Grammarly: Effects on the Senior High Students' Writing Performance

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Abstract

Academic writing remains a persistent challenge for many Senior High School students, often resulting in underperformance in structured outputs such as article critiques, research reports, and position papers. With the growing use of artificial intelligence (AI) in education, tools like Grammarly offer immediate, automated feedback on grammar, syntax, and clarity. This study aimed to determine the effects of Grammarly on the writing performance of Grade 11 students at Sulangon National High School, specifically assessing its impact across three academic writing tasks. A quasi-experimental pretest-posttest nonequivalent group design was used, involving students from the STEM and HUMSS strands. The experimental group used Grammarly during writing tasks, while the control group received traditional teacher feedback. Pretest and posttest outputs were evaluated using the AAC&U Written Communication Rubric, and data were analyzed using paired and independent samples t-tests at a 0.05 significance level. Results showed that the experimental group demonstrated significant improvement, particularly in the research report task, with a mean gain of over two points. These findings suggest that AI-assisted feedback enhances self-directed revision and writing performance. The study recommends integrating Grammarly as a supplementary instructional tool to support teachers and improve student outcomes in academic writing.

Chapter 1
THE PROBLEM AND ITS SCOPE
Introduction
Mastery of English grammar is essential for Senior High School students, especially as they are expected to produce structured academic outputs such as research reports, article critiques, and position papers. However, many still struggle with grammatical accuracy, coherence, and sentence construction—challenges that affect their overall writing performance (Singh et al., 2017; Dawson et al., 2018). These persistent issues highlight the need for innovative instructional support in grammar and writing.

Grammarly, an AI-powered writing assistant, addresses these challenges by offering real-time grammar, syntax, and clarity feedback. Its accessibility and immediate, personalized suggestions empower learners to revise their work independently, bridging the gap left by delayed or generalized teacher feedback (Fitria, 2021; Dizon & Gayed, 2021; Huang et al., 2020; Al-Samarraie & Saeed, 2018).

Recent studies affirm Grammarly's potential to improve writing performance. Abendan et al. (2023) reported gains in grammar and sentence construction among Filipino students, while Kim-Phung (2023) and Alam et al. (2023) observed enhanced accuracy and clarity among learners in Vietnam and India. However, most of these studies focus on higher education or informal use, with limited evidence from structured Senior High School classrooms.

A few studies have targeted secondary education. For example, Jelita et al. (2023) found that Grammarly enhanced the writing performance of Indonesian high school students, especially in grammatical accuracy and structural coherence. Nonetheless, many such studies lack rigorous research designs, such as quasi-experimental setups or control group comparisons. Moreover, scholars like Barrot (2021) and Saricaoglu (2018) have cautioned that automated feedback tools may misinterpret contextual meaning or promote over-reliance, hindering the development of internalized grammar skills and higher-order writing abilities. In the Philippine context, where English serves both as a subject and medium of instruction, and where blended or resource-constrained teaching is prevalent, AI-based grammar tools like Grammarly may help address instructional gaps. However, empirical evidence on their effectiveness in improving writing performance within formal Senior High School settings remains limited, particularly in complex, subject-integrated writing tasks.

This study addresses that gap by investigating Grammarly's effects on the writing performance of Senior High School students. Specifically, it seeks to determine whether the tool functions as a grammar corrector and a pedagogical support that enhances self-directed learning, boosts writing confidence, and contributes to measurable gains in academic outputs. Anchored in a quasi-experimental framework, this research offers timely insights into integrating AI-driven writing assistants within K–12 English instruction and their potential to complement traditional feedback practices.

Theoretical / Conceptual Framework

This study is anchored on Constructivist Learning Theory and three complementary educational technology frameworks: the Substitution–Augmentation–Modification–Redefinition (SAMR) Model, the Technological Pedagogical Content Knowledge (TPACK) Framework, and Bloom's Digital Taxonomy. Collectively, these frameworks provide the conceptual lens through which the effects of Grammarly on the writing performance of senior high school students are examined.

At the core of this study is the Constructivist Learning Theory, developed by Jean Piaget (1952) and Lev Vygotsky (1978). This theory posits that learners actively construct knowledge through meaningful interaction, reflection, and feedback. It emphasizes autonomy, engagement, and real-time correction—principles that closely align with the self-directed learning fostered by Grammarly.

Supporting this alignment, Ghosh and Rahman (2023) assert that Grammarly's instant, actionable feedback promotes metacognition and reflective practice, enabling students to internalize grammar rules through iterative revision. Similarly, Qassemzadeh and Soleimani (2016) highlight Grammarly's role in fostering autonomous grammar correction—an essential component of constructivist classrooms. Selim (2022) further affirms that integrating tools like Grammarly can enhance intrinsic motivation and sustained engagement in writing development.

Building on this theoretical base, the SAMR Model by Ruben Puentedura (2014) categorizes technology integration into four levels: Substitution, Augmentation, Modification, and Redefinition. Grammarly moves beyond the lower tiers by offering more than a digital substitute for traditional feedback—it redefines writing instruction by enabling adaptive, immediate, and student-centered grammar correction. In a study on mobile-assisted writing, Dizon and Gayed (2021) demonstrated that Grammarly helped students make meaningful structural revisions in real-time, an outcome characteristic of the "Modification" and "Redefinition" levels of SAMR.

Complementing SAMR, the TPACK Framework introduced by Mishra and Koehler (2006) emphasizes the collaboration among Technological, Pedagogical, and Content Knowledge. Grammarly reflects this

integration by supporting effective grammar instruction through technology, while maintaining pedagogical intent and linguistic content. Barrot (2020) notes that Grammarly allows educators to deliver personalized feedback efficiently, particularly in settings where teacher feedback is constrained by time or workload.

To complete the theoretical scaffolding, Bloom's Digital Taxonomy, adapted by Andrew Churches (2009), positions Grammarly within higher-order thinking tasks. By encouraging learners to apply grammar rules, analyze structural patterns, and evaluate writing clarity, Grammarly facilitates the "Applying," "Analyzing," and "Evaluating" stages. Tusino, Villamero, and Lucman (2024) argue that such engagement with AI feedback nurtures critical thinking and improves student involvement in academic writing tasks.

Together, these frameworks reinforce Grammarly's pedagogical relevance in enhancing students' writing performance. Constructivism explains how students learn through reflection and revision; the SAMR and TPACK frameworks demonstrate how Grammarly transforms instructional processes; and Bloom's Digital Taxonomy captures the cognitive demands of real-time grammar correction and decision-making.

Accordingly, this study employs a quasi-experimental pretest-posttest design 10 involving two groups: an experimental group using Grammarly and a control group receiving traditional teacher feedback. Both groups complete academic writing tasks, including article critiques, research reports, and position papers. Performance is assessed using a standardized rubric, and the results are analyzed to determine whether Grammarly significantly improves writing performance compared to conventional methods.

The conceptual framework (see Figure 1) visually represents the relationship between the instructional methods, the writing tasks, and the resulting writing performance. This theoretical foundation guides the formulation of research questions, data analysis, and interpretation of findings throughout the study.

This schema illustrates the study's focus on comparing the effectiveness of Grammarly's AI-driven feedback system against the teacher-led approach to determine which method better enhances students' writing learning performance.

The conceptual framework illustrates the research process flow, anchored in a quasi-experimental pretest-posttest design 10. It begins with the respondents of the study, Senior High School students, divided into two groups. The control group receives traditional instruction, where teachers provide proofreading and detailed feedback on student outputs. The experimental group, on the other hand, uses Grammarly, an AI-powered writing assistant, as the intervention tool for automated grammar and style corrections.

The process starts with a pretest, which will be assessed using the Writing Proficiency Rubric, to establish the baseline writing skills of both groups. During the intervention phase, the control group relies on traditional grammar instruction and teacher-provided corrections, ensuring personalized feedback based on classroom interactions. Meanwhile, the experimental group utilizes Grammarly's advanced algorithms to independently revise and enhance their writing, with immediate suggestions for grammar, punctuation, and style improvement.

Following the intervention, both groups undergo a posttest, evaluated with the same rubric, to determine changes in their writing proficiency. The results are then analyzed to compare the effectiveness of traditional teacher feedback versus Grammarly in improving writing performance.

This conceptual framework emphasizes the relationship between the instructional method (independent variable)—either traditional feedback or Grammarly—and the respondents' writing proficiency (dependent variable). This structured approach allows for a comprehensive evaluation of how these instructional methods impact students' writing skills.
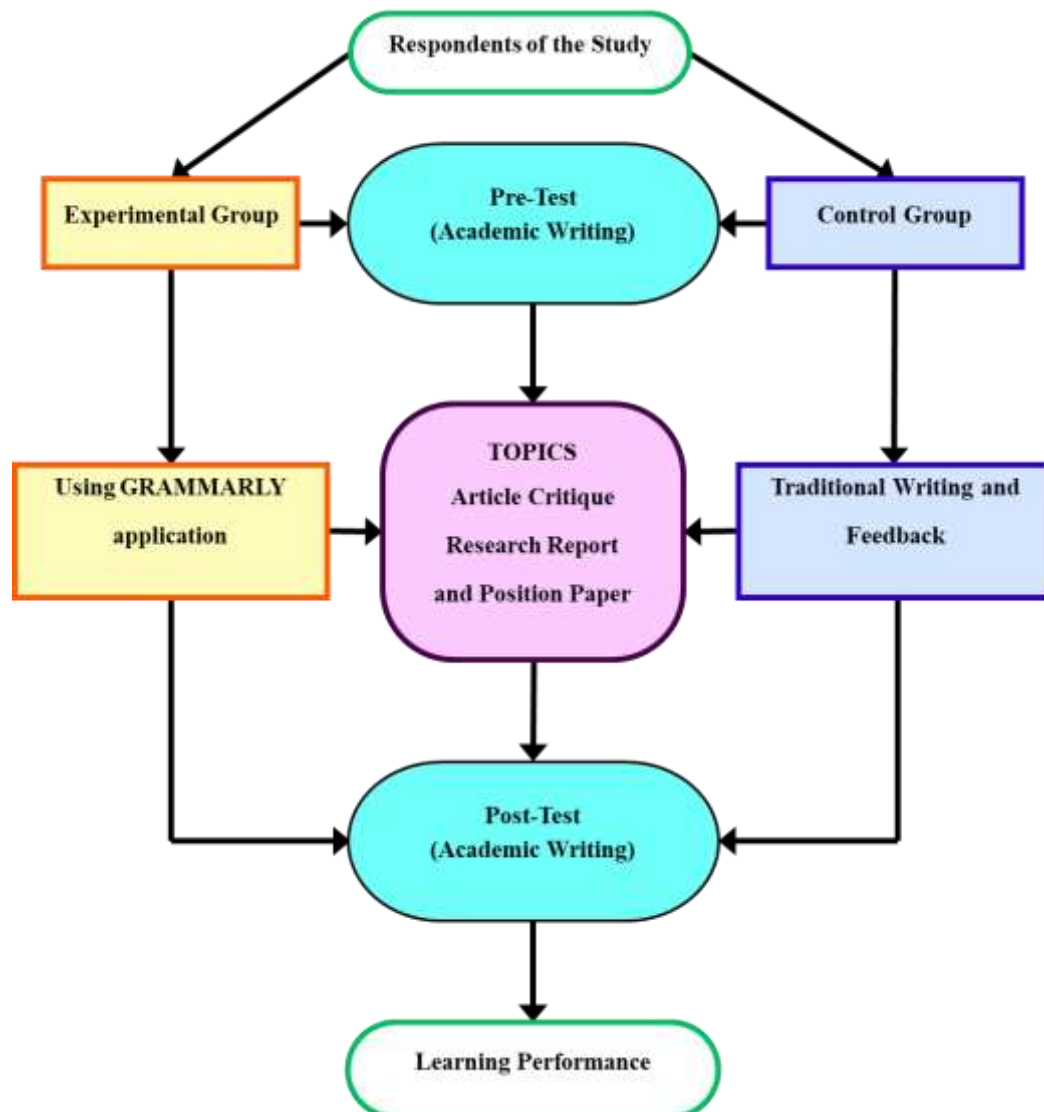
Figure 1 Conceptual Framework of Quasi-Experimental Pretest-Posttest Design 10

Statement of the Problem

This study aimed to determine the effects of using Grammarly as an application to improve the writing performance of senior high school students in English during the Academic Year 2023-2024.

Specifically, this study sought answers to the following questions:

1. What is the pretest performance of the students in the control and experimental groups?
2. Is there a significant difference in the pretest performance between the control and experimental groups?
3. What is the posttest performance of the students in the control and experimental groups?
4. Is there a significant difference in the posttest performance between the control and experimental groups?
5. Is there a significant difference between the pretest and posttest performance of the students in the control group?
6. Is there a significant difference between the pretest and posttest performance of the students in the experimental group?

7. Is there a significant difference in the mean gain performance obtained between the control and experimental groups?

Hypotheses

The following hypotheses were tested:

Ho$_1$: There is no significant difference in the pretest performance between the control and experimental groups.

Ho$_2$: There is no significant difference in the posttest performance between the control and experimental groups.

Ho$_3$: There is no significant difference between the pretest and posttest performance of the students in the control group.

Ho$_4$: There is no significant difference between the pretest and posttest performance of the students in the experimental group.

Ho$_5$: There is no significant difference in the mean gain performance obtained between the control and experimental groups.

Significance of the Study

This study is significant to the following stakeholders:

Senior High School Students. The study shows how Grammarly can help improve their grammar, structure, and overall academic writing through immediate, personalized feedback, building confidence and independence in writing tasks.

Teachers. The findings demonstrate how Grammarly can support traditional instruction by reducing the feedback workload and improving the quality of student outputs.

School Administrators. The results may inform decisions on integrating digital tools like Grammarly to enhance academic performance in writing-intensive subjects.

Curriculum Developers. The study offers evidence to support the inclusion of AI-assisted writing tools in curriculum planning, especially for grammar and composition instruction.

Future Researchers. This research provides a model for investigating AI tools in education and opens pathways for related studies in other subjects and levels.

Scope and Delimitation

The scope and delimitation of this research study defined its focus and ensured the study is feasible and manageable.

This study is delimited to investigating the effects of Grammarly on the writing performance of Senior High School students enrolled in the STEM and HUMSS strands at Sulangon National High School during the first semester of Academic Year 2023–2024. These strands were purposively selected to reflect varied academic orientations, while maintaining curricular consistency for fair comparison. Participants were identified through convenience sampling based on availability during the intervention period.

The investigation focused on three academic writing tasks: article critique, research report, and position paper. Each task required students to produce outputs of at least 1,000 words and at least three well-developed paragraphs. For both the pretest and posttest, the topics assigned were identical for all groups to ensure consistency in content, structure, and expectations. The primary distinction between the two

groups was the feedback mode: the experimental group received AI-generated feedback via Grammarly, while the control group relied solely on traditional teacher feedback.

Writing performance was assessed using the AAC&U VALUE Written Communication Rubric, which evaluates five key domains: Context and Purpose for Writing, Content Development, Genre and Disciplinary Conventions, Sources and Evidence, and Control of Syntax and Mechanics. This rubric was deemed appropriate for the current study as it provides a comprehensive, research-based framework for evaluating academic writing. It is also flexible and scalable, making it suitable for use at the Senior High School level, where students are expected to engage in structured academic writing tasks. The rubric emphasizes clarity, coherence, organization, and language control—core competencies targeted in senior high school outputs such as research reports, article critiques, and position papers. Furthermore, it offers a balanced approach to assessing both the technical and substantive aspects of writing, aligning well with the study's focus on writing performance rather than creativity or literary expression.

The study's scope was limited to writing outputs completed within the intervention period. It did not account for students' prior exposure to Grammarly or similar tools or examine other external variables such as reading proficiency, teacher feedback variability, or classroom environment. Aside from Grammarly for the experimental group, no additional digital platforms were integrated into the instructional process. These delimitations were established to ensure a focused, manageable, and objective analysis of Grammarly's impact on academic writing performance.

Definition of Terms

Clearly defining the key terms and variables used in this study ensures clarity, consistency, and credibility in interpreting the findings. The following operational definitions were adopted for this research:

Academic Writing. Refers to structured, formal writing tasks assigned in the academic curriculum. In this study, academic writing outputs include article critiques, research reports, and position papers produced by senior high school students, which were evaluated to determine the effects of Grammarly on their writing performance.

Article Critique. A type of academic writing that evaluates and analyzes a published article. In this study, students are tasked with identifying the article's strengths and weaknesses, assessing its arguments, and expressing well-reasoned insights while demonstrating critical thinking and adherence to academic writing conventions.

Control Group. This group of participants received traditional writing instruction without the integration of Grammarly. It is the baseline for comparison with the experimental group to measure the intervention's impact.

Experimental Group. This group was exposed to the intervention and used Grammarly as a tool for writing support. These students used the application while performing the same academic writing tasks as the control group.

Grammarly. An AI-powered digital writing assistant that provides real-time feedback on grammar, punctuation, sentence structure, and writing style. In this study, the experimental group uses Grammarly (premium) to revise and improve their outputs during the writing process.

Position Paper. A written work that presents a student's standpoint on a specific issue, supported by evidence and logical reasoning. In this study, the position paper assesses students' ability to argue persuasively, apply academic conventions, and structure their ideas coherently.

Posttest. The assessment was administered after the intervention and used to measure the writing performance of the experimental and control groups. It evaluates the impact of Grammarly and traditional teaching methods on student outputs.

Pretest. The baseline assessment was given before the intervention to both groups. It provides initial data on students' writing performance and allows for comparison with the posttest results.

Research Report. A formal written document that presents the results of an investigation conducted. It includes a clear introduction, methodology, findings, and conclusion. In the context of this study, the research report requires students to apply academic writing skills in organizing data, citing sources, and presenting ideas logically.

Senior High School Students. This refers to Grade 11 learners under the Philippine K–12 educational system. This study involves students from the STEM and HUMSS strands engaged in writing-intensive coursework.

Students' Writing Performance. This refers to the demonstrated ability of students to meet academic writing standards across the assigned tasks. This study measures this using rubric-based evaluations before and after the intervention, focusing on improvement resulting from Grammarly use.

Traditional Feedback – Refers to teacher-provided, post-submission feedback involving manual corrections, written comments, and face-to-face consultations. It emphasizes delayed, instructor-centered guidance typical of conventional classroom settings.

Traditional Writing Instruction – A classroom-based approach in which writing is taught through lectures, guided practice, and teacher-led correction. In this method, feedback is typically handwritten and provided after students complete their work.

Chapter 2
REVIEW OF RELATED LITERATURE

This chapter reviews literature and studies on the effects of digitized instructional materials on learning performance, focusing on cognitive, affective, and behavioral engagement. It progresses from basic concepts to key studies, with sub-headings examining each focus area in detail, showcasing both past and current information.

Global Use of AI-powered Educational Tools

Technology integration into education continues to be a growing trend, driven by the need to enhance teaching and learning outcomes. Despite significant advancements, many priorities for improving education remain unmet. Consequently, educators are increasingly turning to technology-enhanced approaches that are both safe and scalable. In their personal lives, many educators already use AI-powered tools such as voice assistants, grammar correction tools, and automated trip planners. As these AI tools become more accessible, educators are exploring how they can be leveraged to improve the learning experience.

One of the primary areas of focus for educators is using AI to support students with disabilities, multilingual learners, and others who require more personalized, adaptive learning tools. AI-powered technologies, such as speech recognition, are proving valuable in providing essential support to these groups. Furthermore, educators are investigating how AI can enhance lesson planning, content creation, and the selection and adaptation of teaching materials (Cardona et al., 2023). A growing body of research

across diverse global contexts suggests that AI tools are already making a noticeable impact on student performance, particularly in areas like writing performance.

For example, a study by Kim-Phung (2023) in Vietnam examined the integration of Grammarly, an AI-powered writing tool, in university-level English instruction. The results demonstrated significant improvements in student engagement and writing accuracy, primarily attributed to Grammarly's real-time error detection. This highlights the importance of immediate feedback in enhancing student writing. Similarly, a study by Alam et al. (2023) in India found that Grammarly helped ESL (English as a Second Language) learners significantly reduce grammar errors and improve the clarity of their writing. This case study emphasizes the effectiveness of AI tools in non-native English-speaking environments, broadening their impact beyond English-speaking countries.

Further research by Al-Shaboul et al. (2024) examined the impact of Grammarly on foreign language learners in the Middle East, revealing improvements in writing organization, style, and grammatical accuracy. This demonstrates the value of AI-powered tools in diverse educational settings, particularly in regions where English is not the first language. A case study by Marzuki et al. (2023) in Indonesia explored how AI writing tools, including QuillBot, WordTune, and ChatGPT, enhanced the quality of English as a Foreign Language (EFL) students' writing, particularly in terms of content and structure. The study concluded that these tools significantly improved coherence and structural clarity, although it recommended further research to examine their effectiveness in broader educational contexts and over extended periods.

These international studies underscore the broad global impact of AI-powered educational tools and set the stage for understanding their role in specific national contexts, including the Philippines. Research by Abendan et al. (2023) aligns with these findings, showing that Grammarly significantly improves Filipino students' grammatical competence and overall writing skills. This highlights the tool's effectiveness in non-native English-speaking countries, reinforcing the positive outcomes seen globally.

In addition to these studies, a systematic review by Raheem, Anjum, and Ghafar (2023) analyzed the transformative role of AI applications like Grammarly, Quillbot, and ChatGPT in improving academic writing. Their findings highlighted significant improvements in writing performance, especially in error correction, structure, and academic tone. Fitria (2021) further examined Grammarly's role as an AI-powered writing assistant for EFL students, finding that it serves as an effective tool for real-time corrections and personalized feedback.

Beyond writing performance, AI-powered educational applications are increasingly designed to enhance accessibility, engagement, and effectiveness across various learning contexts. These apps support diverse learning preferences by offering interactive simulations, quizzes, games, and multimedia content that adapt in real-time to individual progress and skill levels. For younger learners, such applications often focus on foundational skills like reading, math, and critical thinking, utilizing vibrant visuals and user-friendly interfaces to increase engagement and retention (Hirsh-Pasek et al., 2015).

In higher education, educational apps provide extensive study materials, collaborative features for group assignments, and real-time feedback systems that monitor academic progress. These tools support not only formal schooling but also continuous learning for professionals seeking to gain new skills or remain current in their fields (Al-Samarraie & Saeed, 2018). As such, educational apps contribute significantly to the adaptability of learning schedules, facilitate distance education, and encourage self-directed learning. In today's interconnected world, these apps foster autonomous study habits and critical digital literacy skills, shaping the future of learning (Walcutt & Schatz, 2019).

Research by Saricaoglu (2018) in China revealed mixed outcomes regarding automated writing evaluation (AWE) tools, such as Grammarly. Some students benefited from automated grammar feedback, while others disregarded it due to perceived inaccuracies. However, a broader analysis by Dizon and Gayed (2021) confirmed that AWE tools help reduce grammatical errors and improve writing organization, underscoring their potential as supplementary instructional resources.

The influence of mobile technologies in language education is also becoming increasingly prominent. Studies on mobile-assisted language learning (MALL) show that mobile applications significantly improve grammar instruction. Rustam, Rajendran, and Md Yunus (2021) observed that mobile application students demonstrated higher grammar test scores than those taught through traditional methods, although further quantitative research was recommended. Refat et al. (2020) also explored mobile learning's impact on grammar instruction and found that students using mobile applications performed better in grammar tests than those taught by conventional methods.

Furthermore, a study by John and Woll (2020) compared automated grammar checkers, finding that the NTNU statistical grammar checker outperformed the Microsoft ESL Assistant in detecting L2 English writing errors. This highlights the potential value of grammar checkers, despite their limitations, in improving grammatical accuracy in students' writing.

The impact of AI tools and educational applications on grammatical accuracy and student engagement is further emphasized by studies in the Philippines. Abendan et al. (2023) found that the use of Grammarly helped Filipino students significantly improve their grammatical proficiency by identifying errors in spelling, punctuation, and sentence structure. Similarly, Obsioma (2023) discussed how Grammarly's automated feedback helps Filipino researchers refine their written communication, underscoring the practical benefits of AI in academic writing.

In conclusion, the integration of AI-powered educational tools, mobile applications, and interactive technologies is reshaping the landscape of education. These tools significantly contribute to enhancing writing performance, particularly in non-native English-speaking countries. By providing real-time feedback and personalized support, AI technologies offer dynamic solutions for meeting the diverse learning needs of students. As such, the continued exploration and implementation of these technologies hold immense potential for improving teaching and learning outcomes worldwide.

Grammarly: An Educational Application to Improve Writing

Grammarly is widely recognized as a leading educational tool that improves writing quality by offering advanced grammar and style correction. Students, professionals, and educators extensively use it to enhance accuracy and clarity across various writing contexts, such as academic, professional, and creative writing. Grammarly's AI-powered features include grammar checking, plagiarism detection, and tone suggestions, which help users minimize errors and foster better communication skills (Benaiche & Ghodbane, 2023; Zinkevich & Ledeneva, 2021).

Founded in 2009, Grammarly has become a prominent online writing assistant. It provides real-time grammar and spell checking, style suggestions, and plagiarism detection, all aimed at improving the clarity and coherence of written content. The tool's versatility makes it a valuable resource for students and professionals. Available as a Google Chrome extension, Grammarly detects grammar and spelling mistakes, incorrect sentence construction, and plagiarism, making it an essential tool for error correction and rule learning.

Grammarly is especially beneficial for English as a Foreign Language (EFL) learners. It not only identifies grammar errors but also corrects pronunciation, punctuation, vocabulary usage, and plagiarism (Ghufron & Rosyida, 2018). As an assistive software, Grammarly analyzes uploaded text using sophisticated algorithms, pinpointing a wide range of grammar and style issues (Carter & Laurs, 2017). According to LornaMarie (2018), Grammarly is among the most accurate grammar checkers, and its plagiarism detection engine identifies similarities between texts and sources available on the internet (Gitsaki & Coombe, 2016).

Moreover, Grammarly's ability to detect weak paraphrases—where only minor text modifications are made—is particularly valuable in academic writing. Roughton et al. (2019) define Grammarly as a comprehensive online tool that aids in grammar checks, punctuation, vocabulary enhancement, and plagiarism detection. Its user-friendly interface makes it easier for students to edit their writing and identify common mistakes, which helps improve their writing over time (Tucker, 2015).

Grammarly's popularity in educational institutions worldwide stems from its ability to refine written assignments by identifying grammatical errors, providing contextual suggestions, and enhancing vocabulary. Research shows that Grammarly not only improves grammar but also enhances the overall coherence and structure of academic essays, making it an indispensable tool in higher education (Muhammad, 2024). Additionally, its integration into online writing courses on platforms like Coursera and edX highlights its role in digital learning environments, where students benefit from real-time, AI-driven feedback (edX, 2024; Coursera, 2024).

A study by Cauring et al. (2023) revealed that students value Grammarly for improving their research writing by enhancing grammar, clarity, and coherence. Avila et al. (2021) also found that Grammarly significantly improved the readability of students' texts, ensuring their work was not only grammatically correct but also easily comprehensible. This aligns with findings from Abendan et al. (2023) on Grammarly's positive impact on students' grammatical competence.

Despite its many advantages, Grammarly has limitations. Critics argue that overreliance on AI tools may diminish critical thinking and self-editing skills. However, when used as a complementary tool, Grammarly enhances the learning process by providing immediate feedback, allowing learners to correct mistakes and better understand grammatical rules (Barrot, 2021; Lipalam et al., 2023).

In the Philippines, Grammarly has gained significant traction in both academic and professional settings. Filipino students and educators increasingly use it to enhance English writing performance, particularly in higher education and business communication. The tool's adaptability to non-native English speakers is especially beneficial in the Philippines, where English is a second language. Grammarly's suggestions help bridge language gaps, improving communication skills among Filipino students and professionals (Soriano, 2024).

In conclusion, Grammarly's impact on education, both globally and in the Philippines, underscores its effectiveness in enhancing writing skills. Its widespread adoption in educational and professional settings highlights its role as a transformative tool in writing instruction. When integrated thoughtfully into the curriculum, Grammarly supports error correction, grammar learning, and the development of effective writing skills, making it an invaluable resource in today's digital age.

English Grammar Proficiency in Writing: Fundamentals and Common Mistakes

Mastering English grammar is essential for effective communication. It involves understanding various elements such as parts of speech, sentence structure, and punctuation, which work together to convey

meaning clearly and accurately. However, for many English learners, achieving proficiency in grammar remains a significant challenge. This challenge is often exacerbated by the interference of learners' native languages and by common grammatical errors that persist throughout the language-learning process.

Grammar Fundamentals

Grammar, as defined by Ramadhani and Ovilia (2022), is a fundamental aspect of language that governs the rules for structuring words, phrases, and sentences. It is essential for clear communication, as it ensures that words are placed in the correct order to convey intended meanings. As Fitria (2023) explains, grammar encompasses a set of rules that governs language use, from the arrangement of individual words to the formulation of entire sentences. These rules are essential in forming coherent and meaningful discourse, whether spoken or written.

A strong grasp of grammar begins with the understanding of the parts of speech, which serve as the building blocks of sentences. Parts of speech refer to how words are categorized according to their roles in a sentence, such as nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions, and interjections. Mastery of these parts is crucial because, as Maili et al. (2022) argue, understanding the morphology and structure of each part helps students form grammatically correct and meaningful sentences.

For instance, the word "book" can function as both a noun and a verb, depending on its placement in a sentence. Understanding such dual roles is vital for proper sentence construction. Similarly, the word "over" can serve as an adverb or a preposition, depending on context. Such nuances require learners to understand the correct use of words in relation to one another to avoid errors that could alter the intended meaning.

Sentence Structure and Subject-Verb Agreement

Another critical aspect of grammar is sentence structure. Sentence structure refers to how words are organized to form meaningful patterns. A foundational rule in sentence structure is subject-verb agreement, which dictates that the subject and verb must match in number (singular or plural). Ensuring subject-verb agreement is essential for clarity and coherence in communication.

There are different types of sentences, each serving a distinct purpose. These include declarative sentences, which state facts; interrogative sentences, which ask questions; imperative sentences, which issue commands; and exclamatory sentences, which express strong emotions. Additionally, the use of compound and complex sentences—which combine independent and dependent clauses—adds variety and depth to writing. These sentence types allow for more nuanced and sophisticated expression, enhancing the overall quality of communication (Schlesinger, 2019).

The Importance of Punctuation

Correct punctuation plays a crucial role in enhancing the clarity of written communication. Yakhontova (2020) highlights that punctuation marks, such as full stops, commas, semicolons, and question marks, help indicate the beginning and end of textual units, as well as connect ideas. Proper punctuation also adds emphasis and tone to the writing, influencing how readers interpret the message.

The misuse of punctuation marks, particularly commas, is common among learners, as it can lead to confusion regarding sentence boundaries and meaning. As noted by Mansouri (2016), errors in punctuation, such as overuse or incorrect placement of commas, can significantly impact the readability and clarity of a text. Similarly, Rismanti (2015) emphasizes that punctuation marks help eliminate ambiguity and facilitate comprehension by guiding readers through the text.

In the context of English as a foreign language (EFL), learners often struggle with punctuation due to differences between their native languages and English. Studies by Suliman et al. (2019) and Asogwa (2019) reveal that common errors include the incorrect use of commas, periods, and capitalization. These errors often arise from a lack of knowledge about punctuation rules, as well as the influence of the learners' mother tongues.

The Need for Targeted Grammar Instruction

To help learners overcome these challenges, it is essential to provide targeted grammar instruction that addresses both basic and advanced grammar concepts. Mastery of fundamental grammar, such as subject-verb agreement, the correct use of articles, and proper sentence structure, lays the foundation for more advanced grammatical proficiency. As learners progress, they should be encouraged to develop the ability to handle complex sentence structures, such as dependent and independent clauses, and use nuanced grammatical elements to enhance their writing (Burton-Roberts, 2021).

In addition, error analysis can be used to focus teaching efforts on areas where students struggle the most. For instance, a study by Sumalinog (2018) on Turkish high school students found recurring errors related to subject-verb agreement, misuse of articles, and tense confusion. By identifying these persistent issues, educators can develop targeted interventions to address them.

In conclusion, achieving proficiency in English grammar is essential for effective communication. It requires a comprehensive understanding of grammar fundamentals, including parts of speech, sentence structure, and punctuation. Additionally, learners must recognize and correct common grammatical errors that arise from their native languages or misunderstandings of English grammar rules. With targeted grammar instruction and error analysis, ESL learners can overcome these challenges, ultimately improving their writing and speaking proficiency. By focusing on both basic and advanced grammar concepts, educators can help students refine their language skills and become more confident in their ability to communicate effectively in English.

The Impact of Grammar on Writing Performance

Academic writing performance is a critical skill for students, particularly those majoring in English, as it enables them to communicate effectively within academic settings and to demonstrate a thorough understanding of their subject matter. Csizér and Tankó (2015) argue that mastering academic writing is essential not only for academic success but also for future professional endeavors. Strong writing skills allow students to express their ideas clearly and persuasively, which is vital for success in higher education and many careers. However, academic writing performance extends beyond merely mastering grammar rules. According to Hinkel (2015), it requires the ability to organize ideas logically, critically analyze information, and effectively communicate complex concepts. These competencies are essential for constructing well-reasoned arguments, presenting research findings, and engaging in scholarly discourse. Developing proficiency in academic writing is undoubtedly challenging, but it is indispensable for students who aim to excel both academically and professionally.

Research has shown that technology can play a significant role in enhancing language learning and improving writing skills. One notable technological advancement in this area is computer-assisted language learning (CALL), which provides students with tools for immediate feedback, self-correction, and increased language accuracy. Chen and Lee (2017) found that the use of grammar checkers significantly improved students' writing quality, particularly in terms of grammatical accuracy and complexity. Similarly, Zhang and Barber (2017) discovered that integrating online writing tools, such as

grammar checkers, into the writing process helps students enhance their language proficiency by offering real-time feedback and facilitating error correction. These tools provide a user-friendly and efficient means of guiding students through the learning process, making it easier for them to identify and correct mistakes as they write.

In the Filipino context, a study by Garcia and Hernandez (2019) examined the influence of grammar checkers on Filipino English major students. Their research found that the use of grammar checkers significantly improved students' awareness of grammatical rules and conventions. By providing immediate feedback on errors, these tools enabled students to make timely revisions and corrections, fostering greater accuracy in their academic writing. This research aligns with the broader trend in language education, where technology plays a pivotal role in supporting students' writing development. The ability to self-correct errors with the assistance of technology not only boosts students' confidence but also enhances their understanding of English grammar, thus contributing to overall academic writing performance.

Further exploration into the integration of technology with writing instruction reveals the benefits of combining grammar checkers with peer feedback. Li and Liu (2018) found that this combination, within an online writing environment, led to improved writing accuracy. Peer feedback encourages collaborative learning, allowing students to engage with each other's writing and provide constructive suggestions. This interactive process deepens students' understanding of language rules and enhances their ability to revise effectively. Moreover, Song and Kwon (2019) applied Vygotsky's Zone of Proximal Development (ZPD) theory to writing courses for English majors. Their study demonstrated that students' creative writing abilities improved when they received targeted guidance and feedback within their ZPD. The ZPD concept suggests that learners perform tasks more effectively when provided with appropriate scaffolding and support, which allows them to reach higher levels of competence.

From a cognitive perspective, Anderson and Choi (2020) examined the role of working memory in academic writing tasks within the ZPD framework. Their research showed that students' working memory capacity significantly influences their ability to engage in writing tasks with the necessary scaffolding. When students are supported within their ZPD, they are better able to manage the cognitive demands of writing, which leads to improved writing outcomes. The interaction between cognitive capacities, feedback, and scaffolding is crucial for optimizing writing instruction and fostering academic success.

Li and Wang (2018) further investigated the impact of online writing platforms integrated with grammar checkers, finding that immediate feedback contributed to substantial improvements in writing quality. This supports the ZPD theory by showing that timely interventions can enhance students' writing abilities. Similarly, Guo and Wang (2017) explored the role of self-efficacy beliefs in students' writing performance. They discovered that students with higher self-efficacy, or confidence in their abilities, were more likely to engage with writing tasks and fully utilize the scaffolding provided, leading to better writing outcomes. Thus, technology not only provides essential support but also helps cultivate a growth mindset, motivating students to engage more deeply with the writing process.

In conclusion, the importance of grammar in academic writing cannot be overstated, particularly for English majors, as it directly impacts their academic performance and professional success. Proficient academic writing requires more than just grammatical accuracy; it demands the ability to structure ideas logically, conduct critical analysis, synthesize information, and effectively communicate complex concepts. Recent studies have shown that technology, especially grammar checkers and online writing platforms, can significantly enhance students' writing skills by providing immediate feedback and fostering self-correction (Chen & Lee, 2017; Zhang & Barber, 2017; Garcia & Hernandez, 2019). These

technological interventions align with the principles of the Zone of Proximal Development (ZPD), demonstrating that when feedback is provided within students' optimal learning range, it can significantly improve their writing accuracy and overall performance (Anderson & Choi, 2020). In contrast, traditional feedback methods, which primarily focus on evaluating and correcting mistakes at the end of a learning period, do not provide the same level of immediate, constructive engagement (Guo & Wang, 2017). As educational practices continue to evolve, it becomes increasingly important to assess the effectiveness of various feedback strategies in enhancing students' writing performance.

Teachers' Traditional Method for Written Feedback

The evolution of feedback practices in education reflects significant changes in educational philosophy, technology, and pedagogical strategies. In the early stages of formal education, feedback often centered on criticism and punitive measures, emphasizing error correction and discipline. During the 19th century, as the Industrial Revolution accelerated and the demand for skilled workers grew, educational institutions became more structured and uniform (Barro & Yi, 2015). Feedback in this era was largely evaluative, delivered after a learning unit or term through grades and written comments. This approach was influenced by behaviorist theories, which framed learning as a response to external stimuli, with feedback serving as reinforcement for correct actions and deterrence for errors (Brookhart et al., 2016).

By the mid-20th century, feedback practices shifted to emphasize individual development and improvement. This transformation was driven by the rise of cognitive and constructivist learning theories (Barro & Yi, 2015), which underscored the importance of understanding the learning process and utilizing feedback to foster continuous growth. Visionaries like Benjamin Bloom and John Dewey advocated for feedback that not only assessed student performance but also guided their development and comprehension (Chawira, 2017). This period saw the introduction of more advanced feedback systems, such as personalized comments and diagnostic assessments, designed to identify specific areas for improvement and encourage a growth-oriented mindset. Feedback became a central element of the learning process, empowering students to self-regulate and take ownership of their education (Barro & Yi, 2015).

In recent decades, feedback practices have expanded to address not only academic performance but also social-emotional development and modern competencies such as critical thinking, creativity, and collaboration (Frey et al., 2019). Feedback methods have become more comprehensive, aiming to develop well-rounded individuals with diverse skills. The integration of analytics and big data in education has enhanced feedback systems, enabling educators to track student progress over time and provide targeted interventions (Fischer et al., 2020). Additionally, the growing emphasis on student agency has led to feedback strategies that actively involve students, incorporating self-assessment and reflection as integral components of the learning process (Nieminen et al., 2021).

Despite these advancements, traditional feedback methods remain prevalent in many educational settings, particularly in higher education. According to Rahman et al. (2018), traditional feedback often relies on summative evaluations, such as exams, quizzes, and brief written comments provided after learning sessions. These methods focus primarily on assessing achievement against predetermined criteria and are typically characterized by unidirectional communication from teacher to student. While traditional feedback provides measurable indicators of success, it often lacks the immediacy, detail, and actionable guidance needed for meaningful improvement. Furthermore, the delayed nature of feedback in traditional approaches can reduce its relevance and impact on student learning (Padgett et al., 2021).

Challenges in providing effective feedback stem from both the giver and recipient perspectives. Faculty members may hesitate to deliver critical feedback for fear of causing distress or straining relationships, while students may resist or dismiss constructive criticism (Winstone et al., 2019; Lefroy et al., 2015). Additionally, feedback that lacks specificity is unlikely to enable meaningful behavioral changes (Shrivastava & Shrivastava, 2018). Teachers require a deep understanding of formative assessment to deliver feedback effectively, ensuring it is timely, clear, and constructive (Irons & Elkington, 2021).

Methods of Traditional Feedback

Written Feedback

Education has long relied on traditional feedback methods for their ability to provide direct, individualized, and comprehensive guidance to students. Among these methods, written feedback has been one of the most prevalent forms, with teachers meticulously reviewing assignments, identifying specific issues, and offering revisions and constructive advice either in the margins or at the end of the work (Walvoord et al., 2023). These written comments are typically intended to be thorough, focusing on both the strengths and weaknesses in a student's work. The goal is to give students clear, actionable insights on how they can improve in future assignments (Parker et al., 2020).

Written feedback is an essential aspect of the educational process, serving as a primary means for instructors to communicate with students about their performance, strengths, and areas needing improvement (Wanner & Palmer, 2018). This type of feedback plays a pivotal role in fostering learning and development, as it provides students with detailed insights into their progress. Educators facilitate this process through various forms of feedback, including comments on assignments, evaluation rubrics, and personalized notes.

To ensure the effectiveness of written feedback, certain critical factors must be met: clarity, specificity, timeliness, and constructiveness. First, clarity is crucial, as it ensures the feedback is easily understood, thereby avoiding ambiguous language that could confuse students rather than guide them (Francis et al., 2019). Second, specificity focuses on delivering detailed and targeted comments that address the strengths and weaknesses of a student's work. This helps highlight what has been done well and what requires further improvement. Third, timeliness is vital because prompt feedback allows students to apply the insights to subsequent work, thus enhancing their learning experience. Finally, constructiveness ensures the feedback is not overly critical but provides actionable suggestions, fostering a growth mindset (Brock, 2018).

Written feedback can take two main forms: formative and summative. Formative feedback, aimed at guiding learning and progress, is particularly effective when it is timely, clear, and encourages reflection (Heitink et al., 2016). It provides students with guidance, enabling them to engage in self-reflection, reworking, and self-regulation of their learning. On the other hand, summative feedback serves to reinforce learning outcomes and justify grades or course outcomes (Houston & Thompson, 2017). By combining these two approaches, educators can provide comprehensive support that addresses both immediate learning needs and long-term development.

One notable advantage of written feedback is its permanence (Brookhart, 2017). Unlike oral feedback, which is often fleeting, written comments can be revisited by students as they work on revisions or prepare for future assignments. This permanence fosters a reflective process where students can track their progress over time, recognizing how past feedback has shaped their learning. Furthermore, written

feedback serves as a documented record of both student performance and teacher evaluations, offering valuable insights for making informed instructional decisions (Yu & Liu, 2021).

Despite its benefits, delivering effective written feedback poses significant challenges. One major obstacle is the substantial time and effort required from educators, particularly in large classes where the workload is considerable (Kebritchi et al., 2017). Additionally, tailoring feedback to the individual needs of each student is demanding but necessary to ensure relevance and impact. Generic comments often fail to address specific issues and may undermine the feedback's effectiveness. Moreover, students may struggle to interpret or implement feedback without further guidance, limiting its practical utility (Carless & Boud, 2018).

By taking this approach, teachers offer a detailed evaluation of the student's performance, providing them with a roadmap for improvement. However, the effectiveness of written feedback depends heavily on the clarity of the teacher's comments and the student's ability to interpret and apply the feedback. If the feedback is vague or overly technical, it may fail to guide students toward meaningful changes in their work. Furthermore, students' varying levels of reading comprehension and ability to integrate feedback into their learning process can impact the overall utility of written comments.

In conclusion, written feedback offers a unique opportunity for in-depth and personalized evaluations that emphasize individual strengths and areas for growth (Houston & Thompson, 2017). It provides students with actionable insights, helping them understand and respond to their performance. When combined with tools like rubrics, which offer systematic and impartial assessment frameworks (Chowdhury, 2019), written feedback becomes even more powerful. Together, these tools enhance the learning experience by promoting clarity, consistency, and self-regulation, ultimately supporting students' academic and personal development.

Oral Feedback

Oral feedback, another traditional method, is often delivered either during class discussions or in one-on-one sessions between the teacher and student. In a classroom setting, oral feedback has the advantage of being delivered in real time, allowing the teacher to address common issues and provide immediate clarification (Cole et al., 2018). This interaction fosters a dynamic learning environment where students can ask questions, seek clarification, and engage in a more interactive process with their teacher. One-on-one oral feedback further personalizes the learning experience, offering students tailored advice specific to their needs and areas for improvement. These sessions can also strengthen the student-teacher relationship, creating a more comfortable space for students to discuss challenges openly. However, the effectiveness of oral feedback can be limited by time constraints and the students' ability to recall and apply the advice given. As oral feedback typically occurs in a live setting, it can be harder for students to refer back to it later, and they may struggle to implement the feedback without written reminders (Cole et al., 2018).

Peer Feedback

Peer feedback and group feedback sessions are also vital components of traditional feedback practices. In peer feedback, students assess each other's work, providing insights, suggestions, and critiques. This process not only helps students develop critical thinking and evaluation skills but also encourages them to view their own work from different perspectives, which can deepen their understanding (van Vliet et al., 2016). Group feedback sessions, where the teacher provides collective feedback to an entire class or a smaller group of students, allow teachers to address common issues across multiple students' work. These sessions can foster a sense of shared learning, where students learn from each other's experiences and

perspectives (Awidi & Paynter, 2019). The group dynamic can stimulate valuable discussions and enhance students' engagement with feedback. However, the success of these sessions relies heavily on students' ability to provide constructive and respectful feedback, as well as the teacher's role in effectively managing and guiding the process to ensure productive outcomes (Järvelä et al., 2016).

Rubrics and Checklists

Rubrics, checklists, and correction codes also play an integral role in traditional feedback systems by providing clear and structured guidelines for evaluation (Reed, 2018). Rubrics outline specific criteria and performance levels, allowing teachers to assess students' work more consistently and objectively (Jones et al., 2016). They help demystify the grading process by making the expectations for each assignment explicit, ensuring that students understand exactly what is required for success. Checklists serve a similar function by breaking down assignments into smaller components, making it easier for students to track whether they have met all necessary requirements (Villa & Thousand, 2021). Correction codes, on the other hand, provide shorthand for teachers to highlight specific types of errors, such as grammatical mistakes or issues with argument structure, without the need to write lengthy comments (Kraut, 2018). These tools streamline the feedback process, enhancing its efficiency and ensuring transparency. However, the effectiveness of these methods depends on students' familiarity with the systems. For instance, if students do not fully understand the rubric's criteria or the meaning behind correction codes, the feedback may be less effective in guiding improvement.

A *rubric* is a scoring tool that lays out the expectations of a task or assignment across 3 to 5 performance levels. Rubrics can be used to state standards, instructional goals, and objectives for the type of performance students should achieve while completing a task. Instructors use rubrics to divide assignments or tasks into different parts, with a detailed description of each component reflecting what constitutes acceptable or unacceptable levels of performance (Chowdhury, 2019).

The use of rubrics in the classroom allows students to understand what is meant by an acceptable level of performance when performing a given task. Effective rubrics also help students to realize the extent to which their current performance meets each criterion of importance and what future steps can be taken to enhance the quality of their work (Brookhart & Chen, 2014). Although rubrics are helpful for grading and assessment, many authors claim that well-designed rubrics can also be used as an instructional tool to facilitate student learning.

Rubrics play a crucial role in providing clarity to students about the expectations of the assessment (Kilgour et al., 2019; Pang et al., 2022). This clear and systematic communication of expectations has increased students' understanding of the task, boosting their confidence and lessening anxiety around assessments (Gyamfi, 2021). The role of rubrics in providing this clarity is a significant benefit that students can derive from their use (Reynolds-Keefer, 2019).

Some have identified increased student performance as a positive effect of the use of rubrics within assessment practices (Tshering & Phu-Ampai, 2018; Ragupathi & Lee, 2020); although the mere existence of the rubric cannot be purported to have a causative relationship with academic improvement or performance, as there are many other factors involved such as whether the rubric is used as part of formative assessment practice (Ragupathi & Lee, 2020) or is used as a critical resource throughout a teaching period (Tshering & Phu-Ampai, 2018). This involves the students engaging more deeply with the rubric by, for example, providing training in using them and/or being involved in their development; these implications will be explored further.

Rubrics and feedback are interrelated components that substantially influence student learning and achievement. Rubrics provide a systematic framework for assessing student work by specifying expectations and performance levels, improving clarity, and easing anxiety over evaluations. This systematic approach establishes a uniform method of assessment and enhances students' comprehension of explicit benchmarks for achievement and areas for enhancement. The rubrics' clarity has a more significant impact when paired with positive feedback, which is crucial in directing student growth and motivation (Burns et al., 2019).

Challenges in Traditional Feedback Methods

Traditional feedback methods are foundational to educational practices, but they present several challenges for educators and students alike. One significant issue is the time-consuming nature of providing detailed, individualized feedback, especially in large classes. According to Simonson et al. (2019), teachers are often faced with the daunting task of grading numerous assignments within tight time constraints, leading to feedback that may be rushed or superficial. This is particularly problematic as it diminishes the quality of feedback, making it less actionable for students. Teachers, already balancing other responsibilities such as lesson planning, grading, and classroom management, may find it difficult to devote sufficient time and attention to each student's work. As a result, feedback may lack the necessary depth, specificity, and personalized attention that students require to improve their performance.

Additionally, traditional feedback mechanisms are typically one-way communications, delivered at the end of an assignment or grading period. This delivery model limits the potential for ongoing, iterative dialogue between teachers and students (Ott et al., 2016). In an educational environment where feedback is seen as an essential component of the learning process, the lack of immediacy in traditional feedback systems can hinder students' ability to make real-time corrections and deepen their understanding of their mistakes. Without the opportunity for rapid adjustments, students may struggle to integrate feedback into their ongoing learning process, thus slowing their progress and diminishing the feedback's impact on their development.

Another critical challenge is the resistance that students may have to traditional feedback. Often, students may overlook or misunderstand written comments, which can result in confusion about how to improve their work. When feedback is perceived as overly critical or negative, students may become demotivated and resistant to engaging with the suggested improvements (Sotlikova, 2023). This response can be exacerbated by cultural and language differences, especially in diverse classrooms where students may have varying levels of proficiency in the language of instruction. As noted by De Leersnyder et al. (2021), students' interpretations of feedback can be influenced by their cultural backgrounds, further complicating the effectiveness of traditional feedback methods. Therefore, teachers must be conscious of these dynamics, striving to deliver feedback that is not only clear and constructive but also supportive and culturally sensitive to foster a positive learning environment.

Despite these challenges, several strategies can be employed to improve the effectiveness of traditional feedback methods. One such approach is the use of structured feedback frameworks, such as rubrics. Rubrics provide clear criteria for evaluating students' work, ensuring consistency and transparency in grading (Wollenschläger et al., 2016). By offering detailed descriptions of expectations and performance levels, rubrics help reduce ambiguity and clarify the areas where students need to focus their attention. Bennett (2016) further emphasizes that rubrics guide students through the process of self-assessment, enhancing their understanding of what is required for success. This structured approach not only aids

teachers in delivering consistent feedback but also enables students to understand their strengths and weaknesses more clearly.

Incorporating formative assessment practices is another effective solution. Rather than waiting until the end of a lesson or unit to provide feedback, formative assessment offers opportunities for teachers to provide input throughout the learning process (McCallum & Milner, 2021). This allows students to receive feedback while they are still engaged with the material, which promotes a more dynamic and iterative learning experience. With ongoing feedback, students can make real-time adjustments, improving their understanding and performance before the final evaluation. This method aligns with the principles of continuous learning and supports the development of critical thinking skills.

Additionally, fostering interaction and dialogue around feedback can further enhance its effectiveness. Li et al. (2016) suggests that one-on-one or small group conferences between teachers and students allow for personalized discussions of feedback, clarifying misunderstandings and promoting deeper engagement. Such interactions can build rapport and trust, making students more receptive to feedback. These personalized exchanges also provide opportunities for teachers to explain their comments in greater detail, helping students understand how to improve their work. Peer feedback mechanisms can also complement these efforts by encouraging collaborative learning. As Huisman et al. (2018) highlight, peer feedback allows students to offer constructive suggestions to one another, thereby developing critical evaluation skills and creating a more interactive and supportive learning environment.

Digital Feedback

Feedback is a cornerstone of effective education, with traditional methods like written comments, oral feedback, rubrics, and peer reviews serving as long-standing pillars. However, the advent of digital feedback systems has introduced transformative opportunities that complement these conventional approaches.

Digital tools, such as online platforms, enable teachers to provide real-time, detailed, and organized comments directly on student submissions. This fosters faster turnaround times and promotes continuous learning, as emphasized by Oliveira et al. (2016). Moreover, learning management systems (LMS) equipped with automated feedback tools deliver immediate, personalized responses, addressing specific strengths and areas for improvement. These advancements not only enhance the efficiency of feedback but also expand its accessibility and scope.

One of the key advantages of digital tools is their ability to overcome the limitations of traditional feedback methods. For example, written feedback can be time-intensive, and providing individualized attention in large classrooms can pose logistical challenges. Digital systems empower students to access feedback anytime, enabling timely revisions without delays (Huang et al., 2020). Features such as track changes, multimedia annotations, and video or audio feedback increase clarity and engagement, creating a more interactive and dynamic experience for learners.

Beyond enhancing the delivery of feedback, digital platforms also enable educators to monitor student progress over time. By leveraging data-driven insights, teachers can identify patterns, adjust instructional strategies, and create a continuous feedback loop that supports student development more comprehensively than traditional, end-of-assignment feedback. For instance, online quizzes with instant feedback, automated grading systems, and adaptive learning programs exemplify how technology facilitates effective and targeted feedback (Alamri et al., 2020).

While digital feedback methods offer speed, scalability, and efficiency, traditional approaches retain their value, particularly in fostering personal connections between educators and students. A balanced integration of both methods can create a responsive and supportive learning environment, maximizing student growth and achievement. At the heart of these advancements, the foundational principles of effective feedback—clarity, specificity, timeliness, and constructiveness—remain constant. By adhering to these principles, educators can harness the strengths of both traditional and digital methods to adapt to the evolving needs of education, ultimately enhancing feedback practices and supporting student success.

Methods of Digital Feedback

Digital feedback methods have significantly transformed the landscape of education, introducing innovative strategies to enhance student engagement, learning outcomes, and overall instructional effectiveness (Serrano et al., 2019). Among the various methods, online comments and annotations via educational platforms stand out as a prominent approach. Tools such as Google Classroom, Microsoft Teams, and other Learning Management Systems (LMS) enable educators to provide precise, inline comments directly on students' digital submissions (Xiang et al., 2017). This capability allows educators to identify specific strengths and weaknesses in students' work, offering contextual feedback that is both easy to reference and structured for clarity and understanding (Cédric Sarré et al., 2024). Furthermore, the immediacy of this feedback ensures that students receive input shortly after submission, maintaining the continuity of their learning process and enhancing its relevance. Compared to handwritten notes, digital annotations are generally more legible and organized, reducing the risk of misinterpretation and enabling students to accurately apply feedback for improvement (Sterponi et al., 2017).

In addition to manual annotations, automated feedback provided through LMS platforms represents another transformative innovation. Systems such as Moodle, Canvas, and Blackboard include features like automated grading for quizzes and assignments, which deliver instant feedback on objective questions, such as multiple-choice or true/false formats. This immediate feedback loop not only informs students of their performance but also facilitates prompt reflection and corrective action. Moreover, advanced LMS platforms integrate adaptive learning technologies to further personalize the feedback process. For instance, if a student consistently struggles with a particular concept, the system can recommend additional resources or exercises tailored to that need. By adapting to each student's learning style and progress, these systems save educators time while ensuring students receive targeted and actionable feedback, effectively guiding their learning trajectories in real time (Zhang et al., 2020).

Video and audio feedback emerge as popular alternatives that provide a more personal and engaging experience compared to traditional written comments. These methods allow educators to convey nuanced feedback through tone, emphasis, and context. For example, teachers can record themselves discussing a student's work, offering detailed commentary that might be difficult to capture in writing. Video feedback, in particular, enables teachers to highlight areas for improvement visually and provide real-time explanations, making the feedback more engaging and comprehensible. Similarly, audio feedback allows teachers to adopt a conversational and approachable tone, fostering a stronger connection with students. Both methods are particularly effective when feedback involves emotional sensitivity, as the teacher's voice or facial expressions can convey empathy and encouragement (Walter et al., 2016). By bridging the gap between digital communication and personal interaction, video and audio feedback enhance student motivation and investment in their learning process.

Another advanced digital feedback method involves using digital rubrics and e-portfolios to provide structured, reflective, and comprehensive evaluations. Digital rubrics integrated into LMS platforms offer a clear framework for assessing assignments against predefined criteria, ensuring consistency, objectivity, and transparency. These rubrics can be shared with students in advance, providing a roadmap for how their work will be evaluated and helping them align their efforts with academic expectations (Olaniyi, 2020). On the other hand, e-portfolios enable students to compile and showcase their work over time, creating a holistic representation of their learning journey and development. This approach not only allows for ongoing reflection but also supports teacher feedback on individual pieces or the portfolio as a whole, encouraging students to identify their growth and set future goals. Additionally, e-portfolios foster peer review and self-assessment, further enhancing the interactive and reflective aspects of the feedback process (Olaniyi, 2020).

In conclusion, these digital feedback methods collectively enhance the timeliness, accessibility, and personalization of feedback, fostering more dynamic and interactive learning environments. By enabling clear, immediate, and individualized feedback, these approaches increase student engagement, improve learning outcomes, and empower students to take ownership of their educational experiences.

Comparative Analysis: Traditional vs. Digital Feedback

Performing a comparative analysis between conventional and digital feedback in the classroom is crucial for understanding the evolving dynamics of educational practices and their effectiveness. This analysis identifies strategies that enhance student learning and engagement, provide prompt and efficient feedback, and address diverse learning needs. Additionally, it examines the impact on teachers' workloads and students' perceptions, offering valuable insights into preferences and receptiveness. Furthermore, the adaptability of digital feedback, which can be customized to individual student needs, is a notable advantage. Ultimately, such an analysis informs well-grounded decisions to optimize educational outcomes for both students and educators.

Traditional feedback methods, such as written comments on assignments and in-person discussions, have long been a cornerstone of education (Perkins et al., 2020). These methods are highly regarded for their personal touch and the opportunity for direct, face-to-face interaction. Teachers can provide detailed explanations and immediately address misunderstandings, fostering a more tailored and supportive learning experience. Additionally, traditional feedback is often perceived as more empathetic and human, helping to build strong rapport and trust between teachers and students (Meyers et al., 2019).

However, traditional feedback also presents significant challenges. It is time-intensive, particularly in larger classes, and often lacks immediacy, as students typically wait for assignments to be graded to receive feedback (Ahea et al., 2016). This delay can reduce the relevance and impact of the feedback on the student's learning process. Moreover, written comments may sometimes be ambiguous, leading to misunderstandings if not discussed in person (Ranalli, 2018). These limitations highlight the need for more efficient and accessible feedback mechanisms, especially in today's fast-paced educational environments.

In contrast, digital feedback methods offer innovative solutions to many limitations of traditional approaches. Learning management systems (LMS) such as Moodle, Canvas, and Blackboard enable timely and consistent feedback delivery (Iqbal et al., 2020). Features like inline comments, automated grading, and performance analytics provide immediate, data-driven insights into student progress. Furthermore, digital feedback often includes multimedia elements, such as audio and video commentary, which enhance clarity, engagement, and accessibility (Grigoryan, 2017). The continuous and iterative nature of digital

feedback fosters ongoing communication and supports a cycle of improvement and reflection (Marion et al., 2020).

The rise of digital learning has expanded the definition of feedback to include various automated and data-driven approaches. Online quizzes with pre-set commentaries, for example, provide instant responses that guide learners (Forster et al., 2018; Maier et al., 2016). Technology is also being leveraged to increase the volume and timeliness of feedback. Automated systems can generate comments efficiently, while advanced algorithms personalize feedback to address individual learner needs (Pardo et al., 2017).

For instance, Yassin et al. (2024) conducted a study involving Thai EFL students using the online platform Padlet for feedback over a 16-week period. The findings demonstrated that Padlet was a user-friendly tool that boosted students' confidence, motivation, and collaborative skills. However, the platform's open nature sometimes caused anxiety and embarrassment, as students felt vulnerable when their peers could see feedback on their mistakes. This duality underscores the need for tools that balance transparency with sensitivity.

Despite these advantages, digital feedback has its challenges. It may lack the personal and empathetic qualities of traditional feedback, potentially making it feel impersonal. Students may also encounter technical difficulties or lack the necessary digital literacy skills to access and act upon feedback effectively (Buckley et al, 2021). Additionally, over-reliance on automated systems can result in generic, surface-level comments that fail to address the unique needs of individual learners (Zhai et al., 2024). These drawbacks emphasize the need to balance digital tools with thoughtful, personalized input from educators. Despite these advancements, challenges remain. Research shows that students must engage meaningfully with feedback to benefit from it, regardless of whether it is delivered digitally or in person (Mensink & King, 20; Winstone et al., 2020). To address this, Cheng et al. (2024) explored the effects of teacher scaffolding on students' engagement with written feedback. The results indicated that positive psychology and pedagogical practices fostered active engagement, emphasizing the importance of educator involvement even in digital contexts.

Looking ahead, combining traditional and digital feedback methods holds promise for creating a dynamic and effective feedback ecosystem. Advances in artificial intelligence (AI) and machine learning offer opportunities to enhance digital feedback systems, providing tailored and adaptive responses based on student needs (Gligorea et al., 2023). For example, AI-driven tools can analyze performance trends and offer personalized suggestions, complementing human insights.

Virtual and augmented reality technologies also have the potential to transform feedback practices. These tools could create immersive scenarios where students apply feedback in real-world contexts, enabling experiential learning and immediate correction (Childs et al., 2021). Such innovations promise to make feedback more engaging and practical.

Additionally, feedback literacy will play a critical role in future educational practices. Teachers and students alike must develop skills to give, interpret, and act on feedback effectively (Carless & Winstone, 2020). Professional development programs should equip educators with strategies to integrate digital tools without compromising the relational aspects of traditional feedback (Trust et al., 2016). Similarly, students should be trained to navigate and utilize digital feedback to foster a more adaptive and responsive learning environment (Maier & Klotz, 2022).

In conclusion, both traditional and digital feedback methods have distinct strengths and limitations. A hybrid approach that leverages the personal touch of conventional methods with the efficiency and innovation of digital tools can create a more effective feedback system. As technology continues to evolve,

integrating advanced tools while maintaining meaningful educator-student interactions will be key to fostering deeper engagement and improved learning outcomes.

Effects of Feedback on Students' Performance

Feedback plays a vital role in the educational process, significantly influencing student motivation and performance. Defined as information regarding performance outcomes and learning processes, feedback is pivotal in guiding students' learning trajectories and enhancing their academic achievements (Mulliner & Tucker, 2017; Rietsche, 2023). It is widely recognized as one of the most influential factors affecting student performance and is often regarded as having the most profound individual impact on academic success (Schwartz et al., 2016). To optimize teaching strategies and enrich student learning experiences, it is essential to examine the effects of feedback on motivation and performance, given its substantial role in shaping educational outcomes.

The Role of Feedback in Academic Achievement

Recent studies have provided insights into the relationship between feedback and student outcomes. Burns et al. (2019) explored the interplay between teacher feedback–feedforward (encompassing corrective feedback and guidance for improvement) and personal best goal setting in students' mathematics achievement. In a study involving 362 Australian students, personal best goal setting emerged as a predictor of mathematics achievement and served as a mediator between teacher feedback and student performance. This finding underscores the importance of goal-oriented feedback in fostering academic success.

Similarly, Winstone et al. (2019) investigated the mediating role of four feedback beliefs—self-efficacy, utility, accountability, and volition—in connecting personality and achievement goal orientation with students' use of feedback. Their study of 746 students aged 16–18 revealed that feedback self-efficacy mediated all the relationships studied, while perceived feedback utility and volition partially mediated others. These findings position feedback self-efficacy as a critical area for intervention to enhance feedback effectiveness and usage.

Mediating Factors in Feedback Effectiveness

Carvalho et al. (2020) further advanced understanding by examining the mediating role of school identification in the relationship between teacher feedback and student engagement. Their large-scale study, encompassing 2,534 students from grades 6 to 12, demonstrated both direct and indirect effects of teacher feedback on engagement through students' perceived identification with their school. These results suggest that fostering a sense of belonging and identification within the school environment is crucial for amplifying the impact of teacher feedback.

In a similar vein, Man et al. (2020) examined engagement strategies among 118 Chinese undergraduate students learning English. Through a rebuttal writing activity, students were encouraged to reflect on and justify their revisions based on teacher feedback. The findings indicated that this activity enhanced students' ability to engage meaningfully with feedback, with familiarity with the task further amplifying its benefits. This highlights the value of interactive and reflective feedback processes in promoting deeper student engagement.

Shin et al. (2020) delved into how cognitive appraisal styles (threat vs. challenge) and feedback types (positive vs. negative; person vs. task-oriented) influenced feedback acceptance and motivation among 172 Korean primary students. Their findings revealed that students with a challenge-oriented appraisal style showed greater acceptance of positive task-oriented feedback and were more motivated when receiving negative feedback compared to their threat-oriented peers. Conversely, students with a threat-

oriented style benefited more from negative task-oriented feedback. This research underscores the importance of tailoring feedback to individual cognitive styles to maximize its effectiveness.

Challenges in Conventional Feedback Approaches

Despite its critical importance, conventional feedback practices often face several limitations. These include the labor-intensive nature of providing comprehensive feedback and the unidirectional format, which hinders timely and interactive exchanges (Man et al., 2020; Shin et al., 2020). Such challenges highlight the need for innovative feedback methods that are both efficient and responsive to student needs. Burns et al. (2019) emphasized the role of teacher feedback–feedforward and goal setting in addressing these limitations by providing structured, forward-looking guidance. Similarly, Winstone et al. (2019) and Carvalho et al. (2020) pointed to the importance of fostering feedback self-efficacy and school identification to bridge the gap between feedback delivery and its effective utilization. These studies collectively stress the need to refine feedback practices to overcome existing barriers and enhance their impact on student motivation and performance.

Moving Toward Improved Feedback Practices

In conclusion, understanding the impact of feedback on student motivation and performance is critical for advancing educational practices. Feedback's influence on academic achievement is well-documented, with research highlighting the importance of personalized, goal-oriented, and interactive approaches. Burns et al. (2019) illustrated the effectiveness of feedback-feedforward strategies, while studies by Winstone et al. (2019) and Carvalho et al. (2020) shed light on the mediating roles of self-efficacy and school identification. Moreover, innovative approaches such as rebuttal writing (Man et al., 2020) and personalized feedback based on cognitive appraisal styles (Shin et al., 2020) demonstrate the potential for tailored methods to enhance student engagement.

As the field evolves, addressing the challenges of traditional feedback methods requires adopting more dynamic and accessible approaches. Integrating prompt, reflective, and personalized feedback practices can significantly improve educational outcomes, ultimately fostering a more supportive and effective learning environment.

Synthesis and Gaps

The reviewed literature highlights the growing adoption and utility of AI-powered writing tools like Grammarly, particularly within ESL and EFL contexts. Numerous studies have consistently demonstrated Grammarly's efficacy in enhancing grammar, punctuation, and writing clarity. For example, Cauring et al. (2023) observed that students found Grammarly beneficial for refining research writing skills, emphasizing its intuitive interface and immediate feedback. Similarly, research by Prasetya and Raharjo (2023) and Jelita et al. (2023) showed significant improvements in grammatical accuracy and writing mechanics among high school and EFL students. Ebadi et al. (2023) further supported these positive outcomes, documenting improvements in students' spelling, punctuation, and sentence structure following repeated Grammarly usage.

Additionally, a quasi-experimental study by Magadan and Tulud (2024) in the Philippines confirmed that Grammarly users exhibited greater writing improvements than peers who received traditional instruction. These findings collectively underline Grammarly's potential to strengthen feedback cycles and support student writing development in local educational contexts.

Despite these encouraging results, several researchers have voiced concerns about an excessive reliance on Grammarly. For instance, Barrot (2021) and Saricaoglu (2018) argued that Grammarly primarily

addresses mechanical errors but lacks sufficient support for higher-order writing skills such as critical thinking, argumentation, and rhetorical nuance. Moreover, concerns have emerged about students becoming overly dependent on automated feedback, potentially reducing their ability to internalize grammatical rules without explicit guidance (Lipalam et al., 2023; Racoma & Abulencia, 2023). Dawson et al. (2018) also pointed out that while offering instant corrections, digital tools cannot fully replicate the formative and developmental feedback traditionally provided by teachers.

Despite the extensive research at tertiary education levels, a significant gap remains regarding Grammarly's application within Senior High School contexts, particularly in the Philippines. Current studies primarily target university students and frequently overlook structured academic writing tasks such as article critiques, research reports, and position papers within formal high school curricula. Addressing this research gap is essential because Senior High School represents a critical developmental stage where writing performance directly impacts college readiness and lifelong communication skills.

Exploring Grammarly's effectiveness within specific academic genres at this educational stage can yield valuable insights into its pedagogical value. Such exploration can guide instructional approaches within K–12 education, balancing technological innovation with traditional literacy practices. Consequently, this study investigates Grammarly's impact on Senior High School students' writing performance by comparing Grammarly-supported instruction to conventional teacher-led feedback, address   it need for localized, evidence-based guidelines for responsible AI integration i

Chapter 3
RESEARCH METHODOLOGY
This chapter details the methodology employed in this study, including the research design, environment, respondents, sampling design, instruments, validity and reliability of instruments, data gathering procedure, statistical treatment, and ethical considerations.

Method Used
The study utilized quantitative research with a quasi-experimental design 10 utilizing the Pretest–Posttest Nonequivalent Group Design.

Research Environment
This study was conducted at Sulangon National High School, a public secondary school in a rural community in the Philippines. The institution caters to a diverse population of Senior High School students, particularly those enrolled in the Science, Technology, Engineering, and Mathematics (STEM) and Humanities and Social Sciences (HUMSS) strand. The school is representative of typical public senior high school settings where access to advanced writing tools and consistent writing instruction may be limited due to resource constraints.

The academic environment reflects common challenges faced in English instruction, especially in the area of academic writing. Students often demonstrate difficulties in grammar, organization, coherence, and adherence to academic conventions. Writing outputs such as article critiques, research reports, and position papers are regularly required across both strands. Yet, students frequently struggle to meet expected standards in these outputs, particularly in demonstrating clarity and structure.

Instructional practices in the school primarily follow traditional, teacher-centered methods, which include lecture-based grammar instruction and manual feedback provided after submission. While these

approaches offer a degree of personalized evaluation, they may be constrained by time limitations, large class sizes, and the absence of immediate feedback mechanisms. These conditions present a practical opportunity to introduce and evaluate AI-assisted tools like Grammarly, which offer real-time feedback and support for iterative writing improvement.

In this context, the study introduced Grammarly as an intervention tool for the experimental group, aiming to support students in enhancing their writing performance during the composition of academic outputs. Meanwhile, the control group received instruction through conventional teacher-led proofreading and feedback. The study spanned six weeks during the first Academic Year 2023–2024 semester. This controlled timeframe ensured that both groups received equal instructional exposure and that comparisons in writing performance could be attributed to the intervention rather than to extraneous factors.

The study offers practical insights into Grammarly's usefulness in improving students' writing performance, particularly in under-resourced or traditionally structured schools, by situating the research in an authentic classroom environment with real instructional challenges.

Respondents of the Study

The respondents of this study were selected from two Senior High School strands at Sulangon National High School: the Humanities and Social Sciences (HUMSS) strand and the Science, Technology, Engineering, and Mathematics (STEM) strand. A total of 27 Grade 11 students participated in the study, with 17 assigned to the control group and 10 to the experimental group.

The inclusion of only HUMSS and STEM strands was purposively determined based on the curricular emphasis on academic writing in both tracks. These strands require students to produce structured written outputs such as article critiques, research reports, and position papers—tasks central to this study's focus on improving writing performance. Other strands, such as Technical-Vocational-Livelihood or Sports Track, emphasize practical or performance-based assessments and do not consistently engage students in extended academic writing tasks. Thus, HUMSS and STEM provide the most appropriate and comparable contexts for investigating academic writing improvement.

A randomization technique was employed to assign groups objectively. A coin toss determined which of the two strands would receive the intervention. The STEM strand was randomly selected to serve as the experimental group, receiving feedback through Grammarly. In contrast, the HUMSS strand was designated as the control group, receiving traditional teacher-led feedback. This method helped reduce selection bias and maintain internal validity in the quasi-experimental design.

Respondents were chosen through convenience sampling, based on their availability and enrollment during the first semester of Academic Year 2023–2024. All ethical protocols were observed: participation was voluntary, informed consent was secured, and student identities were kept confidential throughout the research process.

Table 1 presents the number and percentage distribution of respondents by group.

Table 1 Respondents of the Study

Groups	Size of the Group	Percent Equivalent
Experimental	10	37.04%
Control	17	62.96%
Total	27	100.00%

Sources of Data

The primary data source for this study consisted of the students' original academic writing outputs, which were produced as part of the intervention and evaluation process. These outputs provided direct evidence in assessing changes in students' writing performance. The writing tasks included three common academic genres required across Senior High School curricula: an article critique, a research report, and a position paper. Each student was tasked to compose at least 1,000 words, organized into well-developed paragraphs exhibiting logical flow, clarity, and coherence.

The topics for these tasks were selected based on their alignment with competencies outlined in the Department of Education (DepEd) Senior High School Curriculum Guide. They were not chosen arbitrarily or based solely on the teacher's discretion. Instead, they were designed to be thematically appropriate for both HUMSS and STEM strands and to reflect interdisciplinary relevance and academic rigor. The topics also encouraged critical thinking, structured reasoning, and integration of academic conventions, making them suitable for evaluating students' writing performance in a formal educational setting. Appendix G includes the complete task prompts and instructions for transparency and reference.

To evaluate the outputs, this study employed the AAC&U VALUE Written Communication Rubric, which measures five key dimensions of academic writing: (1) Context and Purpose for Writing, (2) Content Development, (3) Genre and Disciplinary Conventions, (4) Sources and Evidence, and (5) Control of Syntax and Mechanics. Each criterion was rated on a four-point scale, and the resulting total scores from the rubric were subjected to descriptive and inferential statistical analyses. The rubric was selected for its clarity, validity, and relevance to academic writing standards expected at the senior high school level. Its components apply to Grade 11 students, particularly in evaluating formal academic texts. A detailed breakdown of the rubric criteria and descriptors is provided in Appendix E.

It is important to clarify that this study did not involve a multiple-choice or objective-type assessment. Instead, the scores used in the analysis were derived from performance-based evaluation using the AAC&U VALUE Written Communication Rubric. Each written task was assessed across five distinct writing domains, and each criterion was rated on a four-point scale. As such, the scores reflect levels of student performance in writing, not item-based accuracy or test responses. This distinction is critical for interpreting the results, especially in understanding how Grammarly influenced aspects of writing such as organization, coherence, and mechanics.

Prior to implementation, the rubric underwent expert validation by two field specialists and the research adviser to ensure alignment with the objectives and learner context. Two qualified evaluators rated the written outputs independently, and inter-rater reliability was assured by averaging the scores. This dual-rating process minimized subjective bias and enhanced the consistency of the evaluation.

Data Gathering Procedure

The data-gathering process strictly adhered to ethical and methodological standards to ensure transparency, reliability, and the protection of all research participants. Prior to conducting the study, ethical clearance was secured from the University's Research Ethics Committee, in compliance with institutional requirements. This clearance was obtained only after the Graduate School formally endorsed the research proposal, signifying that the study met academic and ethical standards suitable for implementation.

Following the approval of the Research Ethics Committee, the researcher sought written permission from key institutional authorities. First, a formal request letter was submitted to the College Dean of Arts and Sciences and to the Graduate School Chairperson for academic endorsement and administrative clearance.

Once approved, an official endorsement letter was issued to the researcher to proceed with seeking permission from the research locale.

Subsequently, the researcher directly submitted a letter of request to the School Head of Sulangon National High School, where the study was to be conducted. After reviewing the study's objectives, methodology, and ethical safeguards, especially regarding the involvement of minors, the School Head granted formal approval. All necessary documents were secured, participants' rights were safeguarded, and ethical standards for research involving human subjects were followed.

Table 2 Data Gathering Process

Process	Activities	Week/Day
Securing Approvals	Obtain endorsement from the Graduate School Dean and Chairperson. Secure Ethical Clearance from the Research Ethics Committee	2 days
	Obtain approval from the school head.	
Pretest	Administer pretest writing tasks to both groups.	Week 1
Intervention	Experimental Group: Students revise outputs using Grammarly for real-time feedback.	Week 2-7
	Control Group: Students revise outputs based on the teacher's manual, proofreading, and feedback.	
	Conduct writing tasks during the intervention phase (identical tasks for both groups).	
Posttest	Administer posttest writing tasks to both groups.	
Evaluation	Grade pretest and posttest outputs.	Week 8
Statistical Analysis	Calculate percentages and compare results between groups.	Week 9

Following the ethical clearances, the data collection phase began with administering the pretest to both control and experimental groups. Students were tasked to complete three academic writing outputs aligned with senior high school learning competencies: an article critique (*"If Art Is How We Express Our Humanity, Where Does AI Fit In?"*), a research report (*"Understanding and Creating Art with AI: Review and Outlook"*), and a position paper (*"Is Technology an Effective Substitute for Traditional Teaching Methods?"*). These tasks were intentionally selected for relevance to HUMSS and STEM students, ensuring content parity across groups. During the pretest, participants wrote their outputs manually, without internet access, to ensure authenticity and baseline comparability.

The intervention for each group followed a structured process to ensure procedural clarity and fidelity. The control group underwent a carefully planned eight-week intervention that mirrored the experimental group in terms of writing tasks, scheduling, and time allotment. However, unlike the experimental group, which utilized Grammarly for real-time automated feedback, the control group received traditional, teacher-led evaluation and guidance throughout the process, as shown in Table 3.

In Week 1, students were oriented to the study's objectives, procedures, ethical safeguards, and expected outcomes. This session was followed by the pretest for the Article Critique, in which students read an

assigned article and composed a critique consisting of at least three well-developed paragraphs and a minimum of 1,000 words.

In Week 2, a teacher-led discussion introduced students to the structure, purpose, and strategies for writing an effective article critique. Immediately after, students completed the posttest by writing a new critique based on the same article used in the pretest. Their handwritten drafts were then submitted to the teacher, who provided individualized feedback through written comments and proofreading.

In Week 3, students revised their article critiques based on the teacher's feedback and submitted their final versions. The second half of the session was used to administer the pretest for the Research Report, which assessed students' initial ability to write without prior instruction.

In Week 4, the teacher conducted a comprehensive discussion on how to write a research report, emphasizing format, coherence, evidence integration, and use of formal language. This was followed by the posttest, where students wrote research reports using a model text included in Appendix G. Outputs were submitted for teacher evaluation and returned with feedback.

In Week 5, students finalized and submitted their revised research reports based on the feedback they had received. In the same session, students took the pretest for the Position Paper, responding to a given topic without supporting reading materials.

In Week 6, the teacher discussed the components of a position paper, emphasizing claim development, logical reasoning, and persuasive strategies. After the discussion, students completed their posttest outputs, which were again submitted for feedback.

In Week 7, students focused on revising their position papers, incorporating the teacher's suggestions on structure, stance clarity, grammar, and idea development. Final outputs were submitted at the end of the session.

In Week 8, the teacher evaluated and scored all student outputs using the AAC&U VALUE Written Communication Rubric. This marked the official conclusion of the writing intervention for the control group.

As summarized in Table 3, the total instructional time amounted to 32 hours, with sessions evenly distributed across tasks and feedback cycles. The consistency in structure ensured both groups received equal exposure to instruction and assessment. The primary distinction lay in the source of manual, teacher-led feedback for the control group versus automated, AI-based feedback via Grammarly for the experimental group.

Table 3 Implementation Procedure Matrix for the Control Group

Class Sessions	Activities	Time Allotment
Week 1	Orientation of the Purpose of the Study	2 hours
	Pretest Administration for Article Critique	2 hours
Week 2	Article Critique (discussion)	2 hours
	Posttest Administration for Article Critique (Drafting and Submitting to Teacher for Feedback)	2 hours
Week 3	Revising and Submitting Final Drafts (Based on Teacher's Feedback)	2 hours
	Pretest Administration for Research Report	2 hours
Week 4	Research Report (discussion)	2 hours

	Posttest Administration for Research Report (Drafting and Submitting to Teacher for Feedback)	2 hours
Week 5	Revising and Submitting Final Drafts (Based on Teacher's Feedback)	2 hours
	Pretest Administration for Position Paper	2 hours
Week 6	Position Paper (discussion)	2 hours
	Posttest Administration for Position Paper (Drafting and Submitting to Teacher for Feedback)	2 hours
Week 7	Revising and Submitting Final Drafts (Based on Teacher's Feedback)	4 hours
Week 8	Teacher Evaluation and Scoring of Final Outputs	4 hours
Total Hours		32 hours

In contrast, the experimental group underwent an eight-week writing intervention that paralleled the control group in terms of writing tasks, instructional sequence, and time distribution, as presented in Table 4. However, instead of receiving teacher-led feedback, students in this group received AI-assisted feedback via Grammarly, which provided real-time suggestions on grammar, clarity, coherence, and conciseness throughout the writing and revision process.

In Week 1, an orientation was conducted to explain the study's objectives, research procedures, ethical considerations, and writing expectations. Students were also briefed on the basic functions of Grammarly and how to interpret its feedback. After the orientation, the pretest for the Article Critique was administered. Students were tasked with writing a critique based on an article consisting of at least three well-developed paragraphs and a minimum of 1,000 words.

In Week 2, the teacher conducted a structured discussion on article critique writing, emphasizing text evaluation, organization, and the use of evidence. Following the discussion, students completed the posttest using the same reading material from the pretest. Drafts were uploaded to Grammarly, and students were encouraged to review and apply the platform's suggestions for improvement.

In Week 3, students revised and submitted their final article critiques based on the AI-generated feedback. The latter part of the session was allocated to the pretest for the Research Report, where students independently drafted a report without prior instruction or sample guides.

In Week 4, a discussion on research report writing was conducted, focusing on structure, citation practices, clarity, and academic tone. Afterwards, students completed the posttest task and uploaded their drafts to Grammarly for automated feedback and revision.

In Week 5, students finalized their research reports based on Grammarly's suggestions and submitted the final outputs. In the same session, they took the pretest for the Position Paper, wherein students were given only a topic and asked to write their initial draft without supplemental reading.

In Week 6, the teacher discussed position paper writing, focusing on argument construction, logical flow, and stance clarity. Following the session, students completed the posttest task and uploaded their drafts to Grammarly for revision.

In Week 7, students revised and submitted their final position papers, guided by Grammarly's real-time feedback features.

In Week 8, the teacher conducted the final evaluation and scoring of the students' revised outputs using the AAC&U VALUE Written Communication Rubric, concluding the intervention for the experimental group.

The intervention followed a structured and consistent cycle comprising pretest administration, teacher-led discussion, posttest writing, Grammarly-assisted feedback, and final revision. To ensure procedural fairness, all task instructions, topics, and writing requirements were identical to those given to the control group. The integration of Grammarly was intended to assess the potential of AI-generated feedback in improving students' academic writing across three specific genres: article critique, research report, and position paper.

Table 4 Implementation Procedure Matrix for the Experimental Group

Class Sessions	Activities	Time Allotment
Week 1	Orientation of the Purpose of the Study	2 hours
	Pretest Administration for Article Critique	2 hours
Week 2	Article Critique (discussion)	2 hours
	Posttest Administration for Article Critique (Drafting and Uploading to Grammarly)	2 hours
Week 3	Revising and Submitting Final Drafts (Based on Grammarly's Suggestions)	2 hours
	Pretest Administration for Research Report	2 hours
Week 4	Research Report (discussion)	2 hours
	Posttest Administration for Research Report (Drafting and Uploading to Grammarly)	2 hours
Week 5	Revising and Submitting Final Drafts (Based on Grammarly's Suggestions)	2 hours
	Pretest Administration for Position Paper	2 hours
Week 6	Position Paper (discussion)	2 hours
	Posttest Administration for Position Paper (Drafting and Uploading to Grammarly)	2 hours
Week 7	Revising and Submitting Final Drafts (Based on Grammarly's Suggestions)	4 hours
Week 8	Teacher Evaluation and Scoring of Final Outputs	4 hours
Total Hours		**32 hours**

The same trained evaluators assessed all outputs to ensure objectivity, and inter-rater reliability was monitored. The resulting scores were subjected to statistical analysis to determine the presence and magnitude of performance differences attributable to the intervention.

Scoring Procedure

To evaluate students' writing performance during both the pretest and posttest phases, this study employed the AAC&U VALUE Written Communication Rubric, selected for its strong alignment with academic writing standards expected at the senior high school level. The rubric evaluates five core dimensions of

written communication: (1) Context and Purpose for Writing, (2) Content Development, (3) Genre and Disciplinary Conventions, (4) Sources and Evidence, and (5) Control of Syntax and Mechanics. Each criterion was scored using a four-point scale, with 4 as the highest and 1 as the lowest.

Each writing task—namely, the article critique, research report, and position paper—had a maximum possible score of 20 points, resulting in a total possible score of 60 points per student. The rubric was applied consistently across all writing outputs in both the control and experimental groups, and during both pretest and posttest phases, to ensure objectivity, comparability, and fairness in scoring.

To support the interpretation of students' scores, a classification system was used to convert raw scores into descriptive performance levels (e.g., Outstanding, Very Satisfactory, etc.) for each task. This classification is reflected in Tables 5 and 6, which summarize the corresponding pretest and posttest performance categories for both groups.

Table 5 Scoring Scale (20 Points)

Score Range (Per Task)	Descriptor	Description
15.01–20.00	Outstanding	Demonstrates exceptional command of writing. Minor errors (0–2). Insightful, well-structured, and fully aligned with the task.
10.01–15.00	Very Satisfactory	Shows strong writing performance with some minor lapses. Content is straightforward and generally well developed.
5.01–10.00	Satisfactory	Writing performance is emerging. Contains several errors and inconsistencies in structure or content depth.
1.00–5.00	Poor	Writing lacks development and clarity: frequent grammatical errors, vague ideas, and minimal task alignment.

Table 5 presents the scoring classification system used to evaluate each student's written outputs across the three academic writing tasks: article critique, research report, and position paper. Each task was assessed using the AAC&U VALUE Written Communication Rubric, which is widely adopted in educational research for its strong alignment with academic writing standards at the secondary and tertiary levels. The rubric evaluates five essential domains of writing: context and purpose for writing, content development, genre and disciplinary conventions, use of sources and evidence, and control of syntax and mechanics. Each domain is rated on a four-point scale, resulting in a maximum score of 20 points per task. To provide a meaningful interpretation of the raw scores, the study applied qualitative descriptors— Outstanding (15.01–20.00), Very Satisfactory (10.01–15.00), Satisfactory (5.01–10.00), and Poor (1.00– 5.00). These categories reflect varying proficiency levels in academic writing, ensuring consistency and fairness in evaluating students' performance across both the control and experimental groups.

Table 6 Scoring Scale for Total Writing Performance (60 Points)

Score Range	Indicator	Description
45.01-60.00	Outstanding	Indicates consistently high-quality writing across all outputs. Errors are minimal; content is well organized and insightful.
30.01-45.00	Very Satisfactory	Reflects strong and generally coherent writing. Some inconsistencies are present, but major writing skills are well demonstrated.
15.01-30.00	Satisfactory	Demonstrates basic writing competence with evident clarity, development, or mechanics struggles.
1.00-15.00	Poor	Reflects significant weaknesses in structure, grammar, and content. Outputs do not meet academic expectations.

Table 6 provides the overall scoring classification across the three writing tasks. With a cumulative maximum of 60 points, this table offers a holistic view of students' total writing performance before and after the intervention. The descriptors reflect consistent interpretation based on the AAC&U VALUE Written Communication Rubric, enabling the researcher to evaluate the extent of improvement and distinguish the comparative effectiveness of Grammarly-assisted instruction versus traditional feedback.

Two raters—one subject teacher and one external content expert—evaluated all outputs independently. Using two raters helped ensure inter-rater reliability, and discrepancies in scoring were resolved through discussion. The final score for each output was the average of the two ratings.

The raw scores were converted for analysis into percentage equivalents, and group means were computed for each writing task and overall performance. These scores were then compared to the assumed mastery benchmark of 75%, serving as a threshold to determine whether students demonstrated satisfactory or improved writing performance because of the intervention.

Statistical Treatment of Data

The statistical tools used in this study were chosen to measure and compare students' writing performance in both experimental and control groups during the pretest and posttest phases. All statistical tests were conducted at the 0.05 significance level to ensure the findings' reliability and validity.

Mean and Standard Deviation. These descriptive statistics summarize the performance profiles of students in both groups. The mean provided the central tendency of scores, while the standard deviation reflected the variability or spread of the data within each group.

Paired Sample t-Test. This test was applied to compare each group's pretest and posttest scores (control and experimental). It independently determined whether there were statistically significant improvements in writing performance after the intervention in each group.

Independent Sample t-Test. This test was used to compare the pretest scores between the experimental and control groups to establish group equivalence at baseline, and again to compare their posttest scores to determine whether the intervention (Grammarly) led to significantly better outcomes.

The data collected from the students' writing outputs were encoded, analyzed, and interpreted using these statistical procedures with the assistance of a statistician. The application of both descriptive and inferential statistics helped determine whether the use of Grammarly significantly influenced students' writing performance compared to traditional teacher writing and feedback.

Ethical Considerations

The rights, dignity, and well-being of all research participants were prioritized throughout the study. Before data collection occurred, the researcher obtained ethics clearance from the Jose Rizal Memorial State University Research Ethics Committee, ensuring that the study complied with institutional and ethical standards for conducting research involving human participants. In addition, formal approval was secured from the Dean of the College of Arts and Sciences, Chairperson of the Graduate School, and Head of Sulangon National High School.

A formal letter clearly stating the research objectives, rationale, and procedures was sent to the school principal. These communications facilitated transparency, coordination, and institutional accountability during the implementation.

Since the participants were minors in senior high school, parental consent and student assent were secured prior to participation. A comprehensive informed consent form was distributed to participants and their parents or legal guardians, explaining the purpose of the study, data collection procedures, possible risks and benefits, and the voluntary nature of participation. It emphasized that participants had the right to withdraw at any point without penalty or consequence. A copy of the consent form is attached as Appendix F.

All collected data were anonymized and encoded using participant identifiers to protect privacy and confidentiality. Written outputs and scoring records were securely stored and accessible only to the researcher and authorized academic personnel. No personally identifiable information appeared in the study's reports, publications, or presentations.

By adhering to these ethical procedures, the researcher ensured that the participants' rights were safeguarded and that the study was conducted with integrity, transparency, ar   students' welfare.

Chapter 4
PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

This chapter presents the results, analysis, and interpretation of the findings of the study. The presentation follows the order of the statement of the problem and the hypothesis that guided this investigation.

Pretest Performance of the Students in the Control and Experimental Groups

Table 7 presents the pretest writing performance of students in the control group, who had not yet received any intervention. The students attained mean scores of 11.00 in the article critique, 10.353 in the research report, and 11.765 in the position paper, resulting in an overall mean of 33.12 out of 60. Based on the revised 4-point rubric and updated performance brackets, this total score is now classified as Very Satisfactory, indicating a relatively strong baseline in academic writing proficiency.

The standard deviation values—1.732 for the article critique, 2.178 for the research report, and 1.821 for the position paper—reflect moderate variation in student performance across tasks. These values justify the standard deviation, as they indicate that while students generally performed well, there were

observable differences in how individuals approached various writing demands. The highest variation appeared in the research report, suggesting that students differed in their ability to organize technical content, integrate sources, or adhere to formal academic conventions. This observation aligns with Kilgour et al. (2019), who emphasized that variation in rubric-based scoring often reveals genre-specific writing challenges that require differentiated instructional support.

The classification of Very Satisfactory implies that students exhibited competent control of grammar, organization, and content development. They were generally able to structure their ideas, convey arguments with clarity, and adhere to the conventions of each writing genre. However, this performance level still reflects areas where higher-order writing skills, such as critical synthesis, persuasive reasoning, and stylistic sophistication, may not yet be fully developed. As Landicho (2020) observed, even high-performing Senior High School students in the Philippines often rely on surface-level coherence and struggle to deepen their written arguments without explicit modeling or iterative feedback.

From the perspective of the AAC&U VALUE Written Communication Rubric, the Very Satisfactory performance of the control group suggests foundational competence in surface-level writing skills such as grammar, syntax, and organization. These are essential traits for clear communication, and the students' consistent scores across tasks indicate their ability to manage these conventions independently. However, the rubric also measures higher-order skills such as content development, academic voice, and genre-specific structure. The relatively modest scores, especially in the research report, imply challenges in sustaining argument logic, citing credible sources, and achieving coherence across extended texts. These insights underscore the importance of structured intervention for developing both foundational and advanced writing skills, particularly in tasks that demand synthesis and academic conventions.

Further task-specific analysis highlights that research report writing remains a relative challenge for students, as evidenced by its lower mean score and higher SD. This may be due to the cognitive demands of research tasks, which require precision, logical sequencing, and the integration of credible sources. Al-Samarraie and Saeed (2018) emphasized that structured writing genres such as research reports demand instructional scaffolds beyond grammar correction, particularly when students are expected to demonstrate information synthesis and citation ethics.

Despite these challenges, the control group's baseline performance reflects a solid foundational grasp of academic writing expectations. These results are significant in validating group equivalence in pre-intervention phases and ensuring that any differences observed later can be attributed more confidently to the treatment applied, namely, the integration of Grammarly in the experimental group.

The control group's Very Satisfactory performance confirms that students began the study with a relatively high level of writing proficiency, particularly in organization, coherence, and genre awareness. This provides a stable and reliable baseline from which to measure intervention impact. However, the data also implies that more advanced writing competencies, especially those required in formal and research-based outputs, may not be consistently present among all students, highlighting the need for strategic instructional enhancement in future stages of instruction.

Table 7 Pretest Performance Profile of the Control Group

Category	Highest Expected Score	Actual Score	Standard Deviation	Description
Article Critique	20	11.00	1.732	Very Satisfactory

Research Report	20	10.353	2.178	Very Satisfactory
Position Paper	20	11.765	1.821	Very Satisfactory
Total	**60**	**33.12**	**4.45**	**Very Satisfactory**

Table 8 displays the pretest writing performance of students in the experimental group before integrating Grammarly into their instruction. Students recorded a mean score of 12.60 in the article critique, 16.70 in the research report, and 12.20 in the position paper. Based on the updated scoring rubric, the article critique and position paper fall under the Very Satisfactory category. At the same time, the research report is rated Outstanding—the total mean score of 35.50 out of 60 places the group within the Very Satisfactory performance band.

The corresponding standard deviations, which range from 2.312 to 2.951, indicate moderate to noticeable variation in student performance across tasks. The highest variability was observed in the article critique, suggesting that students displayed differing levels of ability in evaluating texts critically, skills that involve interpretation, reasoning, and academic voice. Conversely, the high average score and relatively lower variation in the research report reflect a firmer and more consistent grasp of structured writing conventions, such as formal tone, evidence integration, and sequencing of ideas.

These results imply that students in the experimental group began the study with moderately strong writing performance, especially in structured and formal genres. The Outstanding performance in the research report may be linked to prior exposure to investigatory projects and technical writing, which are commonly introduced in Grade 10 curricula. This suggests the presence of foundational academic literacy that could be further enhanced through focused intervention.

Several contemporary studies support these interpretations. For instance, Landicho (2020) confirmed that prior exposure to research writing, especially in science and social studies, can help students develop basic structural competence even without intensive formal writing instruction. Meanwhile, Temirgalieva et al. (2025) reported that higher pre-intervention performance in structured tasks strongly predicts gains when automated feedback tools like Grammarly are introduced. Moreover, Hsu et al. (2023) emphasized that AI-powered writing platforms benefit students most when they already possess a baseline familiarity with academic writing genres, enabling them to engage more meaningfully with real-time feedback. In addition, Ranalli et al. (2022) highlighted that the effectiveness of automated writing evaluation tools increases when learners possess foundational metacognitive awareness of writing goals, strategies, and structure. Their study showed that higher pre-existing writing knowledge enables students to filter and prioritize automated suggestions more effectively, leading to better revisions and learning outcomes.

The pretest data from the experimental group offer a valuable foundation for tracking writing development. While the group exhibited strong starting performance, especially in structured academic genres, variation in open-ended tasks like the article critique indicates potential areas for growth. The integration of Grammarly is expected to help bridge these gaps by providing consistent feedback on grammar, structure, and clarity, particularly in outputs where teacher-led feedback is limited. The results also establish a reliable baseline for measuring the intervention's effectiveness in enhancing writing performance across varied genres.

From the standpoint of the AAC&U VALUE Written Communication Rubric, the pretest results of the experimental group show notable strengths in grammar, organization, and surface-level mechanics, especially in the research report task. The 'Outstanding' rating in that task suggests strong performance in domains like content development and genre conventions, likely due to students' prior exposure to

structured academic writing. In contrast, lower scores and higher variability in the article critique indicate areas for growth in coherence and critical engagement—domains that require deeper reasoning and synthesis of ideas. These findings imply that while the group entered the study with a strong foundation in technical writing skills, they still needed support in higher-order competencies, which the intervention aimed to address.

Table 8 Pretest Performance Profile of the Experimental Group

Category	Highest Expected Score	Actual Score	Standard Deviation	Description
Article Critique	20	12.60	2.951	Very Satisfactory
Research Report	20	16.70	2.312	Outstanding
Position Paper	20	12.20	2.348	Very Satisfactory
Total	**60**	**35.50**	**5.54**	**Very Satisfactory**

Significant Difference in the Pretest Performance between the Control and Experimental Groups

Table 9 *Test of Difference on the Pretest Mean Scores Between the Control and Experimental Group*

Category	Mean Control	SD	Mean Experimental	SD	t-value	P-Value	Decision	Description
Article Critique	11.00	1.73	12.60	0.93	-1.56	0.144	H_0 not rejected	Not Significant
Research Report	10.35	2.18	10.70	2.31	-0.38	0.705	H_0 not rejected	Not Significant
Position Paper	11.76	1.82	12.20	2.35	-0.50	0.622	H_0 not rejected	Not Significant
Total	**33.12**	**4.46**	**35.50**	**5.54**	**-1.16**	**0.265**	**H_0 not rejected**	**Not Significant**

Table 9 presents the independent samples t-test results comparing the pretest writing performance of the control and experimental groups across three academic writing tasks and overall scores. The control group obtained mean scores of 11.00 in the article critique, 10.35 in the research report, and 11.77 in the position paper. In comparison, the experimental group scored 12.60, 16.70, and 12.20, respectively. Despite the visibly higher mean in the experimental group's research report score, all p-values across tasks—0.144, 0.705, and 0.622—along with the overall p-value of 0.265, were greater than the standard 0.05 significance level.

These results lead to the null hypothesis's non-rejection, indicating no statistically significant difference in the pretest writing performance between the two groups. This equivalence confirms that the control and experimental groups began the intervention with comparable writing performance, thus ensuring internal validity in the quasi-experimental design. Lim and Yun (2021) emphasize that establishing group equivalence at the pretest phase minimizes potential confounding variables and strengthens the interpretability of post-intervention effects.

The inclusion of standard deviation values (e.g., 3.12 for the research report in the experimental group) provides further insight into the variability of performance across tasks. While the experimental group demonstrated slightly greater dispersion, particularly in structured genres, these differences were not significant enough to affect group comparability. This is consistent with the findings of Kilgour et al. (2019), who noted that rubric-based assessment tasks tend to produce varying standard deviations due to differences in genre familiarity, cognitive demands, and students' writing strategies.

Furthermore, the results support Magadan and Tulud's (2024) framework, which stresses the importance of an equitable baseline when evaluating the effects of AI-enhanced tools such as Grammarly. By confirming that both groups started from a statistically similar level of performance, the study can more confidently attribute any posttest differences in writing improvement to the treatment condition—namely, the use of Grammarly by the experimental group.

These findings are crucial to the study's methodological rigor. The absence of a significant difference between the control and experimental groups at the pretest confirms the fairness and reliability of the comparative design. It also justifies the later use of gain scores and posttest results to evaluate Grammarly's efficacy in enhancing students' writing performance. Interpreted through the AAC&U VALUE Written Communication Rubric lens, the pretest scores suggest that both groups began with comparable proficiency levels in grammar, organization, coherence, content, and mechanics. Furthermore, the observed task-specific variation in standard deviation underscores the necessity of interpreting writing performance not solely based on raw scores, but also by examining how students respond to distinct academic genres, each of which carries unique cognitive and structural demands. This further justifies the rubric's use in capturing surface-level and higher-order writing skills critical to academic development.

Posttest Performance of the Students in the Control and Experimental Groups

Table 10 presents the posttest writing performance of students in the control group, who received traditional teacher-mediated instruction without using digital tools such as Grammarly. The students achieved a mean score of 12.235 in the article critique, 10.624 in the research report, and 12.882 in the position paper. With a total mean score of 35.94 out of 60, the group's overall performance is categorized as Very Satisfactory under the adapted AAC&U VALUE Written Communication Rubric.

The standard deviation values, ranging from 1.921 to 2.038, indicate moderate variation in task performance. The slightly higher variability in the research report suggests that students responded differently to this genre's structural and evidential demands. This validates standard deviation as a statistical tool to analyze genre-specific performance dispersion, as also discussed by Kilgour et al. (2019), who highlighted how genre-based tasks yield distinct cognitive demands and variability in writing outcomes.

The "Very Satisfactory" descriptor implies that most students demonstrated competence in grammar, organization, and coherence, yet may not have consistently exhibited depth in content, originality, or nuanced argumentation. This interpretation aligns with Landicho (2020), who reported that Filipino senior high school students often display structural control in writing but lack advanced integration of critical thinking and synthesis in formal tasks like research reporting.

Although the control group showed improvement from pretest to posttest, the results suggest that traditional instruction alone may not be sufficient to move learners beyond the Very Satisfactory range. As Li (2023) emphasized, teacher-led instruction contributes to writing performance gains, but digital

writing platforms offer additional support that boosts learner autonomy, revision fluency, and motivation, especially in academic writing tasks requiring high cognitive demand.

Moreover, the findings by Magadan and Tulud (2024) strengthen this argument, revealing that students exposed to Grammarly in a quasi-experimental Philippine context made significantly higher gains in writing performance than their traditionally taught counterparts. This implies that while the control group achieved consistent, satisfactory outcomes, the lack of real-time, automated feedback may have limited their growth in more technical aspects such as evidence-based argumentation or source integration.

The results of Table 10 validate the efficacy of traditional instruction in establishing foundational academic writing skills. Viewed through the AAC&U VALUE Written Communication Rubric, the control group's posttest performance indicates moderate to strong writing ability in grammar, organization, and coherence—domains that traditional instruction often reinforces through explicit modeling and teacher feedback. However, the sustained 'Very Satisfactory' ratings across tasks suggest that more complex domains such as content development, source integration, and genre-specific conventions may not have improved substantially. This implies that while the students could construct well-structured arguments, they may have lacked depth in generating original insights or integrating evidence effectively, especially in cognitively demanding tasks like research reports. Students were able to produce coherent outputs across multiple genres, as indicated by their Very Satisfactory ratings. However, the genre-specific variation, particularly the lower mean in research report writing, suggests that traditional feedback may fall short in supporting higher-order tasks that require source analysis, formal tone, and multi-step reasoning.

This reinforces the argument that while traditional feedback is pedagogically sound, it may need to be complemented by automated tools like Grammarly to help students reach higher descriptors such as "Outstanding," especially in writing outputs with complex structural expectations.

Table 10 Posttest Performance Profile of the Students in the Control Group

Category	Highest Expected Score	Actual Score	Standard Deviation	Description
Article Critique	20	12.235	1.921	Very Satisfactory
Research Report	20	10.624	2.038	Very Satisfactory
Position Paper	20	12.882	1.933	Very Satisfactory
Total	**60**	**35.94**	**4.48**	**Very Satisfactory**

Table 11 displays the posttest writing performance of the students in the experimental group, who used Grammarly as a writing aid during the intervention period. The results show that students scored 14.100 in the article critique, 13.300 in the research report, and 15.200 in the position paper. According to the AAC&U VALUE Written Communication Rubric, all three writing tasks fall under the Very Satisfactory descriptor range (14–16), except the research report, which approaches this level from the lower boundary. The overall average score of 42.60 out of 60 also places the group within the Very Satisfactory performance level.

The standard deviations, which range from 2.183 to 2.860, indicate moderate variability in writing performance across tasks. Notably, the highest variation was observed in the position paper, which may reflect differences in students' ability to express argumentative positions or integrate Grammarly feedback

into more subjective writing contexts. This observation aligns with Kilgour et al. (2019), who highlighted that rubric-based writing tasks are genre-sensitive and reveal varied learner responses across cognitive domains and output types.

The results suggest that students in the experimental group demonstrated strong writing performance in grammar, organization, and clarity, particularly in structured genres like article critiques and position papers. These genres benefit most from Grammarly's real-time corrective features, especially in sentence-level construction and cohesion. However, the slightly lower score in the research report implies that while Grammarly improves surface-level accuracy, students may still require explicit instruction in integrating citations, developing logical flow, and achieving a formal academic tone—skills that AI tools cannot fully scaffold alone.

This is consistent with Temirgalieva et al. (2025), who found that Grammarly significantly improved students' grammatical accuracy and sentence cohesion but had more limited impact on higher-order academic writing skills unless complemented by teacher intervention. The results also agree with Sistani and Tabatabaei (2023), who concluded that Grammarly Premium enhanced writing performance and revision quality, especially among students who previously relied on delayed or generalized teacher feedback. Similarly, Sebastián et al. (2022) reported that students using Grammarly were better able to self-correct, revise strategically, and increase awareness of writing conventions.

The posttest performance of the experimental group supports the pedagogical value of Grammarly as a supplementary writing tool. While traditional instruction builds foundational competencies, Grammarly enhances students' ability to revise efficiently, especially in structured tasks. Although the group did not reach the "Outstanding" descriptor, the measurable gain from pretest to Very Satisfactory posttest performance confirms that real-time AI feedback improved writing outcomes. More importantly, the results affirm that AI-supported revision tools like Grammarly help improve student writing in key AAC&U VALUE Written Communication Rubric domains—particularly in grammar, organization, and mechanics. These are areas where Grammarly's automated feedback is most effective. However, the slightly lower mean score in the research report suggests that domains such as content development, source integration, and disciplinary conventions—skills requiring critical thinking and nuanced reasoning—may still benefit from sustained teacher guidance. This highlights the complementary value of combining AI-assisted and teacher-led instruction for holistic writing development

Table 11 Posttest Performance Profile of the Students in the Experimental Group

Category	Highest Expected Score	Actual Score	Standard Deviation	Description
Article Critique	20	14.100	2.183	Very Satisfactory
Research Report	20	13.300	2.312	Very Satisfactory
Position Paper	20	15.200	2.860	Outstanding
Total	**60**	**42.60**	**5.82**	**Very Satisfactory**

Significant Difference in the Posttest Performance between the Control and Experimental Groups

Table 12 Test of Difference on the Posttest Mean Scores Between the Control and Experimental Group

Category	Mean Control	SD	Mean Experimental	SD	t-value	P-Value	Decision	Description
Article Critique	12.235	1.921	14.100	2.183	-2.24	0.039	H₀ rejected	Significant
Research Report	10.624	2.038	13.300	2.312	-2.81	0.012	H₀ rejected	Significant
Position Paper	12.884	1.933	15.200	2.860	-2.28	0.040	H₀ rejected	Significant
Total	**35.94**	**4.48**	**42.60**	**5.82**	**-3.12**	**0.007**	**H₀ rejected**	**Significant**

Table 12 presents the results of the independent samples t-test conducted to compare the posttest scores of the control and experimental groups across various writing tasks. The results indicate statistically significant differences in all three output categories: critique, research report, and position paper, with p-values below the 0.05 threshold. The overall posttest comparison yielded a t-value of -3.12 and a p-value of 0.007, leading to the rejection of the null hypothesis (H_0) and confirming that the experimental group, which used Grammarly, significantly outperformed the control group regarding writing performance.

In the Article Critique, the experimental group had a higher mean score of 14.100 than the control group's 12.235. The computed t-value of -2.24 and p-value of 0.039 indicate a significant difference, suggesting that Grammarly's instant feedback helped students revise and improve textual analysis and coherence more effectively than traditional instruction alone.

For the Research Report, the mean difference of 2.676 (13.300 vs. 10.624) and a t-value of -2.81 (p = 0.012) further support the conclusion that students who used Grammarly produced more structured and complete academic reports. This aligns with the view of Magadan and Tulud (2024), who found that Grammarly enhances performance in tasks requiring source integration, organization, and tone.

In the Position Paper, a t-value of -2.28 and a p-value of 0.040 indicate a significant difference in favor of the experimental group. Given that position papers require clarity of stance, persuasive structure, and logical flow, this result implies that Grammarly supported students in refining these elements through guided, immediate revision.

The consistent significance across all tasks indicates that Grammarly contributed to writing improvement across diverse genres, helping students refine grammar, structure, and coherence regardless of the task type. These results are consistent with Jelita et al. (2023) and Sebastián et al. (2022), who reported that Grammarly-assisted learners showed measurable gains in fluency and self-editing ability. Likewise, Prasetya and Raharjo (2023) found that Grammarly-supported instruction significantly reduced grammar and sentence-level errors in ESL students' academic outputs.

Viewed through the lens of the AAC&U VALUE Written Communication Rubric, the statistically significant posttest gains reflect improvements not only in surface-level domains like grammar, sentence structure, and organization, but also in higher-order dimensions such as content development and genre-specific conventions. The rubric captured how Grammarly's real-time feedback enhanced clarity and fluency across all three tasks, especially in structured academic formats. However, the improvement in the

research report also suggests gains in more cognitively demanding domains, such as synthesis, integration of sources, and sequencing of ideas—areas that the rubric is designed to evaluate comprehensively.

The findings reinforce the value of integrating automated writing feedback tools like Grammarly into classroom instruction. The significant differences observed suggest that such tools do not merely serve as error-correction aids but also enhance learners' awareness of writing quality and their ability to revise and improve across multiple writing contexts. While teacher feedback remains important, Grammarly may offer scalable support, especially in large classrooms or blended environments with limited one-on-one correction.

Significant Difference between the Pretest and Posttest Performance of the Students in the Control Group

Table 13 Test of Difference Between the Pretest and Posttest Performance of the Control Group

Category	Pretest	SD	Posttest	SD	t-value	P-Value	Decision	Description
Article Critique	11.00	1.732	12.235	1.921	-5.64	0.000	Reject H_0	Significant
Research Report	10.353	2.178	10.824	2.038	-1.65	0.119	H_0 not rejected	Not Significant
Position Paper	11.765	1.821	12.882	1.935	-4.37	0.000	Reject H_0	Significant
Total	**33.12**	**4.46**	**35.94**	**4.48**	**-7.15**	**0.000**	**Reject H_0**	**Significant**

Table 13 presents the results of the paired samples t-test comparing the pretest and posttest writing performance of students in the control group. The analysis shows that students obtained a mean score of 33.12 during the pretest and 35.94 in the posttest, resulting in an overall improvement. The computed t-value of -7.15 and p-value of 0.000 indicate that this difference is statistically significant, leading to the rejection of the null hypothesis (H_0) for the overall writing performance.

When examined by task, statistically significant improvements were also found in the article critique (t = -5.64, p = 0.000) and position paper (t = -4.37, p = 0.000). These results suggest that traditional instruction had a measurable and positive effect on students' performance in these specific genres, particularly in tasks that involve expressing a stance and critiquing texts—skills often reinforced in literature or communication-based subjects.

However, the result for the research report (t = -1.65, p = 0.119) shows no significant improvement, implying that traditional instruction alone may not be sufficient to foster higher-order competencies such as technical formatting, evidence integration, or formal register skills more prominent in research-based writing. This finding supports the observation by Landicho (2020) that many senior high school students struggle with the demands of structured research writing, especially when instruction is limited to generalized feedback or textbook-based modeling.

The significant gains in article critique and position paper writing reflect how teacher-led instruction can still support writing development in familiar genres. However, the lack of significant improvement in research report writing highlights a genre-sensitive limitation of traditional methods, as also observed by Al-Samarraie and Saeed (2018), who emphasized that complex writing tasks often require supplementary support, such as scaffolding, exemplars, or digital tools, for learners to improve meaningfully.

These results also suggest that while traditional instruction can yield gains over time due to cumulative practice and internal feedback mechanisms, its effects may not be uniform across genres. Shin et al. (2021) noted that teacher-centered instruction supports gradual growth in routine writing activities but may lag in tasks requiring synthesis, formal tone, or multi-source citation.

These genre-based outcomes align with the dimensions assessed by the AAC&U VALUE Written Communication Rubric. The rubric highlights gains in grammar, organization, and disciplinary conventions—areas that improved in the article critique and position paper. However, the stagnant performance in research writing points to underdeveloped source integration and content development competencies, which are more rigorously evaluated in research-based tasks. This demonstrates how the rubric guided scoring and clarified the specific strengths and instructional gaps in the students' writing.

The results from Table 13 confirm that the control group improved significantly in two out of three writing tasks, showing that traditional teaching methods remain effective in specific contexts. However, the lack of significant progress in research report writing underscores the importance of targeted interventions for more technical and cognitively demanding outputs. These findings serve as a valuable benchmark for evaluating the enhanced effects of digital writing tools such as Grammarly in the experimental group, which are analyzed in the succeeding sections.

Significant Difference between the Pretest and Posttest Performance of the Students in the Experimental Group

Table 14 displays the results of the paired samples t-test comparing the experimental group's pretest and posttest writing performance, which used Grammarly as an AI writing support tool during the intervention. The total pretest mean score was 35.50, which improved to 42.60 in the posttest, resulting in a mean gain of 14.73 points. The overall t-value of -14.73 and p-value of 0.000 confirm that the improvement is statistically significant, leading to the rejection of the null hypothesis (H_0) for total writing performance.

Table 14 Test of Difference Between the Pretest and Posttest Performance of the Experimental Group

Category	Pretest	SD	Posttest	SD	t-value	P-Value	Decision	Description
Article Critique	12.60	2.95	14.10	2.18	-1.29	0.215	H_0 not rejected	Not Significant
Research Report	10.700	2.312	13.300	2.312	-6.15	0.000	Reject H_0	Significant
Position Paper	12.200	2.348	15.200	2.860	-9.00	0.000	Reject H_0	Significant
Total	**35.50**	**5.54**	**42.60**	**2.82**	**-14.73**	**0.000**	**Reject H_0**	**Significant**

Examining the data by writing tasks reveals mixed results. Significant improvements were observed in the research report and position paper. The research report improved from a mean of 10.700 to 13.300 (t = -6.15, p = 0.000), and the position paper rose from 12.20 to 15.20 (t = -9.00, p = 0.000). These statistically significant gains suggest that Grammarly positively influenced the students' ability to structure complex

arguments, cite sources appropriately, and enhance sentence-level accuracy—skills especially relevant in these genres.

However, the article critique did not show a statistically significant difference (t = -1.29, p = 0.215), suggesting that Grammarly's automated feedback may have been less effective in supporting critical analysis, evaluative reasoning, or nuanced textual interpretation—cognitive tasks that may still require direct teacher modeling and scaffolding. This aligns with Hsu et al. (2023), who found that while digital tools effectively enhance grammar and mechanics, their support for higher-order thinking skills is limited without human mediation.

These findings are consistent with those of Temirgalieva et al. (2025), who concluded that Grammarly significantly improved student outcomes in structured academic writing (e.g., reports, and expository essays) but had less consistent effects in subjective or critique-based outputs. Similarly, Kara and Ayaz (2021) emphasized that when digital writing tools are integrated into writing instruction, they can improve students' editing behavior and raise their awareness of formal conventions, particularly in academic or research-based tasks.

The results demonstrate that Grammarly's real-time, adaptive feedback significantly helped students revise their writing more effectively. The substantial gains in research report and position paper tasks suggest that Grammarly supports structural clarity, lexical precision, and self-correction—especially in outputs where grammatical accuracy and logical flow are emphasized. While it may not fully support critical evaluation in tasks like article critiques, its integration enhances student performance in more formal academic writing contexts.

When viewed through the AAC&U VALUE Written Communication Rubric, these outcomes underscore Grammarly's impact on specific dimensions of writing. The notable gains in research reports and position papers indicate improvement in areas such as *Control of Syntax and Mechanics*, *Genre and Disciplinary Conventions*, and *Sources and Evidence*. Meanwhile, the non-significant result in the article critique suggests that gains were less evident in *Content Development* and *Context and Purpose for Writing*, which demand deeper analysis and argumentation—domains where teacher-guided feedback may remain essential.

This analysis strengthens the case for incorporating AI-assisted writing tools in the classroom as a complementary strategy, not as a replacement for teacher feedback, especially when the writing outcomes require deep interpretation, stance-taking, and argument evaluation.

Significant Difference in the Mean Gain Performance obtained between the Control and Experimental Groups

Table 15 Test of Difference on the Mean Gain Scores Between the Control and the Experimental Group

Category	Mean Gain Control	SD	Mean Gain Experimental	SD	t-value	P-Value	Decision	Description
Article Critique	2.235	0.903	1.50	1.35	-0.55	0.591	H_0 not rejected	Not Significant
Research Report	0.47	1.16	2.60	1.26	-4.33	0.00	Reject H_0	Significant

Position Paper	1.12	1.05	3.00	1.05	-4.48	0.00	Reject H_0	Significant
Total	**2.282**	**1.63**	**7.10**	**1.52**	**-6.86**	**0.00**	**Reject H_0**	**Significant**

Table 15 presents the results of the independent samples t-test comparing the mean gain scores between the control and experimental groups across three writing tasks and overall writing performance. The mean gains were calculated by subtracting each student's pretest score from their posttest score.

For the article critique, the control group recorded a higher mean gain (2.235) than the experimental group (1.50). However, the resulting t-value of -0.55 and p-value of 0.591 indicate that the difference is not statistically significant, leading to the non-rejection of the null hypothesis. This implies that both groups improved similarly in this specific task, or that Grammarly's effect on critique-based writing, where interpretation and evaluative reasoning are key, was limited without direct teacher guidance. This is consistent with Hsu et al. (2023), who found that automated writing tools may be less effective in enhancing analytical and critical tasks than structural ones.

In contrast, statistically significant differences were observed in both the research report and position paper tasks. The experimental group showed a mean gain of 2.60 in the research report and 3.00 in the position paper, while the control group recorded only 0.47 and 1.12, respectively. The corresponding t-values of -4.33 and -4.48, with p-values of 0.000, confirm the rejection of the null hypothesis in both cases. This suggests that Grammarly contributed substantially to performance improvement, particularly in genres that benefit from structured organization, clarity, and grammar-focused feedback.

The total mean gain for the control group was 2.282 (SD = 1.63), compared to 7.10 (SD = 1.52) for the experimental group. The overall t-value of -6.86 and p-value of 0.000 strongly support the two groups' significant difference in writing gains. These findings validate Grammarly's usefulness in promoting measurable learning outcomes across multiple writing dimensions.

When interpreted using the AAC&U VALUE Written Communication Rubric, the results highlight Grammarly's influence on specific writing domains. The most significant gains were observed in dimensions such as *Control of Syntax and Mechanics* and *Genre and Disciplinary Conventions*, which are more responsive to AI-generated feedback. In contrast, the minimal gain in article critique suggests less improvement in *Content Development* and *Context and Purpose for Writing*, where deeper analysis and argument construction are needed—areas that typically benefit from human-led scaffolding.

The results of Table 15 strongly reinforce Grammarly's pedagogical value as a writing support tool in secondary education. The significant improvements observed in the experimental group, particularly in structured genres, align with the results of Temirgalieva et al. (2025) and Sebastián et al. (2022), who documented similar gains among learners using Grammarly for research writing and academic composition. Additionally, Sistani and Tabatabaei (2023) reported that Grammarly's real-time, adaptive feedback encouraged student autonomy, facilitated self-revision, and improved clarity in academic writing.

While traditional instruction proved sufficient for some degree of progress, the results suggest that technology-enhanced feedback substantially impacts student writing, particularly in areas requiring precision and organization. These findings support the integration of AI-based tools into blended instruction frameworks to optimize student outcomes.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents the study summary, the conclusions drawn, and recommendations offered.

Summary

This study investigated the effects of Grammarly on the writing performance of Senior High School students at Sulangon National High School. Specifically, it examined whether Grammarly could significantly enhance students' academic writing in three key genres: article critique, research report, and position paper. A total of 27 Grade 11 students from the STEM and HUMSS strands were assigned to control and experimental groups. Both groups completed identical pretest and posttest writing tasks. The experimental group received AI-generated feedback via Grammarly, while the control group received traditional teacher-mediated feedback.

Employing a quasi-experimental pretest-posttest nonequivalent group design, the study utilized both paired and independent samples t-tests at a 0.05 significance level. Results revealed that the experimental group demonstrated greater gains in writing performance, particularly in research reports and position papers. These improvements evaluated using the AAC&U VALUE Written Communication Rubric, underscore Grammarly's effectiveness in supporting grammar, organization, and coherence. However, the absence of statistically significant improvement in article critique tasks suggests that higher-order thinking skills such as critical analysis and evaluative reasoning may require direct, teacher-led instruction. Overall, the findings support the integration of Grammarly as a supplementary tool within blended feedback models, especially for enhancing structural aspects of writing in academic settings.

Findings

From the data gathered, it was revealed that:

1. The pretest performance of the control and experimental groups was generally satisfactory, with the experimental group slightly outperforming the control group.
2. The pretest scores between the control and experimental groups were not significantly different, indicating baseline equivalence.
3. The posttest results showed that the experimental group performed very satisfactorily and scored notably higher than the control group, which remained in the satisfactory range.
4. The posttest scores of the two groups were significantly different, favoring the experimental group that used Grammarly.
5. The control group showed significant improvement in article critique and position paper writing, but not in research report writing.
6. The experimental group showed significant improvement in writing research reports and position papers, but not article critiques.
7. There was a significant difference in gain scores between the control and experimental groups, with the experimental group achieving greater improvement overall.

Conclusions

This study concludes that integrating Grammarly as an AI-assisted writing tool meaningfully supports the academic writing development of Senior High School students, particularly in structured tasks such as research reports and position papers, where clarity, coherence, and technical precision are essential. The comparable pretest performance of the control and experimental groups confirmed their initial

equivalence, reinforcing the validity of the observed post-intervention differences. The experimental group demonstrated significantly higher posttest and gain scores, suggesting that Grammarly effectively enhances students' grammar accuracy, sentence construction, and organizational coherence. Nonetheless, the absence of significant improvement in article critique writing highlights the tool's limitations in fostering higher-order cognitive skills such as critical analysis and synthesis—dimensions of academic writing that may require more nuanced, teacher-mediated instruction. Consequently, while Grammarly serves as a valuable supplementary resource, its pedagogical efficacy is maximized when implemented within a blended learning framework that incorporates teacher feedback, writing scaffolds, and sustained revision practices. These findings align with the Constructivist Learning Theory and educational technological frameworks, underscoring the need for integrative instructional strategies that merge technological innovation with sound pedagogical principles.

Recommendations

Based on the findings and conclusions, the following recommendations are offered:

1. Teachers may conduct baseline writing diagnostics at the start of the semester to identify initial competencies and guide instruction.
2. Master teachers may ensure group equivalence using standardized rubrics and diagnostic tools before implementing classroom research.
3. School heads may implement Grammarly as a support tool for enhancing academic writing performance, especially in senior high schools.
4. Curriculum planners may promote AI-based writing tools like Grammarly as instructional support for improving academic writing outcomes.
5. English teachers may reinforce article critique instruction through scaffolding and structured feedback while enhancing support for research writing.
6. Teachers may integrate teacher-guided feedback with Grammarly to address higher-order skills needed in critical tasks like article critique writing.
7. ICT coordinators may consider institutional subscriptions to Grammarly for equitable access and sustained writing development.
8. Future researchers may conduct longitudinal and cross-disciplinary studies on Grammarly's impact, exploring its usefulness across different subjects, academic levels, and student populations. This can provide further insights into the sustainability and adaptability of digital writing support tools.

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