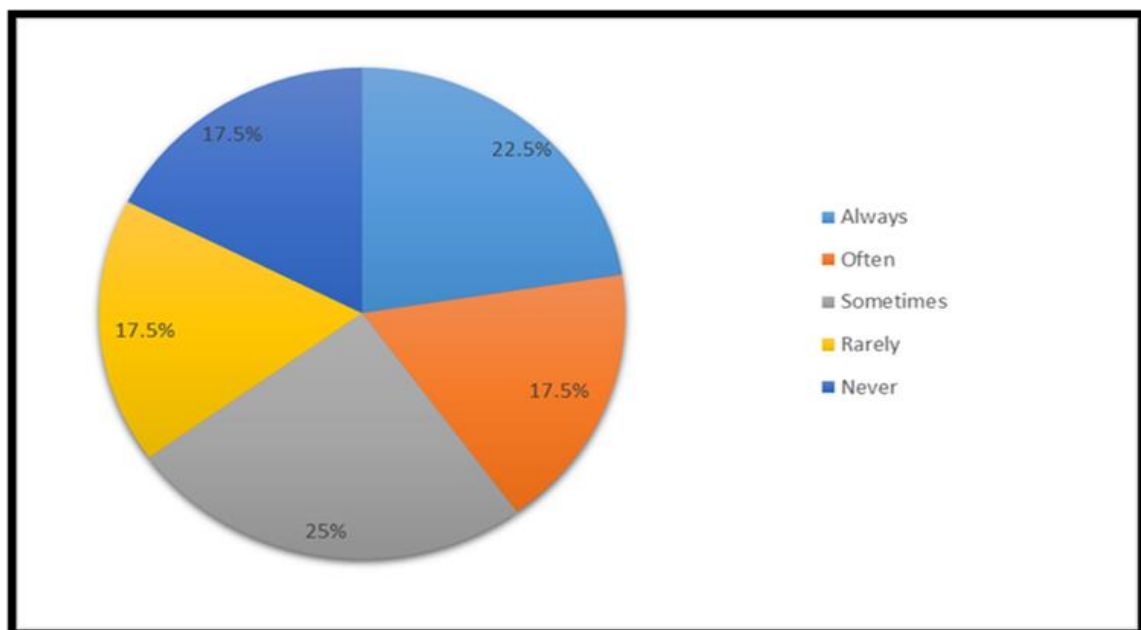
☐ Sometimes

☐ Rarely

☐ Never

Figure 6

Frequency of Grammarly Use in Paragraph Writing



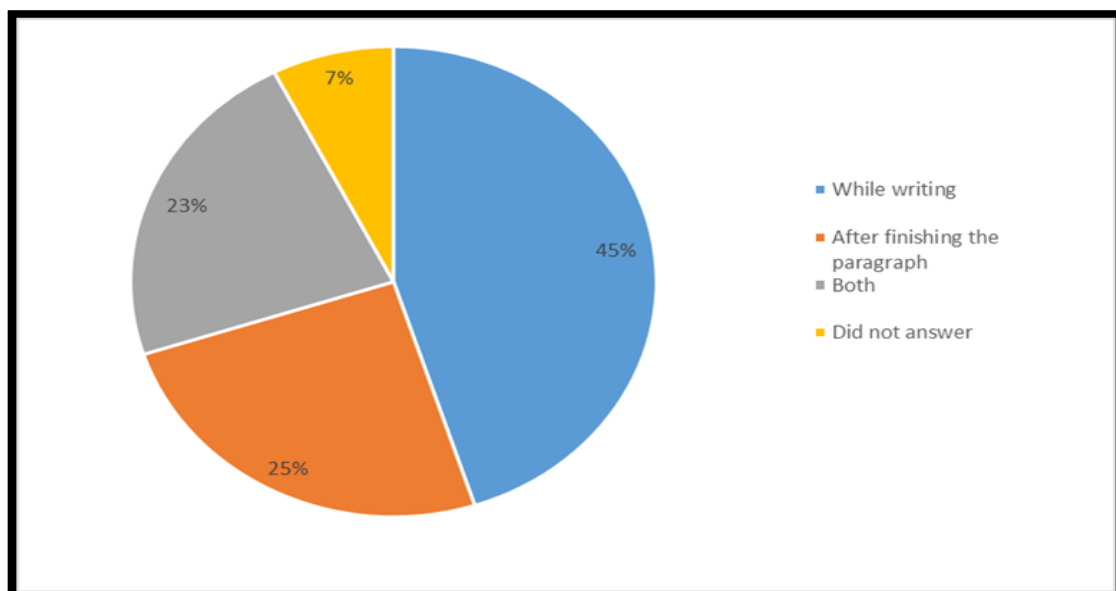
An ordinal frequency scale was used to measure the Grammarly Usage Habits, and it is revealed that the respondents reported varying frequencies in their use of Grammarly when writing paragraphs in English. A proportion of (22.5%) indicated that they always use Grammarly, while (17.5%) reported using it often. The largest percentage, (25%), stated that they sometimes rely on the tool. In contrast, (17.5%) of the participants mentioned that they rarely use Grammarly, whereas an equal proportion (17.5%) declared that they never use it. These results suggest that although some students frequently depend on Grammarly, a considerable number use it only occasionally or not at all.

Question 4. At which stage do you usually use Grammarly?

- ☐ while writing
- ☐ After finishing the paragraph
- ☐ Both

Figure 7

Stage of Grammarly Use in the Writing Process



The results indicate that the participants reported different stages at which they use Grammarly during the writing process. A proportion of (45%) indicated that they use Grammarly while writing, making it the most common practice among respondents. In contrast, (25%) stated that they use the tool after finishing the paragraph, whereas (23%) reported using it at both stages. A small percentage (7%) did not provide an answer. These findings suggest that most students tend to rely on Grammarly during the writing process itself rather than only after completing their paragraphs.

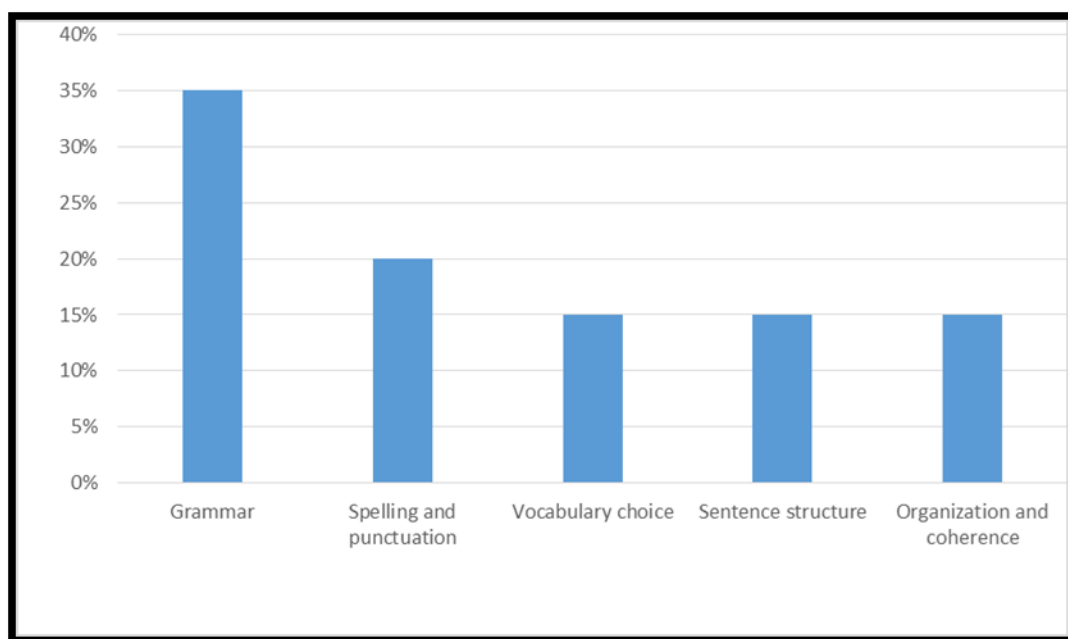
This pattern aligns with a process-oriented view of writing, where revision is embedded within the drafting phase rather than reserved as a final step (Hayes & Flower, 1980).

Question 5. Grammarly mainly helps me with:

- ☐ Grammar
- ☐ Spelling and punctuation
- ☐ Vocabulary choice
- ☐ Sentence structure
- ☐ Organization and coherence

Figure 8

Areas of Grammarly Support in Writing



We observe from the Figure above that the participants reported different areas in which Grammarly mainly helps them. The highest proportion (35%) indicated that Grammarly assists them with grammar. In comparison, (15%) of the respondents stated that it helps with vocabulary choice. Both sentence structure and organization and coherence accounted for (15%) each. Meanwhile, a percentage of (20%) reported that Grammarly mainly helps with

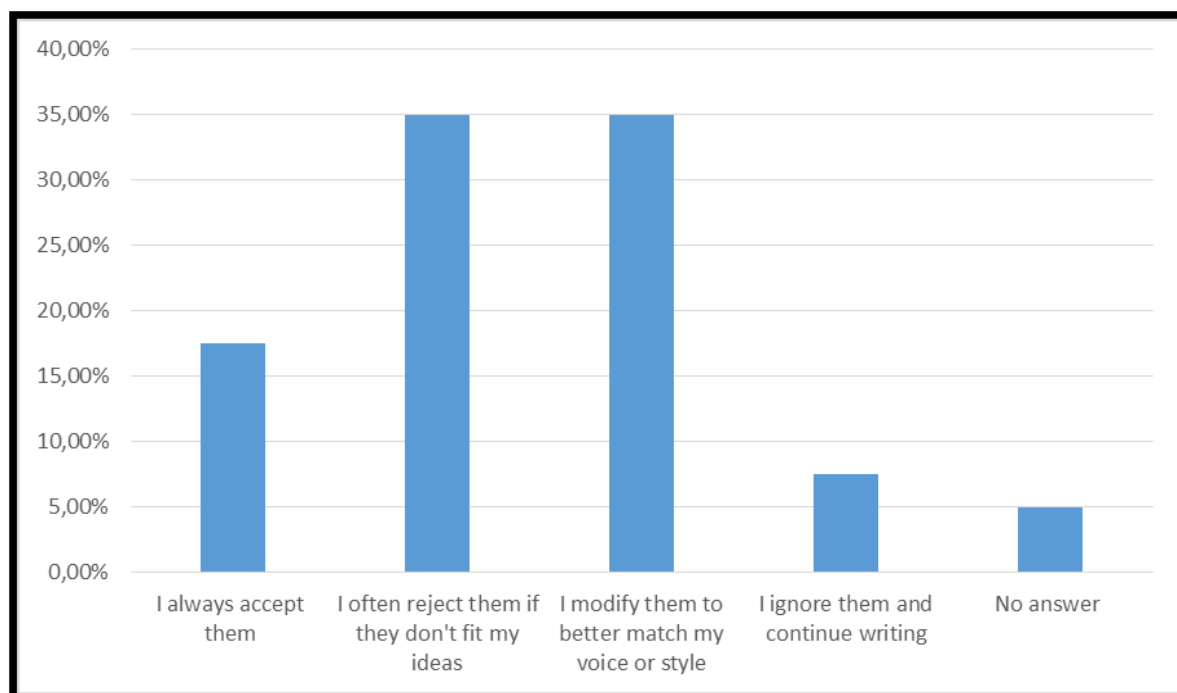
spelling and punctuation. These results suggest that Grammarly is primarily perceived as a tool for improving grammatical accuracy, while its support in other aspects of writing is recognized to a lesser extent.

Only 15% of users recognize Grammarly as beneficial for improving organization and coherence key elements of advanced writing skills. This observation holds theoretical importance, aligning with research suggesting that AI writing tools excel at surface-level corrections but show limited effectiveness when addressing higher-order discourse-level features (Koltovskaia, 2020; Ranalli, 2018).

Section 3: Interaction with Grammarly Feedback

Question 6. How do you typically respond to Grammarly suggestions during the writing process? (Select all that apply)

- ☐ I always accept them
- ☐ I often reject them if they don't fit my ideas
- ☐ I modify them to better match my voice or style
- ☐ I ignore them and continue writing
- ☐ Other (please specify): _____

Figure 9*Students' Responses to Grammarly Suggestions*

This question aimed to explore how students interact with Grammarly's feedback while writing, allowing multiple responses to reflect different writing behaviors.

The result indicates that learners tend to engage selectively and actively with corrective feedback when confronted with the suggestions from Grammarly. Both "often reject them if they don't fit my ideas" and "adapt them so they are more in line with my voice or style" were the most common answers, with (35%) of the participants selecting each one. It shows that many learners did not take up Grammarly's suggestions uncritically, but they interrogated and revised them in terms of their intended meaning and writing style.

In contrast, (17.5%) of the respondents indicated that they always accept the suggestions from Grammarly, which points to a more dependent attitude towards the tool. Meanwhile, only (7.5%) stated that they ignore suggestions and continue writing, reflecting a low tendency to completely disregard automated feedback. Another (5%) of the participants did not answer this question.

The results imply that most learners engage with Grammarly and its feedback in a moderate and reflective way, either by accepting or modifying feedback or by rejecting it selectively.

Section 4: Grammarly and Writing Independence

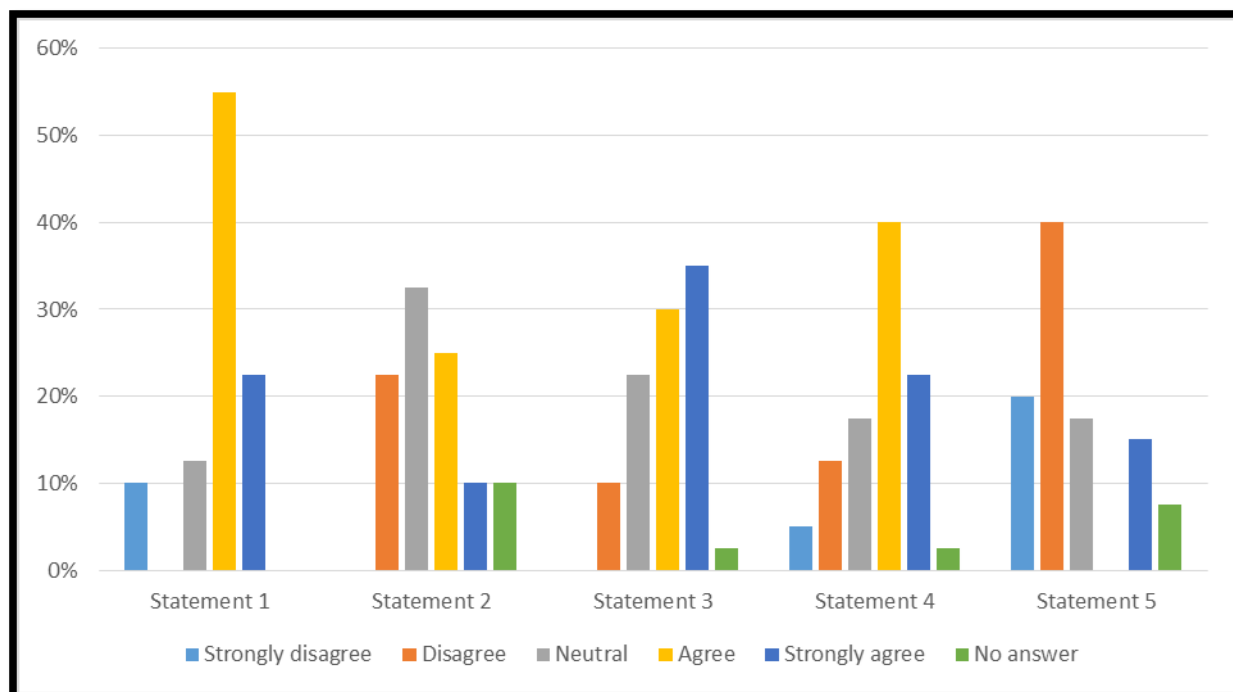
Question 7. Please indicate your level of agreement with the following statements:

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

1. Grammarly helps me learn from my mistakes while writing.
2. I can apply Grammarly's feedback when I write without using the tool.
3. Using Grammarly has improved my ability to edit my own writing.
4. Grammarly increases my confidence in writing paragraphs in English.
5. I feel that I rely too much on Grammarly when I write.

Figure 10

Perceptions of Grammarly and Writing Independence (Likert Scale Items)



The analysis below currently reports only frequencies and percentages. For a rigorous Likert-scale analysis, Mean (M), SD, and a one-sample t-test (test value = 3.0) must be computed per item. See the recommended SPSS steps and descriptive table below.

Table 9

Recommended SPSS Analysis for Likert Scale (Q7)

Steps	
Step 1 — Descriptive Statistics:	Analyze → Descriptive Statistics → Descriptives → M, SD per item
Step 2 — One-Sample T-Test (test value = 3.0):	Analyze → Compare Means → One-Sample T-Test
Step 3 — Reliability:	Analyze → Scale → Reliability Analysis → Alpha (reverse-code S5 first)
Step 4 — Correlations:	Analyze → Correlate → Bivariate → Spearman (ordinal data)
Step 5 — Group comparison (optional):	Analyze → Compare Means → Independent-Samples T-Test → Group: Q1 (prior use Yes/No)

Table 10

Students' Responses to Statement 1

Statement	SA	A	N	D / SD	M (approx.)
S1: Grammarly helps me learn from mistakes	22.5%	55%	12.5%	0% / 10%	≈ 4.00
S2: Can apply feedback independently	10%	25%	33%	22% / 0%	≈ 3.20
S3: Improved self-editing ability	35%	30%	22.5%	10% / 2.5%	≈ 3.85
S4: Increases writing confidence	22.5%	40%	17.5%	12.5% / 5%	≈ 3.70
S5: Rely too much (reverse-coded)	15%	0%	17.5%	40% 20%	≈ 2.15

SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree. M values are approximated from reported frequencies; compute exact values in SPSS. S5 must be reverse-coded before reliability analysis.

The participants were asked to state to what extent they disagreed or agreed with several statements about Grammarly and whether it contributed to making them more writing independent.

Grammarly helps me learn from my mistakes while writing

The results showed that most students had a positive perception of this statement. In particular, (55%) of the participants agreed that they learn from their mistakes with the help of Grammarly and (22.5%) strongly agreed, suggesting a high level of perceived helpfulness of the tool in facilitating learning

In contrast, (12.5%) were neutral and (10%) strongly disagreed with the statement. Notably, no participants selected the “Disagree” category (0%).

This polarized pattern with responses clustering at agreement and strong disagreement but not moderate disagreement warrants caution in interpretation.

The results suggest that Grammarly is widely perceived as a beneficial tool for error recognition and learning during the writing process.

I can apply Grammarly’s feedback when I write without using the tool

The results indicate a more mixed response. Only (25%) of the students agreed and (10%) strongly agreed that they can apply Grammarly’s feedback independently. Nonetheless, a significant percentage of participants reported uncertainty, as (33%) selected the neutral option. Moreover, 22% of participants disagreed. It is also important to note that none of the participants selected the “strongly disagree” category (0%), which indicates the absence of extreme negative perceptions toward this statement.

Relating to Vygotsky's scaffolding concept, Grammarly acts as an immediate support system during the writing process. However, it does not always facilitate the internalization required for developing independent writing skills (see Vygotsky, 1978).

These results suggest that while some learners can apply the feedback given by Grammarly to their independent writing, many learners continue to have doubts over this, suggesting limited development of autonomous writing skills for a portion of the sample.

Using Grammarly has improved my ability to edit my own writing

The responses show an overall positive trend. A significant number of students (35%) strongly agreed that Grammarly had enhanced their self-editing skills; 30% agreed with the statement. Moreover, (22.5%) remained neutral. However, only (10%) disagreed, and (2.5%) did not respond to this item.

The results indicate that Grammarly is considered an effective tool for improving learners' ability to revise and edit their own written production.

Grammarly increases my confidence in writing paragraphs in English

The results indicate an overall positive trend among the respondents. (40%) of the students agreed that Grammarly increases their confidence in writing, while (22.5%) agreed strongly. Against this, (17.5%) were neutral and (12.5%) disagreed. (5%) strongly disagreed, and (2.5%) did not respond.

Link to EFL writing anxiety research: automated, non-judgmental feedback has been shown to reduce writing apprehension (Cheng, 2004; Kassim & Ng, 2014).

The results provide support that Grammarly positively affects learners' confidence in writing, although a minority of students do not perceive the same effect.

I feel that I rely too much on Grammarly when I write

The findings demonstrate that the students do not feel an overdependence on Grammarly. Indeed, (40%) disagreed and (20%) strongly disagreed with the statement,

indicating a low level of perceived over-reliance. Although 15% strongly agreed that they rely too much on the tool, while no respondents selected 'Agree'. Also (17.5%) were neutral. Additionally, (7.5%) did not answer. The results suggest that while a small number of writers recognize that they over-rely on Grammarly, the majority do not consider themselves to be too reliant on the tool in their writing.

The findings indicate that Grammarly is generally perceived as a supportive tool that enhances learning, self-editing skills, and writing confidence among EFL learners. However, the findings also reveal some limitations in terms of learners' ability to fully transfer feedback into independent writing, as well as a small group of students who report dependency on the tool.

Table 11

Students' Response to the Questionnaire Statements

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Q1	22.5%	55%	12.5%	0%	10%
Q2	10%	25%	33%	22%	0%
Q3	35%	30%	22%	10%	2.5%
Q4	22.5%	40%	17.5%	12.5%	5%
Q5	15%	0%	17.5%	40%	20%

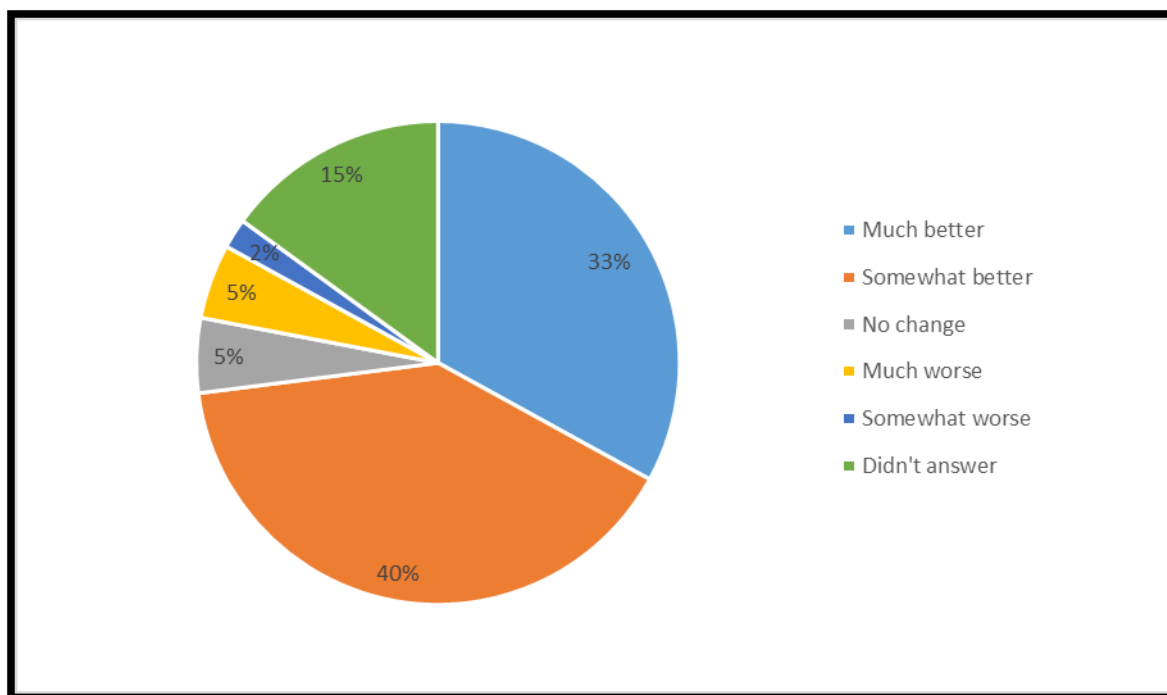
Question 8. After using Grammarly regularly, how has your ability to self-edit without the tool changed?

- ☐ Much better
- ☐ Somewhat better
- ☐ No change
- ☐ Somewhat worse

□ Much worse

Figure 11

Changes in Self-Editing Ability after Grammarly Use



This question aimed to examine whether regular use of Grammarly has influenced students' ability to self-edit their writing without relying on the tool. The results showed that a significant proportion of respondents reported improvement, with (40%) indicating that their ability to self-edit has become somewhat better, while (33%) stated that it has become much better. These results suggest that the majority of students perceive Grammarly as a supportive tool in developing their independent editing skills.

In contrast, only a very small percentage of participants reported no improvement (5%), while (2%) indicated that their self-editing ability had become somewhat worse and another (5%) reported it had become much worse. Additionally, (15%) of respondents did not answer the question.

The results indicate that Grammarly is generally perceived to have a positive effect on students' ability to self-edit their writing independently. However, the presence of a small

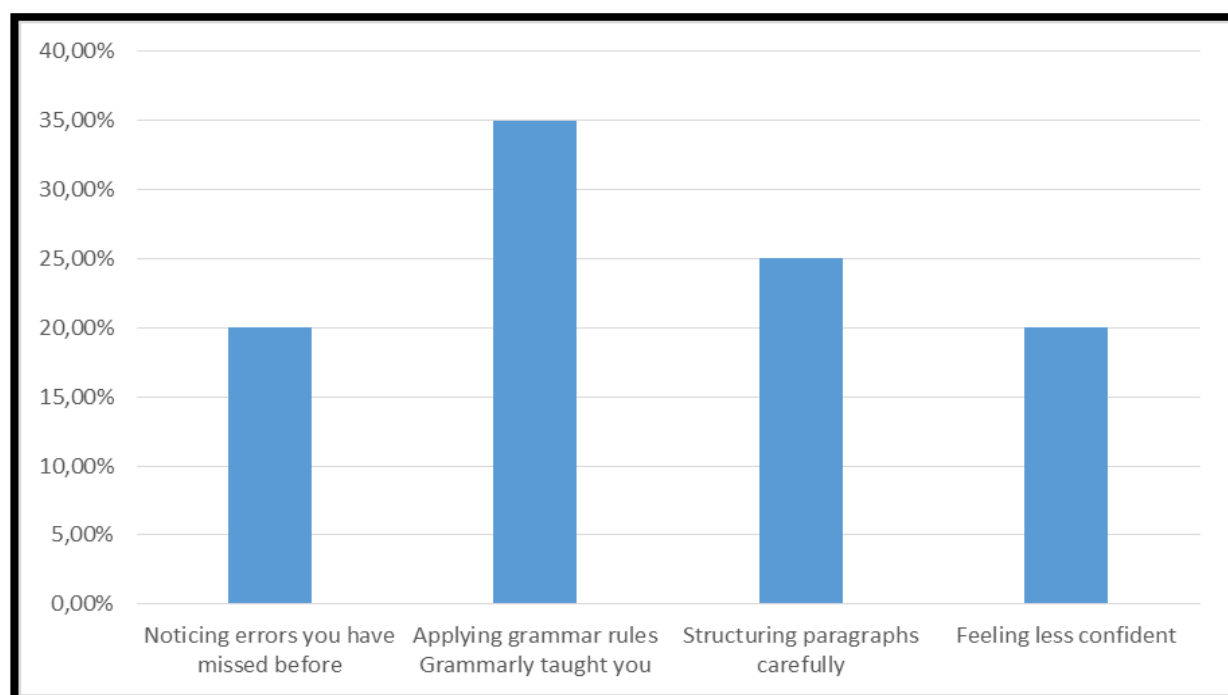
proportion of negative responses suggests that the impact of the tool may vary among learners, possibly depending on how it is used in the writing process.

Question 9. When writing without Grammarly now, do you find yourself: (Check all that apply)

- ☐ Noticing errors you would have missed before
- ☐ Applying grammar rules Grammarly taught you
- ☐ Structuring paragraphs more carefully
- ☐ Feeling less confident
- ☐ No difference in my writing process

Figure 12

Writing Behaviors Without Grammarly After Use



This question aimed to investigate whether students transfer Grammarly's support into their independent writing practices when the tool is not available. The findings revealed that

Grammarly has a noticeable impact on students' writing awareness and competence. One-fifth of the participants (20%) reported that they now notice errors they would have previously missed, indicating an improvement in error-detection ability. In addition, (35%) stated that they actually use grammar rules they have learned through Grammarly, indicating that the tool contributes to the development of explicit grammatical knowledge. Moreover, when writing without Grammarly, (25%) consider that they structure their paragraphs more carefully to match the checkbox option wording and paying greater attention to overall writing organization and planning.

A significant number of students (20%) claimed to be less confident about writing without the tool, indicating a potential dependency effect among some learners. These findings indicate the effectiveness of Grammarly on learners' writing development. Although it promotes error awareness, grammar application and paragraph organization, it may also contribute to reduced confidence among a minority of users when the tool is not available.

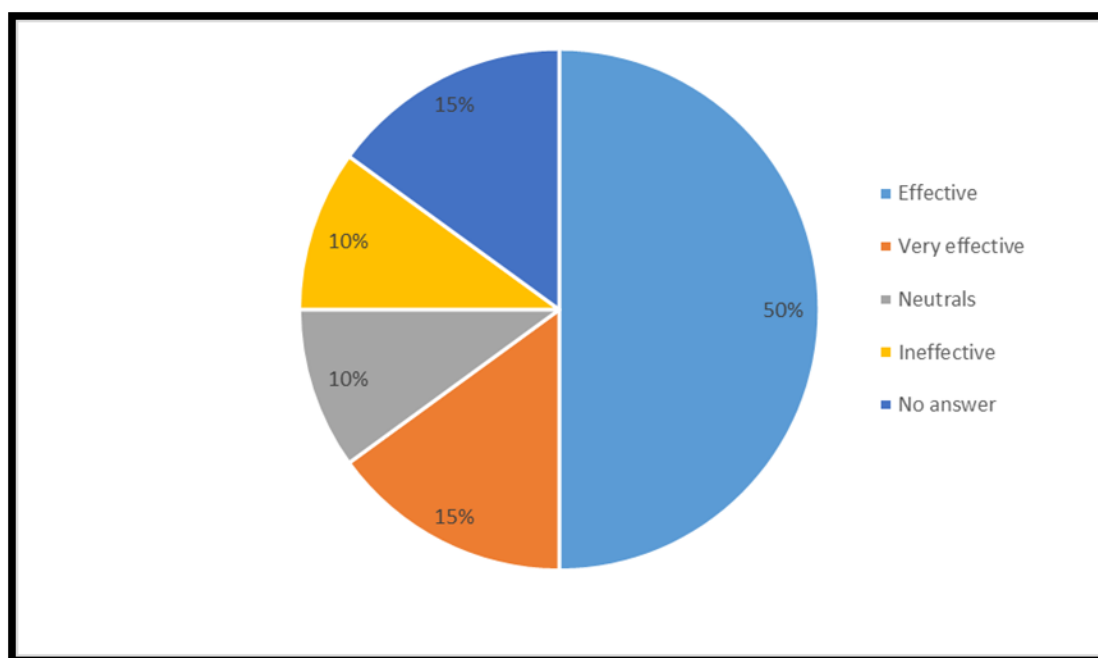
Section 5: Overall Attitudes and Evaluation

Question 10. Overall, how would you rate Grammarly as a writing support tool?

☐ Very effective ☐ Effective ☐ Neutral ☐ Ineffective ☐ Very ineffective

Figure 13

Overall Evaluation of Grammarly as a Writing Support Tool



The data suggest that (50%) of the participants considered Grammarly to be effective and (15%) rated it as very effective. This indicates that a large majority of students have a positive perception of the tool, which suggests that they consider Grammarly as a writing aid to enhance writing performance. Meanwhile, (10%) of participants were neutral about it, indicating uncertainty about its effectiveness. Likewise, 10% of students considered Grammarly an ineffective writing support tool

Furthermore, (15%) of the respondents did not answer this question. These findings indicate that a majority of students believe it is a useful tool to help them improve their English writing. The positive attitude of students toward Grammarly is thus confirmed; however, the existence of neutral or negative answers suggests that the tool's usefulness depends on individual learner needs, expectations, writing style, and practices.

Open-Ended Questions (Q11–Q17)

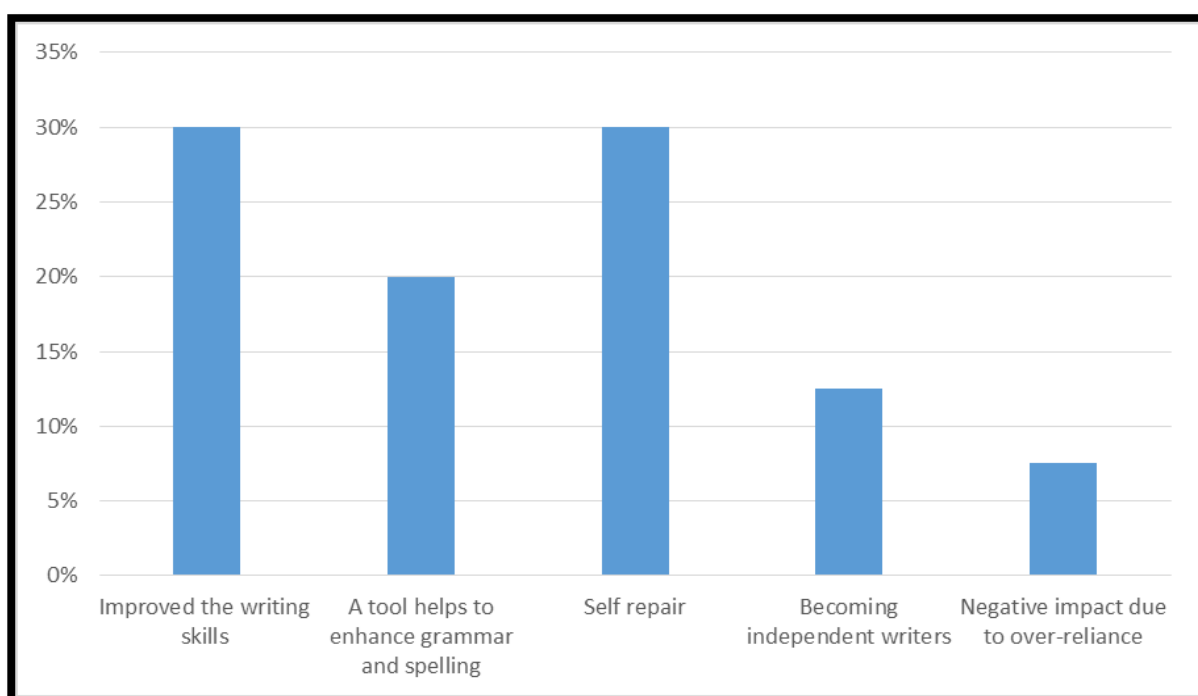
To ensure credibility, a second rater independently coded a 20% random sample of responses. Inter-rater agreement was calculated using Cohen's Kappa (κ). If this was not conducted, note it as a study limitation.

Student verbatim quotes throughout Q11–Q17 should be (1) italicized, (2) enclosed in quotation marks, and (3) attributed with a participant ID (e.g., S07, S22) for traceability. This is applied consistently below.

Question 11. In your opinion, does Grammarly help you become a better independent writer? Explain your answer.

Figure 14

Perceived Impact of Grammarly on Writing



The analysis shows that several perceptions regarding the role of Grammarly in developing students' independence in writing emerged. A considerable number of participants (30%) stated that Grammarly generally helps them improve their writing skills. Additionally, 20% indicated that the tool enables them to learn more about grammar and spelling, while 30% reported that it helps them identify and correct their own mistakes, reflecting a form of self-repair. Moreover, (12.5%) mentioned that Grammarly helps them become independent writers.

However, a small proportion of respondents (7.5%) expressed negative views, arguing that excessive reliance on Grammarly may reduce their confidence and limit the development of their cognitive writing skills.

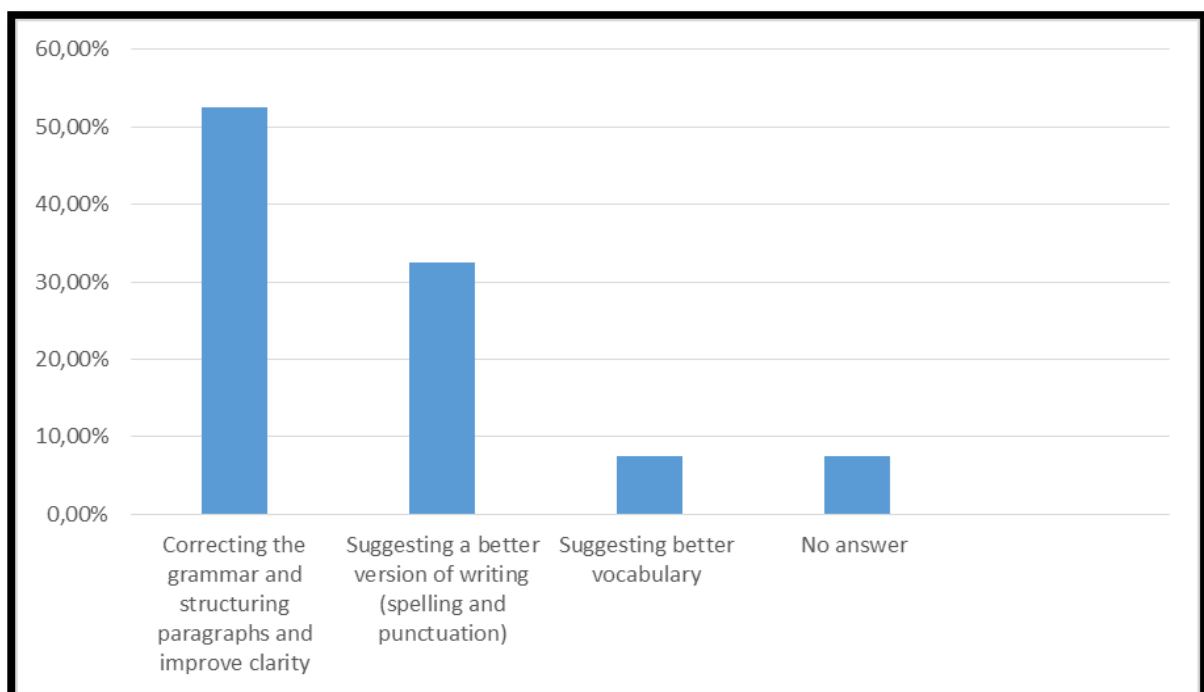
While this constitutes a minority, the concern that automated correction could undermine metacognitive writing strategies holds theoretical significance. It aligns with broader critiques of technology-mediated learning, which argue that such approaches may diminish learner agency (Warschauer & Grimes, 2007).

These findings suggest that Grammarly is generally perceived as a beneficial tool, despite some concerns related to overdependence.

Question 12. What are the main advantages of using Grammarly in paragraph writing?

Figure 15

Perceived Advantages of Grammarly in Paragraph Writing



The most frequently reported advantage (52.5%) was Grammarly's ability to correct grammar and help structure paragraphs. This highlights the tool's central role in enhancing

linguistic accuracy and organization. As one participant noted, *“It helps me correct my grammar and organize my paragraph better”*(S 17).

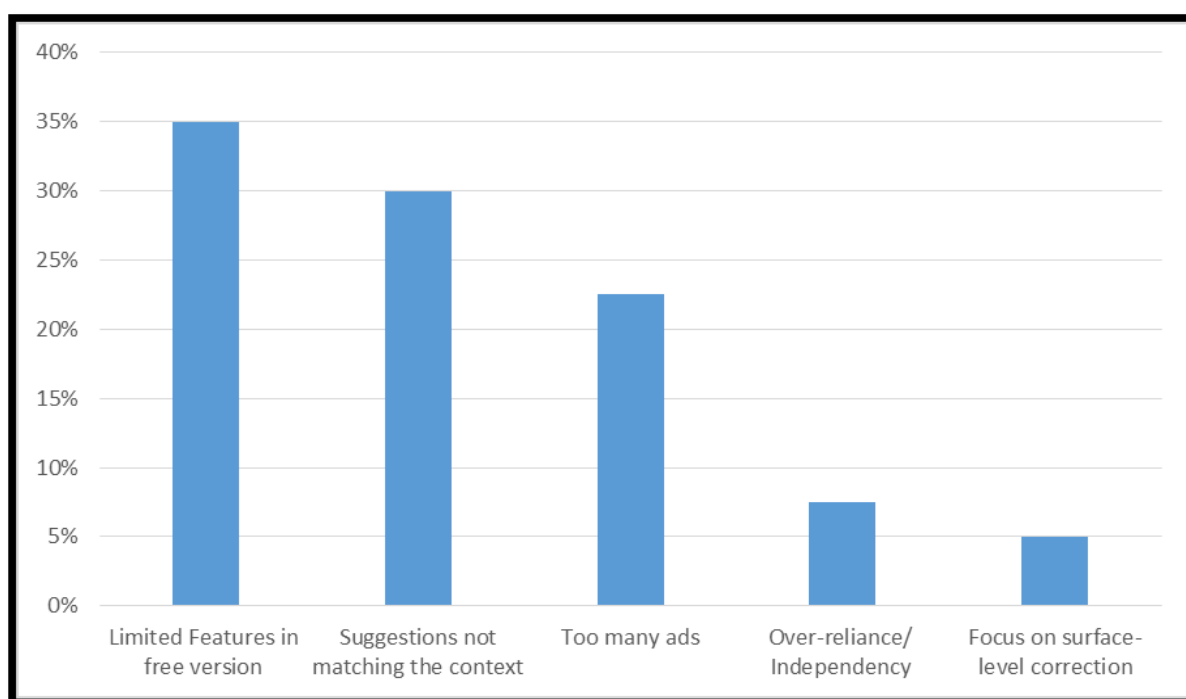
Additionally, (32.5%) of participants emphasized Grammarly’s role in spelling and punctuation. As one respondent noted, *“It corrects my spelling and punctuation mistakes quickly”*(S 4).

Moreover, (7.5%) highlighted vocabulary suggestions. Finally, (7.5%) did not answer.

Question 13. What are the main limitations or problems you face when using Grammarly?

Figure 16

Limitations and Challenges of Grammarly Use



The most commonly reported issue (35%) was that the free version is limited. As one participant stated, *“The free version doesn’t give all the corrections I need”*(S 11).

Another significant concern (22.5%) was the presence of too many advertisements. As one respondent noted, *“There are too many ads, and it distracts me while writing”*(S 13).

In terms of content-related limitations, 30% of participants reported that Grammarly's suggestions do not always match the context. As one learner explained, *"Sometimes the suggestions don't fit what I want to say"* (S 10).

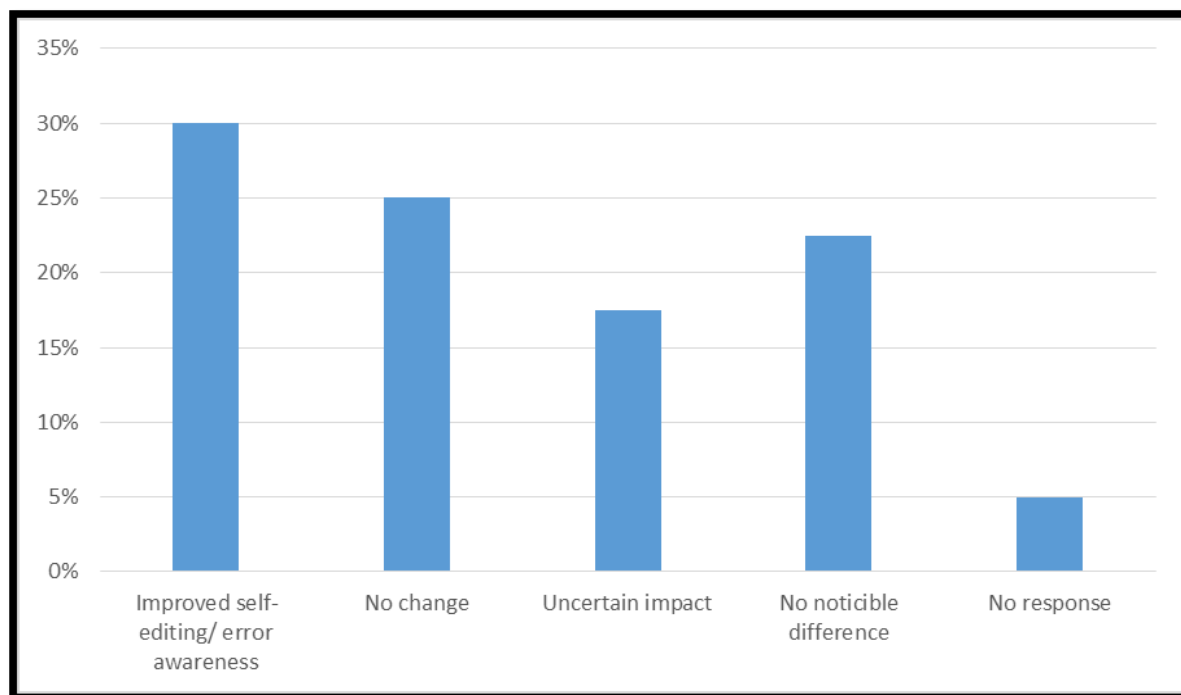
Grammarly's algorithmic reliance on general-purpose corpora means its suggestions may not always reflect the rhetorical conventions of academic EFL writing (Ranalli, 2018; Koltovskaia, 2020).

Additionally, (7.5%) pointed out over-reliance, and (5%) noted Grammarly's tendency to focus only on surface-level meaning, suggesting limitations in addressing deeper aspects of writing.

Question 14. Has using Grammarly changed how you approach the writing process itself (e.g., drafting, revising)? If yes, how?

Figure 17

Impact of Grammarly on Writing Process (Drafting and Revising)



A notable proportion of participants (30%) reported that Grammarly has positively influenced their writing process, particularly in noticing errors and developing self-editing skills. As one participant stated, *“I can now notice my mistakes and correct them while writing”*(S 3).

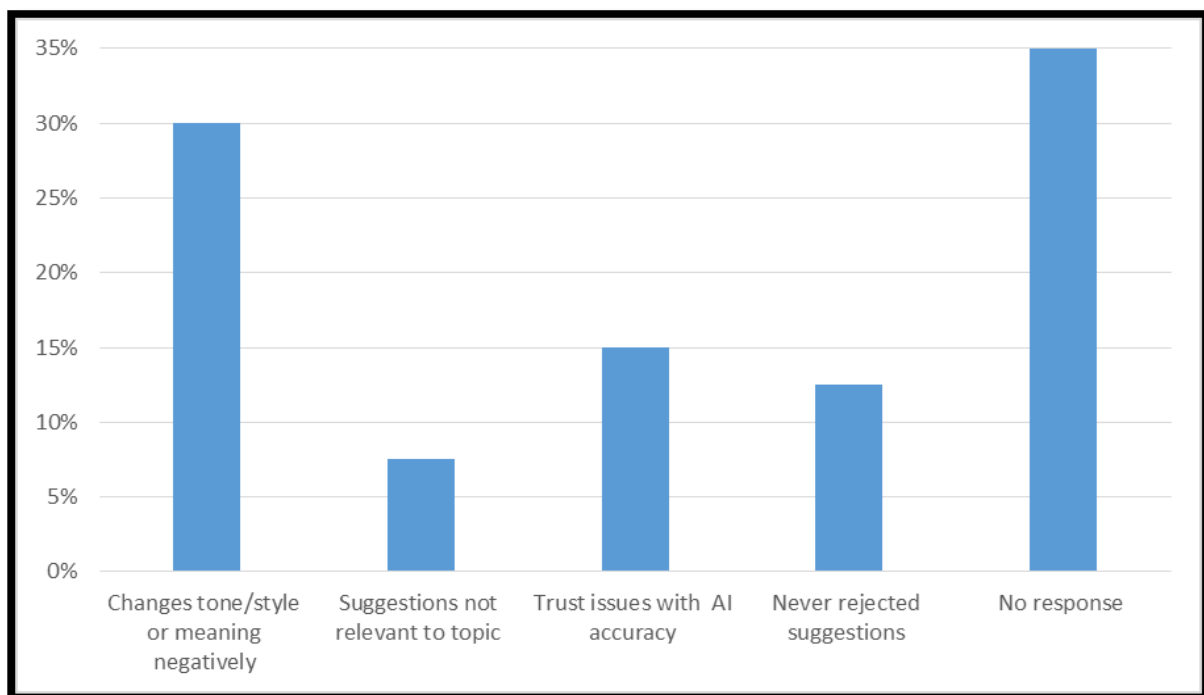
Another mentioned, *“It helps me edit my work by myself ”*(S 22).

However, (25%) indicated that Grammarly did not change their writing approach, and (17.5%) responded with ‘I don’t know,’ reflecting uncertainty or lack of reflection on their writing practices. Another (22.5%) explained that Grammarly had not made any difference because they do not use it frequently enough, underscoring the importance of consistent use. A smaller group (5%) did not answer.

Question 15. Describe a recent time you rejected a Grammarly suggestion. Why did you reject it?

Figure 18

Reasons for Rejecting Grammarly Suggestions



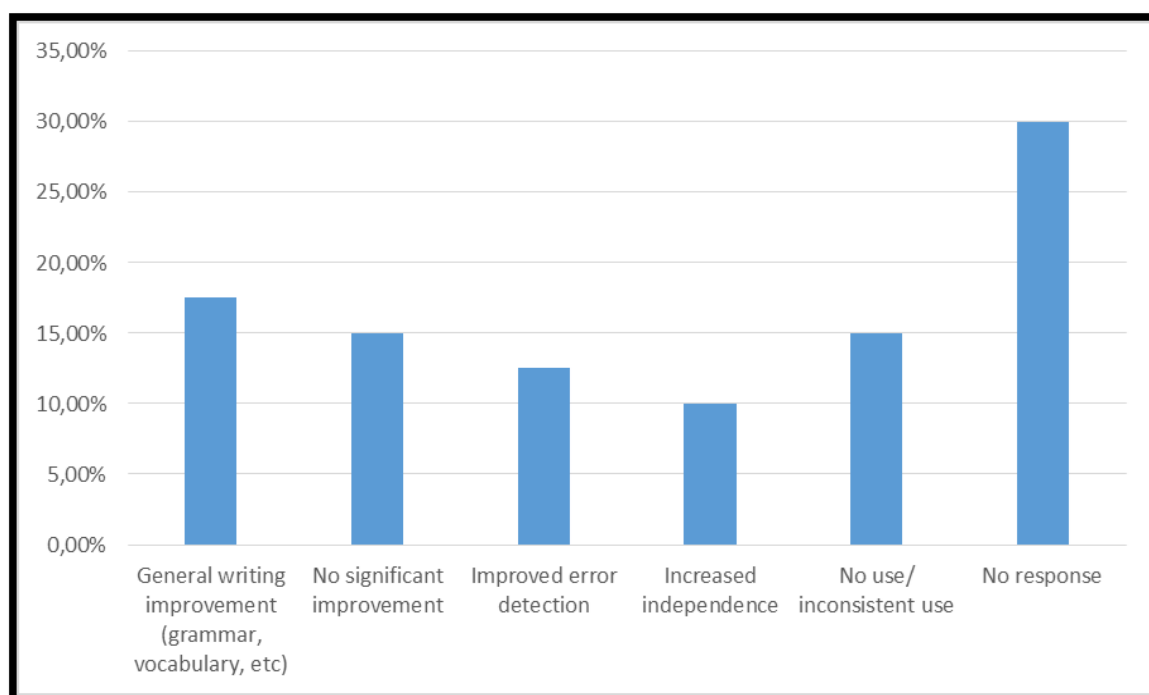
This open-ended question explores participants' experiences and reasons for rejecting Grammarly suggestions. The results reveal a small amount of non-response and a number of interwoven issues including writing voice, preservation of meaning, trust in AI, and the relevance of feedback.

A large number of respondents (35%) did not answer. The most common complaint (30%) is that the suggestions change the writing tone and style, making it sound unnatural or robotic, or even altering the writer's intended ideas. For example, one participant noted, *"Grammarly makes my writing sound robotic and not like it's my own voice"* (S 34).

While another stated, *"It changes my ideas even if the sentence is correct"* (S 6).

Another (7.5%) noted contextually irrelevant suggestions, and (15%) rejected suggestions because they believed the AI was wrong. Finally, (12.5%) reported that they do not reject any suggestions from Grammarly.

Question 16. Have you noticed any changes in your writing independence or self-editing after using Grammarly repeatedly? If yes, what are these changes?

Figure 19*Changes in Writing Independence and Self-Editing*

As seen in the figure above, the responses indicate a mixed pattern of improvement and limited impact, reflecting varying degrees of integration of the tool into participants' writing practices. There was a high non-response rate for this question (30%), which might imply that participants had not reflected on their long-term writing development or that their use of Grammarly was too inconsistent to assess its impact.

A notable group (17.5%) noted improvement in grammar, spelling, punctuation, and vocabulary. As one participant stated, *"Grammarly has helped me improve my grammar and vocabulary over time"* (S 15).

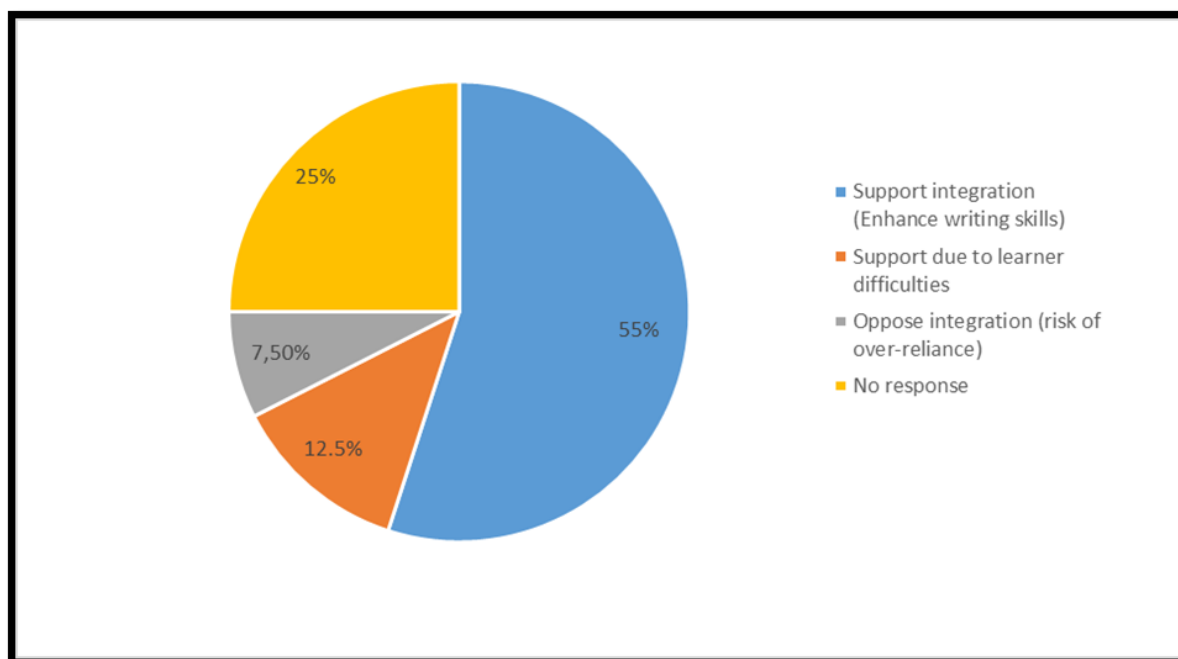
In addition, (12.5%) reported they can now correct and modify their own mistakes more easily, and (10%) reported becoming more independent writers. However, (15%) described the effect as insufficient, and a further (15%) indicated they did not observe any changes due to infrequent use.

Question 17. Do you think Grammarly should be integrated into EFL writing courses?

Why or why not?

Figure 20

Attitudes toward Integrating Grammarly in EFL Writing Courses



This was a concluding question aimed to explore participants' attitudes toward integrating Grammarly into EFL writing courses. The responses reveal a generally positive perception of the tool, although some concerns about over-reliance and skill development are also evident, alongside a noticeable level of non-response.

The majority of participants (55%) supported the integration of Grammarly, emphasizing its role in enhancing students' academic writing. As one respondent stated, *"Grammarly helps students improve their writing level"* (S 25).

While another noted, *"It makes writing more accurate and clear"* (S38).

In addition, (12.5%) supported integration because learners often face difficulties in writing, noting that the tool can act as scaffolding for overcoming common EFL writing challenges.

However, a small but important minority (7.5%) strongly opposed its integration, arguing that relying on Grammarly may hinder grammatical competence development. One respondent argued, “*Students will depend on it instead of learning grammar*”(S 30), while another pointed out, “*Learning grammar needs practice, not just using an application*”(S 37). A considerable proportion (25%) did not answer.

Statistical Analysis of Students' Paragraph Writing Scores

The table below outlines the mean, standard deviation (SD), standard error (SE), median, minimum, and maximum values for each rubric criterion, as well as the total score, as calculated across the sample of 40 participants.

Table 12

Descriptive Statistics for Writing Rubric Criteria and Total Scores

Criterion	N	Mean	SD	SE	Median	Min	Max
Content (max 3)	40	2.300	0.648	0.103	2.00	1	3
Organization / Mechanics (max 2)	40	1.050	0.504	0.080	1.00	0	2
Vocabulary (max 2)	40	1.475	0.599	0.095	2.00	0	2
Language Use (max 3)	40	1.425	0.675	0.107	2.00	0	2
Total Score (max 10)	40	6.250	2.157	0.341	6.50	1	9

The total score mean of 6.25/10 (SD = 2.157) indicates moderate overall writing performance. Content was the strongest sub-criterion (M = 2.30/3), while Organization/Mechanics scored closest to the scale midpoint (M = 1.05/2). The relatively high SD for total scores (2.157) reflects wide variability across participants, ranging from 1 to 9 out of 10.

Table 13

One-Sample T-Test ($\alpha = 0.05$)

Each criterion was evaluated relative to the midpoint of its respective scale, representing the score a student would achieve by performing at precisely 50% of the maximum possible. This approach enabled an assessment of whether students' performance significantly exceeded or fell short of chance or midpoint levels.

Test values (midpoints): Content = 1.5 | Org/Mechanics = 1.0 | Vocabulary = 1.0 | Language Use = 1.5 | Total = 5.0

Criterion	Test Value	t	df	Sig. (2-tailed)	Mean Diff.	Interpretation
Content (max 3)	1.5	7.802	39	<.001	+0.800	Sig. above midpoint ✓
Organization Mechanics (max 2)	1	0.628	39	.534	+0.050	Not significant
Vocabulary (max 2)	1	5.019	39	<.001	+0.475	Sig. above midpoint ✓
Language Use (max 3)	1.5	-0.703	39	.486	-0.075	Not significant
Total Score (max 10)	5	3.665	39	<.001	+1.250	Sig. above midpoint ✓

Decision rule: Reject H_0 when Sig. (2-tailed) < .05. Results show that Content, Vocabulary, and Total Score are significantly above their respective midpoints ($p < .001$).

Organization/Mechanics and Language Use do not differ significantly from midpoint, indicating these areas are weaker and warrant targeted instructional attention.

Pearson's correlation coefficient (r) was calculated for each pair of rubric subscores to determine the extent to which high performance in one criterion aligns with strong performance in others. The analysis revealed that all correlations were statistically significant ($p < .001$).

Table 14

Pearson Correlations among Sub scores

	Content	Org/Mech	Vocabulary	Language Use
Content	1	0.659 $p < .001$	0.812 $p < .001$	0.756 $p < .001$
Org/Mech	0.659 $p < .001$	1	0.599 $p < .001$	0.690 $p < .001$
Vocabulary	0.812 $p < .001$	0.599 $p < .001$	1	0.757 $p < .001$
Language Use	0.756 $p < .001$	0.690 $p < .001$	0.757 $p < .001$	1

All inter-criterion correlations are positive and statistically significant ($p < .001$), indicating that the sub scores reflect interconnected dimensions of writing proficiency. The highest correlation is observed between Content and Vocabulary ($r = .812$), while the lowest is between Organization/Mechanics and Vocabulary ($r = .599$). This trend aligns with findings in holistic writing assessment studies and reinforces the rubric's construct validity.

Table 15

Reliability Analysis: Cronbach's Alpha

Cronbach's alpha (α) was calculated to assess the internal consistency of the four-criterion scoring rubric. Alpha indicates the degree to which the rubric items reliably measure the same underlying construct (paragraph writing ability).

Statistic	Value
Number of Items (k)	4
N (Participants)	40
Sum of Item Variances	1.489
Total Score Variance	4.654
Cronbach's Alpha (α)	0.907
Reliability Interpretation	Excellent ($\alpha > 0.90$)

A Cronbach's alpha of $\alpha = .907$ surpasses the conventional threshold of 0.80 for "good" reliability and approaches the 0.90 benchmark for "excellent" reliability, as outlined by George and Mallery (2003). This indicates that the four rubric criteria—Content, Organization/Mechanics, Vocabulary, and Language Use—exhibit strong internal consistency and collectively assess a unified construct: paragraph-writing proficiency. Furthermore, this high alpha value supports the validity of using the total score as a composite measure in later analyses.

Table 16

Frequency Distribution of Total Scores

The frequency table displays the distribution of total paragraph writing scores for the 40 participants, including cumulative percentages and categorized performance bands.

Score	Frequency	Percentage (%)	Cumulative Freq.	Cumulative %	Performance Band
1	2	5.0%	2	5.0%	Low
2	2	5.0%	4	10.0%	Low
5	12	30.0%	16	40.0%	Below Average
6	4	10.0%	20	50.0%	Below Average

Score	Frequency	Percentage (%)	Cumulative Freq.	Cumulative %	Performance Band
7	5	12.5%	25	62.5%	Average
8	10	25.0%	35	87.5%	Average
9	5	12.5%	40	100.0%	High
Total	40	100.0%			

Table 17*Performance Band Summary*

Students were grouped into four performance bands based on their total scores to provide a holistic overview of writing proficiency distribution.

Performance Band	Score Range	N Students	Percentage	Interpretation
Low	1 – 3	4	10.0%	Significant writing difficulties
Below Average	4 – 6	16	40.0%	Basic writing; frequent errors
Average	7 – 8	15	37.5%	Satisfactory; minor errors
High	9 – 10	5	12.5%	Strong writing performance

Most students (40.0%) are categorized in the Below Average band (scores 4–6), with the Average band (37.5%, scores 7–8) following closely behind. High performance (scores 9–10) was attained by just 12.5% of participants, while 10.0% scored in the Low range (1–3). The distribution resembles a bimodal pattern, prominently clustered around a score of 5 (n = 12, 30%). This indicates that a significant portion of the participants demonstrate basic, yet

underdeveloped, paragraph writing skills, aligning with the proficiency typical of B1-level EFL writers.

Table 18

Raw Data: Individual Student Scores

The table below presents the complete raw scores for all 40 participants across each rubric criterion and total score. Cells are colour-coded by performance level (orange = Low; yellow = Below Average; light green = Average; green = High).

S#	Content (/3)	Org/Mech (/2)	Vocabulary (/2)	Lang Use (/3)	Total (/10)
S1	2	1	2	2	7/10
S2	2	1	1	2	6/10
S3	3	1	2	2	8/10
S4	2	2	2	2	8/10
S5	2	1	2	2	7/10
S6	2	1	1	2	6/10
S7	2	1	1	1	5/10
S8	2	1	1	1	5/10
S9	1	0	0	0	1/10
S10	2	1	1	2	6/10
S11	2	1	2	2	7/10
S12	2	1	1	1	5/10
S13	1	0	1	0	2/10
S14	3	1	2	2	8/10
S15	3	1	2	2	8/10
S16	2	1	1	1	5/10
S17	3	1	2	2	8/10

S#	Content (/3)	Org/Mech (/2)	Vocabulary (/2)	Lang Use (/3)	Total (/10)
S18	2	1	1	1	5/10
S19	2	1	1	1	5/10
S20	2	1	1	1	5/10
S21	1	0	1	0	2/10
S22	3	1	2	2	8/10
S23	3	1	2	2	8/10
S24	2	1	1	1	5/10
S25	3	1	2	2	8/10
S26	1	0	0	0	1/10
S27	3	2	2	2	9/10
S28	3	1	2	1	7/10
S29	3	2	2	2	9/10
S30	3	2	2	2	9/10
S31	2	1	2	1	6/10
S32	3	1	2	2	8/10
S33	2	1	1	1	5/10
S34	3	1	2	2	8/10
S35	2	1	1	1	5/10
S36	2	1	1	1	5/10
S37	3	1	2	1	7/10
S38	2	1	1	1	5/10
S39	3	2	2	2	9/10
S40	3	2	2	2	9/10

Summary of Key Statistical Findings

Mean Total Score: 6.25 / 10 (SD = 2.157)

Strongest Criterion: Content (M = 2.30/3) — significantly above midpoint, $p < .001$

Weakest Criterion: Organization/Mechanics ($M = 1.05/2$) — not sig. above midpoint, $p = .534$

Total Score vs. Midpoint (5.0): $t(39) = 3.665$, $p < .001$ — students scored significantly above chance

Cronbach's Alpha (α): 0.907 — excellent internal consistency of the rubric

Strongest Inter-criterion Correlation: Content ↔ Vocabulary: $r = .812$, $p < .001$

Performance Distribution: 10% Low | 40% Below Average | 37.5% Average | 12.5% High

Significance Level (α): 0.05 (two-tailed) — standard in educational research

Comparative Analysis

Manual Correction vs. Grammarly (Free Version) in EFL Students' Paragraph Writing

This is an in-depth comparative analysis of two correction approaches applied to EFL student paragraph writing: manual corrections performed by a teacher and automated corrections using Grammarly's free version. The evaluation is based on data gathered from a study at the University of Chadli Bendjedid and examines five critical writing dimensions: grammatical accuracy, lexical range, coherence and cohesion, paragraph structure, and mechanics.

The primary finding is that the two methods work in a complementary manner rather than serving as direct substitutes. Grammarly is particularly effective at handling rule-based, surface level issues like spelling, capitalization, punctuation, and basic subject-verb agreement. However, it falls short when it comes to addressing higher-order aspects of writing, such as semantic clarity, coherence across discourse, and the organization of paragraphs. On the other hand, manual correction, while less structured, shows greater effectiveness by

identifying meaning-dependent errors and maintaining the writer's unique voice. This suggests that neither method alone is sufficient for holistic writing improvement. Instead, a blended pedagogical approach appears to be the most effective solution.

Analytical Framework

Both correction methods were evaluated using a standardized rubric comprising five criteria, each scored from 1 to 4 (Poor to Excellent), yielding a maximum of 20 points per paragraph:

Table 19

Standardized rubric evaluation

Criterion	Focus Area	Max Score
1. Grammatical Accuracy	Verb forms, tense, SVA, articles, prepositions, sentence boundaries	2
2. Lexical Range	Vocabulary diversity, precision, avoidance of repetition	2
3. Coherence & Cohesion	Logical flow, transitional phrases, linking devices	2
4. Paragraph Organization	Topic sentence, supporting detail, conclusion	2
5. Mechanics	Spelling, punctuation, capitalization	2
TOTAL	—	10

Error Profile of Student Paragraphs

Error Categories Identified

A thorough annotation of the original student paragraphs revealed errors distributed across five linguistic dimensions. The following table provides representative examples drawn directly from the student texts:

Table 20*Errors' identification*

Error Code	Error Type	Example from Student Text	Correct Form
[GR/SVA]	Subject–Verb Agreement	“AI help students”	“AI helps students”
[VT]	Verb Tense	“it has became”	“it has become”
[ART]	Article Error	“essential part of our life”	“an essential part”
[PREP]	Preposition Error	“search information”	“search for information”
[SS]	Sentence Structure	“Because it provides many features.”	Fragment — attach to main clause
[LEX]	Lexical Error	“virtual rule” / “forward platform”	“vital role” / “semantically unclear”
[SP]	Spelling Error	“larning” / “perfomance”	“learning” / “performance”
[PUNC]	Punctuation Error	Missing commas, run-on sentences	Correct comma placement
[CAP]	Capitalization Error	“finally AI makes”	“Finally, AI makes”
[COH]	Coherence/Cohesion	No transition between paragraphs	Use of “Firstly”, “In addition” etc.
[ORG]	Organization	No clear topic sentence	Clear introduction + body + conclusion

Error Frequency across Participants

The summary below captures the observed distribution of errors among the five participants analyzed. Notable variation in error density was evident, with Participants 7 and 8 exhibiting the highest frequency of grammatical errors, whereas Participants 31 and 40 primarily displayed deficiencies related to stylistic choices and organizational structure.

Table 21

Errors' Frequency

Participant	Topic	Dominant Error Types	Proficiency Level (Estimated)
P2	AI in Academic Settings	Spelling [SP], SVA [GR], Vocabulary [LEX]	Lower-Intermediate
P7	AI in Academic Settings	SVA [GR], Article [ART], Coherence [COH], Organization [ORG]	Beginner–Intermediate
P8	AI in Academic Settings	Verb Tense [VT], SVA [GR], Prepositions [PREP], Organization [ORG]	Lower-Intermediate
P31	Birthday Experience	Verb Tense [VT], Sentence Structure [SS], Punctuation [PUNC]	Intermediate
P40	Birthday Experience	Punctuation [PUNC], Cohesion [COH], Lexical [LEX]	Intermediate

Analysis of Manual Correction

Strengths of Manual Correction

The manual correction method showcased a distinctly Pedagogical and meaning-focused strategy. Instead of aiming to fix every mistake, the teacher employed targeted interventions designed to enhance overall understanding. Its primary strengths include:

- The teacher demonstrated a strong ability to interpret context, accurately understanding the student's intended meaning and providing corrections, even when the phrasing lacked clarity.
- Higher-order revisions focused on addressing structural issues, including sentence fragments, run-on sentences, and the absence of essential logical connectors, ensuring greater coherence and readability throughout the text.
- Semantic precision was enhanced by addressing word-choice errors that caused ambiguity or contradictions. For instance, phrases like "AI introduces workload" or "it forward platform" were revised to ensure clarity and coherence.
- The teacher focused on preserving the student's unique voice and style by steering clear of excessive corrections. Instead, they addressed only significant obstacles to understanding, ensuring the student's ideas remained intact.
- Discourse-level enhancements were evident in multiple instances, particularly in P7 and P8, where the teacher made adjustments to paragraph structure by introducing or rearranging topic sentences, transitions, and concluding ideas.

Limitations of Manual Correction

- Inconsistency in correction: Some types of errors were not systematically addressed, and minor mechanical issues, such as occasional punctuation mistakes, were sometimes overlooked.
- Limited guidance on academic style: The teacher seldom rephrased sentences to improve their formality, lexical complexity, or overall academic tone.

- Lack of systematic vocabulary enhancement: Efforts to improve vocabulary were limited to rectifying misunderstandings caused by errors, without deliberate attempts to expand the students' lexical range.
- Absence of organizational scaffolding: Although topic sentences were occasionally provided or implied, comprehensive efforts to restructure paragraphs for better organization were not consistently undertaken.

Participant-by-Participant Summary (Manual Correction)

Participant 2 — Manual Correction

The manual revision of Participant 2's paragraph successfully addressed the most prominent errors. Spelling mistakes, such as "larning" and "perfomance," were rectified. Issues related to subject–verb agreement, including the adjustment from "AI support" to "AI supports," were resolved, and consistency in verb tense was enhanced. Additionally, vocabulary choices were refined, replacing "tao" with "as well," while ensuring the term "lessons" remained appropriately used. Furthermore, the logical coherence between the two paragraphs was improved through the introduction of clearer transitional phrases.

Participant 7 — Manual Correction

Paragraph 7 exhibited the highest concentration of grammatical and organizational mistakes in the text. The manual revision significantly reorganized the content by incorporating distinct paragraph segments marked by transitions like “First,” “Second,” and “Finally.” Subject-verb agreement errors, such as changing “AI help” to “AI helps,” were corrected across the text. Additionally, informal and ambiguous phrases, such as “school is easy and good,” were refined to more precise and formal alternatives like “school becomes easier and more effective.” The participant demonstrated the most notable improvement as a result of manual correction. How to Rewrite Tex

Participant 8 — Manual Correction

The manual revision of P8 effectively resolved several linguistic issues, including verb tense mistakes (e.g., changing "Artificial intelligence become" to "has become"), subject-verb agreement errors, and the use of inappropriate prepositions. Of particular significance was the enhancement of both sentence-level clarity and paragraph-level coherence. Fragmented, run-on structures were reorganized into well-constructed, logically sequenced sentences. Furthermore, the revision introduced notable stylistic refinements; for instance, the phrase "make learning to teachers more easy" was skillfully rephrased as "make teachers' work easier and require less effort," resulting in a more polished and precise expression.

Participant 31 — Manual Correction

Paragraph P31 exhibited a more literary and personal tone, marked by fewer grammatical errors but affected by noticeable tense inconsistencies and structural shortcomings. During manual correction, the date expression was standardized (changing "In third March" to "On March 3rd"), "mad" was corrected to "had," and the conclusion was revised for improved cohesion. Additionally, the teacher streamlined the paragraph by merging fragmented ideas into a more cohesive and unified structure.

Participant 40 — Manual Correction

The paragraph written by P40 demonstrated the highest level of fluency among the five analyzed, though issues were primarily observed in areas such as punctuation, cohesion, and occasional lexical imprecision. The manual revisions addressed these concerns by restructuring multiple runon sentences, refining the use of transitional expressions, and enhancing the clarity of the narrative flow. Notably, the humorous birthday anecdote was retained and further improved through more precise sequencing, such as with the phrases "but instead, I hit the table" and "It was such a joyful time," which added to its effectiveness.

Analysis of Grammarly Correction (Free Version)

Strengths of Grammarly

Grammarly demonstrated a high level of reliability in areas governed by well-defined grammatical rules and easily recognizable surface-level patterns. Its primary strengths can be summarized as follows:

- **Mechanical Accuracy:** Spelling, capitalization, and punctuation errors were rectified with near-perfect accuracy throughout all five paragraphs analyzed.
- **Morphological Consistency:** Corrections related to subject-verb agreement were consistently applied (e.g., the correction of "AI help" to "AI helps" was accurately identified across all cases).
- **Basic Syntactic Adjustments:** Errors such as omitted articles and missing possessive apostrophes were effectively identified and rectified.
- **Standardization of Word Forms:** Non-standard lexical items (e.g., *informations,* *homeworks,* or overly colloquial expressions like *more easy and more fast*) were appropriately converted to their standard equivalents.
- **Speed and Consistency:** In contrast to human proofreading, Grammarly applies its corrections uniformly and maintains consistent standards across multiple texts, unaffected by fatigue or subjective variation.

Limitations of Grammarly

- Semantic blindness occurs when phrases like "it forward platform," "AI introduces workload," or "my personal girl" (likely intended as "my personal growth") are overlooked or misinterpreted due to a lack of semantic understanding.
- Discourse-level issues arise when there is no enhancement made to aspects such as coherence, cohesion, or logical flow. Problems such as weak topic sentences, missing conclusions, and inadequate transitions between paragraphs remain unaddressed.

- Fragment tolerance refers to the inconsistent detection or resolution of dependent clauses functioning as fragments examples include "Because it provides many features," which may be improperly left unresolved.
- Contextual spelling gaps highlight instances where contextually incorrect but visually similar words, such as "rootin" instead of "routine" or "bath" instead of "path," are not identified or corrected effectively.
- Meaning alteration risks include situations where corrective suggestions subtly modify the intended meaning, such as the omission of possessive pronouns or the unintended shift in verb aspect.
- Finally, a lack of organizational guidance is evident when no effort is made to restructure content, add clearer topic sentences, or reinforce conclusions for improved overall readability.

Participant-by-Participant Summary (Grammarly)

Participant 2 —Grammarly

Grammarly effectively fixed the spelling errors in P2's paragraph and adjusted subject-verb agreement to ensure consistency. However, it inadvertently introduced an unnecessary addition ("academic al settings," likely a byproduct of its suggestion algorithm) and overlooked the informal tone as well as the restricted lexical variety. Additionally, it failed to correct the grammatical mistake in the phrase, leaving "quick" in place of "quickly" where the adverb was required ("analyzing large amounts of data quick").

Participant 7 — Grammarly

Grammarly addressed all subject-verb agreement errors in the paragraph written by P7 and resolved basic punctuation issues. However, the underlying structural weaknesses of the paragraph remained unaltered. The text continued to exhibit a disorganized and list-like format, lacking both a clear introduction and a substantive conclusion. Additionally, the abbreviation "IA," used erroneously in place of "AI," went undetected. Furthermore, the phrase "no need

teacher every time" contained notable grammatical and structural flaws, which also remained uncorrected.

Participant 8 — Grammarly

Grammarly's revisions on P8 resulted in the most noticeable improvements among the five cases. It successfully addressed issues with verb agreement, punctuation, and multiple preposition errors. Nonetheless, significant problems were still unresolved: the major tense error ("Artificial intelligence become very important") was not adjusted to "has become," a fragment in the second paragraph remained uncorrected, and the overall structure of the text continued to lack organization.

Participant 31 — Grammarly

Paragraph 31 was already fairly well-written, requiring only a few minor adjustments by Grammarly. These included changing "In third March 2022" to "In March 2022," correcting "There is no grand plans" to "There are no grand plans," and addressing a slight shift in verb tense. While these changes polished the grammar, the paragraphs' stylistic and literary quality was neither enhanced nor deliberately maintained; it remained untouched stylistically.

Participant 40 — Grammarly

Grammarly made moderate enhancements to P40's paragraph by refining comma placement, ensuring proper number agreement (such as "emotions" and "memories"), and adjusting gerund forms (changing "share" to "sharing"). However, it overlooked the primary structural issue: an overly long opening sentence that connects several ideas with commas, along with the lack of a clear thematic structure spanning the three paragraphs.

Comparative Analysis: Manual vs. Grammarly

Side-by-Side Scoring Comparison

Using the five-criterion rubric, the corrected paragraphs were scored for both methods.

The table below presents average estimated scores derived from the analysis data:

Table 22*Side-by-Side Scoring Comparison*

Criterion	Manual Correction (Avg)	Grammarly (Avg)	Advantage
1. Grammatical Accuracy	1.6 / 2	1.4 / 2	Manual
2. Lexical Range	1.4 / 2	1.1 / 2	Manual
3. Coherence & Cohesion	1.3 / 2	0.7 / 2	Manual (significant)
4. Paragraph Organization	1.2 / 2	0.6 / 2	Manual (significant)
5. Mechanics	1.5 / 2	1.8 / 2	Grammarly
TOTAL (avg)	7 / 10	5.6 / 10	Manual overall

Criterion-by-Criterion Comparison**Grammatical Accuracy**

Both approaches tackled key grammatical errors, including subject-verb agreement and verb tense errors. However, manual correction cast a broader net, identifying additional issues like prepositional errors, sentence fragments, and inconsistencies in discourse-level tense. While Grammarly performed well in addressing morphological and basic syntactic errors, it struggled with more complex structural problems. Advantage: Manual (breadth and depth of coverage).

Lexical Range

Manual correction focused on targeted yet impactful lexical enhancements, such as replacing semantically incoherent phrases and refining word precision. Grammarly addressed

surface-level vocabulary errors including word forms and accountability, but struggled to identify deeper semantic inconsistencies like “forward platform” or “introduces workload.”

Advantage: Manual correction (for semantic competence).

Coherence & Cohesion

This is where the most notable differences arise. Manual correction consistently added transitional devices, reorganized fragmented ideas, and ensured a logical flow between sentences and paragraphs. In contrast, Grammarly did not make any significant improvements in this area for any of the five participants. Advantage: Manual (by a large margin).

Paragraph Organization

In several instances, particularly in paragraphs P7 and P8, manual corrections significantly enhanced the structure by introducing clear organizational markers, segmenting the content into distinct sections, and reinforcing the conclusions. In contrast, Grammarly did not implement any structural changes of this nature. Edge: Manual (exclusively).

Mechanics

Grammarly demonstrated its strongest capabilities here. It excelled in accurately correcting spelling, systematically addressing capitalization errors, and consistently refining punctuation. While manual correction also tackled mechanical errors, the approach was less comprehensive, leaving a few minor mistakes uncorrected to prioritize a broader, more pedagogical focus. Edge: Grammarly.

Table 23

Summary Comparison Table

Feature	Manual Correction	Grammarly (Free)
SVA / Verb Tense	✓ Corrected thoroughly	✓ Corrected reliably
Article / Preposition errors	✓ Corrected thoroughly	✓ Partially corrected

Sentence fragments / Run-ons	✓ Corrected thoroughly	✗ Rarely addressed
Spelling	✓ Partially corrected	✓ Near-perfect accuracy
Capitalization / Punctuation	✓ Selectively corrected	✓ Consistently corrected
Word-form errors (information, etc.)	✓ Partially	✓ Corrected reliably
Semantic / Lexical meaning	✓ Corrected	✗ Not addressed
Coherence & transitional devices	✓ Improved significantly	✗ Not addressed
Paragraph organization / structure	✓ Improved in several cases	✗ Not addressed
Academic style / formality	✓ Limited improvement	✗ Not addressed
Learner voice preservation	✓ Maintained	✓ Variable

Detailed Case Study: Participant 7

Participant 7's paragraph provides the most instructive case for illustrating the differences between the two correction methods, as it contained the highest density of errors across all categories.

Original Paragraph Excerpt

“Today, technology helps people work, learning easier and faster. Students can use AI for learning and work. AI is important because it help students solve problems, find informations, and learn by themselves. AI help students solve problems. For example, students can ask AI for answer or ideas...”

Grammarly-Corrected Version

Grammarly effectively addressed subject-verb agreement concerns by replacing "help" with "helps" where needed, corrected the plural misuse of "informations" to "information," and inserted the article "an" before "answer." It also refined certain adverbial forms for improved grammatical accuracy.

Despite these technical improvements, the text's broader structure remained disorganized, consisting of a sequence of repetitive and loosely connected short sentences lacking a coherent organizational framework. There was no evident strong topic sentence to guide the discussion, and the conclusion was shallow. Additionally, a significant abbreviation mistake—substituting "IA" for "AI"—went undetected, underscoring limitations in its ability to identify contextual or domain-specific errors.

Manually Corrected Version

The manual corrections significantly transformed the paragraph. The teacher implemented a three part structure with "First," "Second," and "Finally" to clearly organize the supporting ideas. Repetitive sentence patterns were substituted with more diverse constructions, adding variety to the text. The conclusion saw notable improvements, emphasizing that "school becomes easier and more effective." Additionally, vague academic language was refined, such as changing "learn alone" to "learn on their own," and unresolved syntactic issues overlooked by Grammarly were effectively addressed.

Conclusion

This analysis highlights the distinct roles played by manual correction and Grammarly (free version) in language editing. Grammarly functions brilliantly as a surface-level tool, fast, consistency, and the ability to address mechanical and basic grammatical errors. In contrast,

manual correction operates on a deeper linguistic layer, tackling aspects like meaning, organization, and discourse areas that automated tools cannot yet approach.

The findings from the five analyzed participants consistently indicate that manual correction yields higher-quality revisions overall, particularly for lower-proficiency students whose challenges go beyond surface-level errors. However, Grammarly's efficiency within its specialized domain makes it a valuable supplementary tool, especially for high-volume feedback where teachers face time constraints.

The most effective approach for fostering EFL writing development lies in a strategic integration of these two methods. By combining the systematic precision of automated tools with the nuanced depth offered by human expertise, this hybrid approach acknowledges both the intricate nature of language and the Pedagogical aim of cultivating skilled, independent writers.

Chapter Five

Discussion

Introduction

The present chapter is devoted to the discussion of the results presented in the previous chapter. It comprises three main parts that provide answers to the research questions and aims at checking the validity of the hypotheses. The chapter concludes by discussing pedagogical implications of the research findings, offering recommendations concerning the effective integration of Grammarly by EFL teachers and students at Chadli Bendjedid University, in addition to limitations of the study and suggestions for further research related to the theme of the dissertation.

Implications of the findings

The study's findings carry several important implications for EFL writing pedagogy, institutional policy, and the broader field of automated writing evaluation research:

The Nature of EFL Paragraph Writing Challenges

In light of the students' questionnaire result and the comparative analysis of their written paragraphs, it can be concluded that EFL students at the Department of English consider paragraph writing as a difficult task, especially when addressing academic topics such as Artificial Intelligence.

The error analysis of the five participants (P2, P7, P8, P31, and P40) indicated numerous difficulties across multiple linguistic dimensions, with error density varying according to proficiency level. Participants 7 and 8, estimated at beginner-intermediate and lower-intermediate levels respectively, produced the most grammatical errors among all participants.

On the other hand, Participants 31 and 40, at intermediate proficiency, showed weaknesses in stylistic choices, organizational structure, and discourse-level coherence. These findings align with the questionnaire data where students identified grammar (35%), spelling

and punctuation (20%), and vocabulary choice (15%) were stated as the students' main area of difficulties aspects where Grammarly proves useful for writing.

The result revealed that students' writing challenges extend beyond surface-level mechanics to encompass higher-order concerns. The prevalence of sentence fragments, run-on sentences, and absence of logical connectors among lower-proficiency learners, as well as a lack of clear topic sentences and concluding statements by multiple participants, prove that difficulties with EFL writing are multidimensional. Teachers face implicit challenges when manually correcting written texts since the data collected through comparisons exhibited inconsistency in addressing mechanical errors and provided limited guidance on academic register development. Consequently, automated tools like Grammarly are viewed as potential facilitators that could complement the EFL teaching and learning process, particularly given the constraints of large class sizes and time limitations that prevent teachers from providing immediate, individualized feedback on all error types.

Grammarly Operates Below the Level of Meaning

The most significant observation about Grammarly's corrections is not that they occasionally fall short, but that they operate within a narrow layer of language divorced from its deeper meaning. Grammarly examines text through the lens of formal patterns subject-verb agreement, word forms, spelling, and punctuation rules. While these linguistic elements are undeniably important and worth addressing, they represent only a small fraction of what makes writing truly impactful.

Consider a sentence like "AI introduces workload." Grammatically, it's flawless. The subject, verb, and object are all in proper form, so Grammarly sees no issue with it. However, the sentence directly undermines the argument of a student's paragraph that claims AI reduces workload. Identifying this as an error requires an understanding of the topic, the paragraph's overarching argument, and the writer's intended message something Grammarly isn't equipped

to provide. This is not a defect specific to its free version but rather an inherent limitation of current algorithmic correction systems.

The same principle applies to coherence and structure. A paragraph can feature entirely grammatically correct sentences and still fail to present a cohesive or persuasive argument. Grammarly is unable to recognize such flaws because doing so requires analyzing the relationships between sentences and evaluating their contribution to the overall meaning tasks it simply cannot perform.

Manual Correction Targets What Actually Impairs Communication

The teacher's approach to corrections was not just more frequent but fundamentally different in focus. Instead of meticulously pinpointing every single rule violation, the teacher evaluated each paragraph as a unit of communication and stepped in only where meaning was obstructed, distorted, or insufficiently conveyed. This reflects the objective of correction in a writing course:

Not to create a flawless text devoid of errors, but to ensure that the text communicates ideas effectively.

This perspective clarifies both the strengths and the perceived omissions in manual correction. For instance, the teacher addressed "AI introduces workload" because it misrepresented the student's argument. Similarly, the teacher reorganized P7 due to its lack of structure, which hindered the reader's ability to follow the student's reasoning. However, certain minor punctuation inconsistencies were left untouched since they did not impede overall comprehension. These decisions were intentional, driven by a pedagogical focus on addressing issues that most significantly impact communication.

The outcome is a revised text that transcends mere grammatical neatness to become more purposeful and impactful one where ideas are not only articulated clearly but also

presented in a logical and cohesive manner. This is the ultimate aim of writing instruction, and it is precisely what exceptional manual correction strives to achieve.

Grammarly's Corrections Risk Creating a False Sense of Completion

When a student submits their paragraph to Grammarly and receives feedback indicating minimal issues, they might reasonably assume their writing has significantly improved. In terms of mechanics, this assumption often holds true. However, when it comes to the aspects most crucial in academic writing such as coherence, organization, and clarity of thought the paragraph might remain as flawed as the initial draft.

This creates a pedagogical risk. The student observes a polished text and may not recognize that deeper, critical issues persist. For instance, in P7, despite Grammarly's modifications, the paragraph retained loosely connected and repetitive sentences without an overarching organizational framework or a meaningful conclusion. While Grammarly enhanced its surface level readability, the structural weaknesses went unaddressed. A student presenting this "corrected" version as final would have resolved the less significant issue while neglecting the core problems.

Moreover, some of Grammarly's recommendations can inadvertently affect meaning. In certain cases, the tool has been observed to exclude possessive pronouns or adjust verb aspects in ways that subtly alter the original intent of the text. If students accept these suggestions without critically evaluating their impact on meaning, they risk replacing one error with another without realizing it.

Manual Correction Has Its Own Limitations

Manual correction, while beneficial, is not without its limitations. The analysis highlights a degree of inconsistency, as not all error types received equal attention from participants. Some minor mechanical mistakes, which tools like Grammarly would have

automatically flagged, were overlooked. Furthermore, the teacher's interventions did not consistently foster the development of an academic register, expand vocabulary beyond resolving clear meaning issues, or offer explicit guidance for constructing a stronger argumentative structure.

These limitations, however, should be seen as reflective of the constraints within the pedagogical context such as the cognitive challenges of reviewing multiple scripts and prioritizing comprehension over surface-level refinement rather than inherent flaws in manual correction itself. Given more time or the adoption of a more systematic correction approach, a teacher could address mechanical issues more thoroughly without compromising the focus on deeper meaning that makes manual correction so valuable.

The Two Methods Are Complementary, Not Competing

The primary insight derived from this analysis is that Grammarly and manual correction are not mutually exclusive but rather complementary tools designed to address different dimensions of the same task. Grammarly excels in managing the systematic and mechanical aspects of writing correction, offering fast, consistency, and a high level of accuracy within its operational scope.

In contrast, manual correction addresses the interpretive and discourse-level complexities that algorithmic tools are inherently unable to produce.

For EFL learners with lower levels of proficiency where grammatical and mechanical mistakes, and fundamental organizational challenges are prevalent manual correction proves to be a more impactful intervention. It effectively addresses the core issues that hinder the clarity and efficacy of their writing. Conversely, for more advanced writers whose writing is already characterized by surface-level accuracy, Grammarly may suffice as a tool for final-

stage refinement, detecting and resolving residual mechanical errors following the drafting process.

In actual practice, an optimal feedback workflow would integrate Grammarly as a preliminary screening tool. By allowing students to independently correct surface-level errors before receiving teacher feedback, automated correction can enhance efficiency. Manual correction, then, can be reserved for addressing higher-order concerns such as coherence, organization, and the precision of meaning. This dual approach not only capitalizes on the strengths of both automated tools and human judgment but also provides a valuable pedagogical advantage. Students who have resolved basic linguistic errors on their own are better equipped to focus on and benefit from nuanced teacher feedback aimed at refining deeper dimensions of their writing.

Discussion of the Research Questions and Hypotheses

Question One

The first question was set to gain insights into the extent to which Grammarly improves EFL learners' paragraph writing performance in terms of grammatical accuracy, lexical diversity, and overall coherence.

The results obtained from the comparative analysis of five student paragraphs revealed a detailed picture of Grammarly's effectiveness. Using a standardized five-criterion rubric scored from one to two per criterion, with a maximum of ten points, Grammarly received an average total score of 5.6 out of 10, compared to 7.0 out of 10 for manual correction. This quantitative difference suggests a general advantage for human feedback, but it hides significant variation in individual writing dimensions that deserve detailed examination.

In terms of grammatical accuracy, Grammarly performed reliable performance in addressing rule-based, surface-level grammatical errors. It consistently corrected subject-verb agreement errors, standardized word forms, spelling errors, and basic article omissions. These

errors align with what Koltovskaia (2020) and Ranalli (2018) describe as suitable for pattern-matching algorithms because they are predictable and rule-based.

The questionnaire data supported this finding, with 35% of respondents identifying grammar as the primary area in which Grammarly helps them, and 20% citing spelling and punctuation. This combined feedback made up the majority of perceived assistance. However, Grammarly mainly focused on morphological and easily recognizable errors. Complex structural issues, such as tense errors that required discourse-level temporal analysis, remained unaddressed, which reduced Grammarly's grammatical accuracy score compared to manual correction. This suggests that while Grammarly improves some aspects of grammatical accuracy, its help is limited and surface-level.

Regarding lexical diversity, Grammarly's impact on lexical range was the most limited among all criteria. The tool effectively corrected word-form errors and accountability errors but struggled with contextually inappropriate word choices. Several phrases that were grammatically well-formed but semantically incoherent were left uncorrected, and in some cases Grammarly suggestions caused new errors.

Manual correction, which considered the student's intended meaning, improved ambiguous sentences into clearer academic expressions. These semantic interventions reflect a level of lexical competence that automated tools currently cannot achieve.

The most significant finding related to coherence and cohesion, where the difference between methods was very clear. Manual correction scored 1.3 out of 2 compared to Grammarly's 0.7 out of 2, representing a significant advantage. Grammarly did not improve coherence for any of the five participants; there were no added transitional devices or logical connectors, and no attempt was made to reorganize ideas in a coherent way.

This limitation stems from sentence-level tools that assess text in isolation, failing to understand the relationships between sentences.

This limitation is inherent to sentence-level tools that evaluate text in isolation without the capacity to consider inter-sentential relationships, which is consistent with Koltovskaia's (2020) characterization of automated writing evaluation tools functioning below the level of discourse, and Ranalli's (2018) finding that tools like Grammarly show no impact on cohesion measures. The questionnaire reinforces this point: only 15% of students identified organization and coherence as areas where Grammarly helps them. In contrast, manual correction significantly transformed disconnected texts through discourse-level restructuring, operating at the precise level at which coherence is constructed and evaluated.

Concerning paragraph organization, Grammarly scored 0.6 out of 2, leaving all structural weaknesses intact, including absence of topic sentences, weak supporting details, and missing conclusions. Manual correction, scoring 1.2 out of 2, successfully reorganized paragraphs into clear introductions, body sections, and conclusions, particularly for participants whose original texts had no recognizable structure.

The only area where Grammarly performed better than manual correction was mechanics, demonstrating near-perfect accuracy in spelling, capitalization, and punctuation corrections. This confirms Grammarly's effectiveness as a surface-level proofreading tool while highlighting its limits to address deeper writing aspects.

It can be concluded that Grammarly does improve EFL learners' paragraph writing performance, but only within a narrow and well-defined area: surface-level grammar, spelling, and mechanical correctness. Its contribution to lexical diversity is minimal, and its contribution to coherence is effectively absent.

As a consequence, the first hypothesis, which states that EFL learners using Grammarly will demonstrate improved grammatical accuracy, lexical diversity, and coherence in their paragraph writing, is partially confirmed.

The findings support improved grammatical accuracy and mechanics, but the hypothesis is rejected regarding lexical diversity, coherence, and paragraph organization. Grammarly's improvements are confined to rule-based features rather than constituting a comprehensive improvement in writing quality.

Question Two

The second research question explored how students at Chadli Bendjedid University perceived Grammarly as a writing tool and how they integrated its automated feedback in their writing. The questionnaire data revealed a positive perception but nuanced picture that aligns closely with patterns reported in the broader literature on student attitudes toward automated writing evaluation (Dikli, 2006; Ranalli, 2018).

A significant majority of 65% rated Grammarly as effective or very effective as a writing support tool, while only 10% considering it ineffective. This positive evaluation is further corroborated by the finding that 77.5% of students agreed or strongly agreed that Grammarly helps them learn from their mistakes while writing, and 72.5% reported improved self-editing skills.

Students' positive perceptions are mainly linked to Grammarly's surface-level features, precisely the same area where the comparative paragraph analysis demonstrated its objective effectiveness. The connection between perceived and actual usefulness in this area represents a notable finding: learners appear to have set their expectations appropriately, at least in the mechanical aspects of writing.

However, students' perceptions also recognize awareness of Grammarly's limitations. When asked where Grammarly mainly helps them, only 15% identified organization and coherence, while 35% pointed grammar and 20% spelling and punctuation.

This distribution matches the results of the comparative analysis, indicating that students are aware that Grammarly's usefulness focuses on surface-level features rather than

higher-order writing skills. Furthermore, 30% of respondents reported in the open-ended questions that Grammarly's suggestions do not always match the context, while another 35% highlighted the free version's limitations as a primary constraint, indicating awareness that the tool's full potential are restricted.

The data on how students interact with Grammarly's suggestions are theoretically significant. Instead of passive acceptance, many students engaged critically. About 35% of respondents reported that they often reject suggestions that do not fit their intended meaning, and an equal 35% reported modifying suggestions to better match their voice or style. Only 17.5% reported always accepting suggestions uncritically. This finding counters a common concern in the automated writing evaluation literature that AI feedback tools create passive or unthinking learners and supports Warschauer and Grimes' (2007) observation that learners aware of a tool's limitations tend to engage more actively with its output. The qualitative data reveal tensions in this integration process, as 30% of respondents who rejected suggestions cited changes to writing tone and style as their primary reason, with some participants mentioned that Grammarly makes their writing sound impersonal and unlike their own voice.

Another important finding related to Grammarly's impact of Grammarly on writing confidence. The results revealed that 62.5% of respondents agreed or strongly agreed that Grammarly boosts their confidence in writing in English. This is consistent with research on writing anxiety in EFL contexts (Cheng, 2004; Kassim & Ng, 2014), which identifies non-judgmental, automated feedback as a potentially anxiety-reducing, especially for students who feel self-conscious about receiving human correction. The non-evaluative nature of algorithmic feedback appears to create a psychologically safe space for experimentation, which may support the development of writing fluency even where it does not directly address higher-order skills.

It can be concluded that EFL learners perceive Grammarly as a useful tool primarily for mechanical and basic grammatical correction, and they integrate its feedback with moderate criticality rather than accepting it directly.

Thus, the second hypothesis, which claims that EFL learners perceive Grammarly as a useful writing tool and successfully integrate its automated feedback into their writing process with higher rates of acceptance for grammatical corrections, is validated for perceived usefulness and grammatical correction acceptance, but qualified by the finding that integration is selective rather than uncritical. Students do perceive Grammarly as useful, and the most engage with its feedback in a reflective and selective manner. The qualitative evidence strongly suggests that students are more receptive to grammatical and mechanical corrections, which they can evaluate against clear rules, than to suggestions involving style or semantic, which is broadly consistent with the main claim of the hypothesis.

Question Three

The third question addressed whether sustained Grammarly use leads to improvement in independent writing without relying on the assistant tool.

The questionnaire findings present a mixed and somewhat contradictory view of developing independent writing skills. They suggest that Grammarly's role in promoting independence is limited and variable across learners. The most relevant data indicate that students' ability to self-edit without the tool has become somewhat better (40%) or much better (33%) after regular Grammarly use. Furthermore, 35% stated that they apply grammar rules learned through Grammarly when writing without the tool, and 20% reported noticing errors they would have previously missed. These findings suggest that Grammarly functions as a form of implicit grammar instruction, raising learners' awareness of certain error patterns and rules, a function that aligns with Vygotsky's (1978) concept of scaffolding, where external support facilitates skill development that may eventually be internalized.

However, this positive view is complicated by other findings. Only 35% of students agreed or strongly agreed that they can apply Grammarly's feedback when writing without the tool, while 33% remained neutral and 22% disagreed. This shows that many learners find the transition from using the tool to writing independently uncertain or incomplete. The neutral responses are especially revealing: it suggests that many students have not yet developed the metacognitive awareness needed to independently identify and correct errors that Grammarly previously flagged for them. Moreover, 20% of users reported feeling less confident when writing without the tool, which raises the question of whether Grammarly has functioned as a genuine scaffold that is progressively removed as skills develop, or as a support on which some learners rely on. This distinction is pedagogically significant because scaffolding, properly understood, is designed to become redundant as the learner internalizes the supported skill (Vygotsky, 1978; Wood, Bruner, & Ross, 1976), whereas dependency represents the opposite trend.

The Likert-scale data add important depth to this picture. The statement stating that Grammarly helps students learn from their mistakes while writing attracted the highest agreement across all five items, with 77.5% of students agreeing or strongly agreeing. The item concerning improved self-editing ability was similarly positive, with 65% in agreement. However, the question regarding whether students can apply Grammarly's feedback when writing without the tool yielded a substantially more cautious response: only 35% agreed or strongly agreed, while 33% were neutral and 22% disagreed. The gap between perceived learning in the moment and the ability to transfer that learning independently is well documented in second language acquisition research and is consistent with the distinction Krashen (1982) draws between acquisition, understood as internalized and automatic competence, and learning, understood as conscious monitored knowledge that requires external support for activation.

The qualitative responses provide more evidence of this pattern. Among those who reported real improvements, 17.5% noted gains in grammar, spelling, and vocabulary; 12.5% reported enhanced self-correction ability; and 10% described themselves as more independent writers. However, 15% described the impact as insufficient, and a further 15% attributed the absence of change to infrequent use. The finding regarding frequency is important: it indicates that Grammarly's potential improvement is contingent on consistent and sustained engagement. Inconsistent use may lead to immediate corrections without producing the repetitive exposure required for internalization. Furthermore, the comparative analysis demonstrated that even when Grammarly corrects a text, the result often remains organizationally and coherently deficient, meaning that a student who internalizes Grammarly's feedback as constituting good writing may develop a truncated understanding of writing quality one that prioritizes mechanical correctness over structural coherence, logical flow, and semantic precision.

It can be concluded that while Grammarly contributes to error awareness and some rule learning, its ability to foster independent writing skills is limited and distributed among learners.

Therefore, the third hypothesis, which states that sustained Grammarly use leads to significant improvement in independent writing skills without relying on the assistant tool, is partially confirmed. The majority of students report perceived improvements in self-editing ability and the transfer of grammar rules to independent writing contexts, providing a positive support development. However, the evidence also reveals a notable gap between perceived learning and actual autonomy: only 35% of students felt confident applying Grammarly's feedback without the tool, 20% reported reduced confidence in its absence, and a significant non-response rate on the longitudinal impact question suggests that self-reported improvements may indicate awareness rather than productive internalization. The hypothesis is confirmed in

its directional claim Grammarly use is associated with perceived writing improvement but the extent and depth of that improvement, particularly regarding to advanced writing skills, remain insufficient to support a claim of comprehensive independent writing development. The evidence points toward Grammarly as a tool that supports gradual surface-level improvement when used consistently, but does not, on its own, cultivate the discourse-level competence required for full writing autonomy in academic EFL contexts.

Discussion of the Hypotheses

The findings of this study provide a distinct assessment of the three hypotheses formulated at the beginning of the research. The first hypothesis, which anticipated that Grammarly use will improve grammatical accuracy, lexical diversity, and coherence, is only partially confirmed.

The research shows that Grammarly addresses surface-level grammatical and mechanical errors consistently, which supports the hypothesis's grammatical accuracy component. However, the hypothesis is rejected in terms of lexical diversity and coherence, as the tool provided no significant improvement in either category.

Grammarly operates at the sentence level and is unable to address the inter-sentential and discourse-level features that ultimately determine academic writing quality. This significant limitation is revealed by the notable difference in coherence and paragraph organization scores between Grammarly and manual correction.

The second hypothesis, which suggested that EFL learners perceive Grammarly as a useful writing tool and integrate its feedback with high acceptance rates for grammatical corrections, is mostly validated. The questionnaire data confirm strong positive opinions and a tendency of critical, selective engagement with suggestions rather than passive acceptance.

Crucially, students show more receptivity to grammatical and mechanical feedback than to stylistic or semantic suggestions exactly the area where Grammarly's objective

effectiveness is highest. A level of metacognitive awareness that is encouraging from a pedagogical standpoint is shown in this alignment between perceived and real use. The findings that integration is reflective and selective rather than random, which ultimately represents a more desirable outcome from a learner autonomy perspective, qualifies the hypothesis.

There is only partial confirmation of the third hypothesis, which claimed that sustained use of Grammarly improves independent writing significantly without tool reliance.

While most of students report increased error awareness and some transfer of grammar rules to unassisted writing, the evidence also shows a concerning dependency effect: a significant proportion of learners feel less confident writing without the tool, and only 35% report being able to apply Grammarly's feedback in independent contexts.

The gap between perceived learning and actual transfer suggests that Grammarly functions as a surface-level scaffold rather than a trigger for deep writing internalization. The hypothesis is directionally supported, but it is not confirmed in terms of the depth and comprehensiveness of independent writing development. In sum, across all three hypotheses: The findings consistently show that Grammarly's contributions are meaningful but restricted: reliable at the mechanical level, limited at the discourse level, and dependent on the extent of autonomous skill development.

Recommendations for Future Research

The results of this study, along with its recognized limitations, open several productive directions for future academic research. The recommendations provided aim to assist researchers in exploring areas that address the highlighted gaps and contribute to advancing the understanding of AWE in EFL writing instruction.

- Grammarly should serve as a pre-submission resource for identifying mechanical and basic grammatical errors, but it should not replace the valuable feedback provided by teachers.

- Teacher feedback should focus intentionally on aspects that Grammarly cannot effectively address, such as coherence, organization, and semantic precision, rather than revisiting surface level issues that the tool has already flagged.
- Students should be encouraged to critically assess Grammarly's suggestions, as the tool's corrections can sometimes change the intended meaning or introduce new errors.
- Writing instruction should place clear emphasis on teaching crucial elements of paragraph organization, including topic sentences, transitional phrases, and conclusions, as these are areas automated tools typically overlook
- Future research should employ pre and post-tests with both control and treatment groups over a full semester or year to draw stronger causal conclusions about Grammarly's effects on EFL writing proficiency and to determine whether observed performance trends persist, intensify, or decline with continued AWE exposure.
- A systematic comparison of Grammarly's free and premium versions is required to assess whether the stated restrictions are caused by the tool itself or its limited functionality.
- Such research is crucial for clarifying the link between AWE usage and the development of authentic language competence, distinguishing it from mere performance focused on achieving textual correctness.
- Cross-cultural study with learners from various L1 backgrounds could assist identify whether the findings are universal or context-specific. Particular emphasis should be paid to Arabic-French bilingual learners and how interference patterns from both languages are addressed via automated versus

manual feedback would offer a valuable and distinctive contribution to the field of second language acquisition and educational technology

- Studies should explore the ideal teaching conditions for effectively incorporating Automated Writing Evaluation (AWE) tools into writing instruction.
- Comparative Studies assessing structured AWE integration, in which students are explicitly taught to analyze automated input, with unstructured use.
- Investigations into the effects of periodic, unassisted writing assignments can encourage learners to minimize the reliance effects on AWE tools highlighted in the current study.

Suggestions for further studies

- The findings and limitations of the present study highlight several areas that deserve further investigation. Therefore, future researchers are encouraged to consider the following recommendations:
- Conduct longitudinal studies involving larger samples and extended periods of monitoring to investigate whether the effects of Grammarly on writing development are maintained over time and if sustained use leads to more writing independence.
- Compare different feedback conditions by investigating the effectiveness of manual, Grammarly, and a combination of both in order to find out which one is more effective for improving EFL learners' writing quality.
- Examine the premium version of Grammarly and compare it with the free version to determine whether advanced features, including suggestions on style, clarity, and tone, can better address higher-order writing concerns.

- Evaluate Grammarly against other Automated Writing Evaluation (AWE) tools such as ProWritingAid or Writing Mate, to assess potential strengths and weaknesses of different technologies in EFL writing teaching.
- Investigate learners' cognitive processes while they are using Grammarly with the help of think-aloud protocols, screen recordings, or interviews, in order to understand how learners interpret, accept, modify, or reject automated feedback.
- Explore proficiency-level differences by investigating the effects of Grammarly on beginner, intermediate, and advanced EFL learners to determine which group(s) benefit most from automated feedback
- Conduct cross-cultural and cross-linguistic research among learners from different linguistic backgrounds to see if the effectiveness of the Grammarly is influenced by the learner's first language and educational contexts.
- Investigate pedagogical integration strategies through explicit instruction on critical evaluation of automated feedback and on the benefits of regular unassisted writing tasks to reduce learner reliance on AWE tools.
- Examine the connections between Grammarly and broader academic literacy skills, such as argumentation, critical thinking, source integration, and genre awareness, to ascertain whether automated feedback supports general academic writing proficiency.
- Conduct replications of this study with larger and more diverse samples across different institutions to improve the generalizability of the findings and provide stronger evidence regarding the role of Grammarly in EFL writing instruction.

Limitations of the Study

Several limitations constrain the interpretive reach and generalizability of this study's findings. These are acknowledged transparently to guide the interpretation of conclusions and to inform the design of future replications.

Sample and Generalizability

The comparative paragraph analysis was based on a sample of five student submissions drawn from a convenience sample of 40 participants at a single institution. While the qualitative depth of the paragraph analysis is considerable, the small sample size substantially limits statistical generalizability across EFL populations. Findings reflect a specific institutional context Chadli Bendjedid University and cannot be assumed to extend without modification to EFL learners in other institutional, national, or linguistic environments. Replication with larger and more diverse samples across multiple institutions is required before broader generalizations can be advanced.

Methodological Limitations

The data from the questionnaire are self-reported and consequently subject to social desirability bias, particularly regarding topics like writing independence and reliance on automated tools. Students may have framed their use of Grammarly in ways aligned with perceived academic standards rather than reflecting their actual practices. Moreover, the study did not utilize a longitudinal design with controlled pre- and post-test writing assessments, which would be necessary to draw strong causal conclusions about Grammarly's role in writing development. Consequently, the evidence for improvement in writing relies on a comparative analysis of individual corrected texts and retrospective self-evaluations rather than on objective longitudinal measurements.

The scoring rubric allowed a maximum of 2 points per criterion, potentially limiting score variability and reducing the ability to detect subtle qualitative differences between correction methods. Additionally, inter-rater reliability for coding qualitative responses in the

open-ended questionnaire was not formally assessed, which constitutes a methodological shortcoming. Future studies should address this limitation by employing reliability measures such as Cohen's Kappa or equivalent consistency statistics.

Grammarly-Specific Limitations

The study focused on the free version of Grammarly. The premium version provides significantly enhanced features, such as suggestions for style, tone, clarity, and engagement, which could potentially yield notably different outcomes in the higher-level writing aspects where the free version showed limited effectiveness. Consequently, any conclusions about Grammarly's shortcomings should be interpreted as specific to the free version's capabilities and not generalized without proper context to the premium or enterprise versions, or to other automated writing evaluation tools with varied algorithmic functionalities.

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Appendices

Appendix A

Student's Writing Tests

Level: Second year University students

Time: 30 minutes

Module: Writing Expression

Instructions:

Write a well-organized paragraph of 120–150 words about the given topic.

Topics:

The importance of Artificial intelligence In language learning for group one .

A birthday celebration for group two.

Note: Below there are 5 sample writing paragraphs from the first and second groups.

Participant 2

One reason AI is important in academic settings is that it helps students learn effectively. It can adapt a lesson to match a student's level of learning, this helps them understand difficult subjects and improve their academic performance. In addition, AI support teachers and researchers in their work too. It can help with organizing academic materials and lessons which ~~helps~~ ^{affects} the teacher to focus more on teaching and guiding students. It makes ~~research~~ academic research more efficient for researchers by analyzing large amounts of data quickly.

In conclusion, artificial intelligence plays

Participant 7

Student and teachers is many way.

Today, technology helps people work,
beginning easier and faster.
~~AI is very useful in school.~~

~~Students can use AI for learning~~
~~and work. AI can help students~~
~~think better and save time.~~ AI is
important because it help students
solve problems, find informations,
and learn by themselves.

AI help students solve problems.

For example, students can ask AI
for answer or ideas. IA can
show many ways to do work.

~~AI can help students think~~

this help students think and
understand better.

AI help students find ~~any think~~
information. Students can ~~help~~
use AI to search fast for ~~the~~
homework or projects. ~~in the class~~

AI can show many examples and
ideas. ~~and information~~ This make
students work easy and fast.

AI help students ~~the way~~ ~~learning~~ learn by themselves. Students can use AI any time, no need teacher every time, ~~and~~ AI can give tips and advice. This make students ~~work easy and fast~~ ~~AI help students learn by themselves~~ ~~students can~~ more independent.

In conclusion, AI is very useful in academic setting. It help students solve problems, find information, and learn alone. if students use AI correctly, school is easy and good.

Participant 8

AI :

The importance of AI:

Technology is a Artificial intelligence. ^{Settings :}
It plays an important role in academic settings today. It helps students and teachers in many ways. Students use

AI to search information, to understand lessons and to write homeworks. This make the study more easy and more fast.

In universities, AI can help teachers to prepare lessons and correct ex. It ~~helps~~ also helps to organize the time. prepare exercises and to find new ideas. ~~AI~~ AI make learning ~~to~~ ~~the~~ to teachers more easy and less effort and can help them in work.

Also AI has a many advantages to the students, it helps them to understand and summarize difficult ~~less~~ ~~less~~ lessons.

image
not today

Participant 31

- In 03 March 2022 I when I turned 17
it is the first time, I had my first Birthday party
and this day is very special, because my family
surprised me, and ~~the wife of my brother~~
My birthday is a gift I give myself
every year. The gift of peace.
there is no fanfare or grand plans, just
a space of silence to breathe, I remember
how I have changed, and I dream a little of
what is to come, Messages from loved ones
arrive ~~is to come~~ like gentle taps
on the window of my soul.
It is my favorite day because it is my truest
day.

Participant 40

- Life is full of experiences and emotions, that can be a memory's, it can be happy or sad moment, one of this is my birthday which was joyful and full of happiness, cause of family gathering, sharing special moments and having many souvenirs.

I enjoy looking at my small family celebrating and being together, being happy, share feelings, looking at each other smile, and this is the main point and goal for my birthday which is family reunion with lot of happiness.

My birthday is a special day cause of the special moments that I share with friends, family, and relatives. Such as cutting cake, that I had a special one with it, it was a funny moment when they tried to push my head to the cake and instead of that I hit the table. All of them was laughing out loud. and what a joyful time was it.

Appendix B

Students' Questionnaire

Dear Participant,

This survey is a part of a master dissertation entitled “Investigating the effectiveness of Grammarly in improving EFL learners’ paragraph writing” to gather information about your experiences and perceptions related to using Grammarly in paragraph writing at Chadli Bendjedid University. Your responses will help us better understand how digital tools like Grammarly support EFL learners in improving their writing skills. The questionnaire is completely voluntary, and all answers will be treated with strict confidentiality. There are no right or wrong answers, so please answer as honestly and accurately as possible. It should take approximately [insert estimated time, e.g., 10–15 minutes] to complete.

Thank you for taking the time to participate in this questionnaire

Title: Investigating the effectiveness of Grammarly in improving EFL learners’ paragraph writing.

Section 1: Background Information (Close-ended)

1. Have you used Grammarly before this academic year?

☐ Yes ☐ No

2. Which version of Grammarly do you mainly use?

☐ Free version

☐ Premium version

☐ Not sure

Section 2: Grammarly Usage Habits (Close-ended)

3. How often do you use Grammarly when writing paragraphs in English?

- ☐ Always
- ☐ Often
- ☐ Sometimes
- ☐ Rarely
- ☐ Never

4. At which stage do you usually use Grammarly?

- ☐ While writing
- ☐ After finishing the paragraph
- ☐ Both

5. Grammarly mainly helps me with:

- ☐ Grammar
- ☐ Spelling and punctuation
- ☐ Vocabulary choice
- ☐ Sentence structure
- ☐ Organization and coherence

Section 3: Interaction with Grammarly Feedback

6. How do you typically respond to Grammarly's suggestions during the writing process?

(Select all that apply)

- ☐ I always accept them
- ☐ I often reject them if they don't fit my ideas
- ☐ I modify them to better match my voice or style
- ☐ I ignore them and continue writing

☐ Other (please specify): _____

•Section 4: Grammarly and Writing Independence

7• Please indicate your level of agreement with the following statements:

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

23. Grammarly helps me learn from my mistakes while writing.

24. I can apply Grammarly's feedback when I write without using the tool.

25. Using Grammarly has improved my ability to edit my own writing.

26. Grammarly increases my confidence in writing paragraphs in English.

27. I feel that I rely too much on Grammarly when I write.

8. After using Grammarly regularly, how has your ability to self-edit without the tool changed?

☐ Much better

☐ Somewhat better

☐ No change

☐ Somewhat worse

☐ Much worse

9. When writing without Grammarly now, do you find yourself: (Check all that apply)

☐ Noticing errors you would have missed before

☐ Applying grammar rules Grammarly taught you

☐ Structuring paragraphs more carefully

☐ Feeling less confident

☐ No difference in my writing process

Section 5: Overall Attitudes and Evaluation

10. Overall, how would you rate Grammarly as a writing support tool?

☐ Very effective

☐ Effective

☐ Neutral

☐ Ineffective

☐ Very ineffective

Open-ended question:

11. In your opinion, does Grammarly help you become a better independent writer?

Explain your answer.

.....
.....

12. What are the main advantages of using Grammarly in paragraph writing?

.....
.....

13. What are the main limitations or problems you face when using Grammarly?

.....
.....

14. Has using Grammarly changed how you approach the writing process itself (e.g., drafting, revising)? If yes, how?

.....
.....

15. Describe a recent time you rejected a Grammarly suggestion. Why did you reject it?

.....
.....

16. Have you noticed any changes in your writing independence or self-editing after using Grammarly repeatedly? If yes, what are this changes?

.....

.....

17. Do you think Grammarly should be integrated into EFL writing courses? Why or why not?

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