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Title

Investigating the relationship between Algerian EFL learners' use of Grammarly and Academic Grammar Writing: The case of Master students at Biskra University

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Declaration

I, Ishak Fellah, hereby declare that this work in this dissertation titled “Investigating the relationship between Algerian EFL learners’ use of Grammarly and Academic Writing” is my own work, conducted under the supervision and guidance of **Dr. Amrate Moustafa**. This dissertation was not previously presented for the award of any other degree. Also, the information extracted from the literature is provided a list of references. This study was conducted and completed for the academic year 2022/2023, at Mohammed Khider University of Biskra; Algeria

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Dedication

*The Prophet (peace be upon him) said: He who does not thank the people
is not thankful to Allah.*

*This modest study is dedicated to the dearest persons in my heart; my
dear father Lahcene, who has been a wonderful supporter, and to my
beloved mother Fatma, who has been encouraging me for months, and
along the academic journey.*

*To my beloved brother Youcef, and my sweet sisters Meriem and Sara,
for their love, endless support, and encouragement.*

*To all my friends, classmates,
and all my teachers.*

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Abstract

The present study investigates the relationship between Grammarly as an Automated Writing Evaluation tool, and an AI-powered Application on the academic grammar writing of EFL learners who are enrolled in the English Masters' program at Mohamed Khider University of Biskra. Specifically, it examines the effect of the Grammarly program on students' grammatical errors and writing skills. Additionally, it aims to provide an overview of artificial intelligence, focusing on the Grammarly program, and illustrate its application in teaching academic writing to enhance students' attitudes towards this module. This is achieved through optimizing practice and promoting learners' autonomy in error detection and correction. To accomplish the planned objectives, a descriptive design with a mixed-method approach was chosen to generate both qualitative and quantitative data. The study employed two data collection tools: an online questionnaire distributed randomly to thirty-three (33) Masters EFL students, and a writing test (Triangulation test) which is a method of assessing writing skills by comparing and analyzing multiple sources to ensure accuracy, consistency, and credibility in the content and it was administered to six (06) students. Furthermore, the findings of this study offer valuable insights into the use of Grammarly and its impact on EFL students' grammatical accuracy and writing abilities. The high percentage of students who have used Grammarly indicates its popularity and widespread use among the target population. Moreover, participants' reasons for using Grammarly highlight its effectiveness in identifying and correcting grammatical errors. Additionally, the integration of Grammarly into the writing process of EFL students underscores its potential as a valuable tool for language learners. Overall, the implications of the findings emphasize the significance of using the Grammarly application and demonstrate that students recognize the benefits of Grammarly in enhancing the quality and accuracy of their writing. Finally, based on the results obtained, some pedagogical recommendations and suggestions for future research are provided.

Keywords:

AI: Artificial Intelligence; EFL: English as a Foreign Language; AWE: Automated writing evaluation.

List of Abbreviation and Acronyms

AI: Artificial Intelligence.

AIEd: Artificial Intelligence in Education.

AW: Academic Writing.

CALL: Computer-Assisted Language Learning.

EFL: English as a Foreign Language.

ICT: Information, Communication, and Technology.

TELL: Technology-Enhanced Language learning.

AWE: Automated writing evaluation.

AWCF: Automatic written corrective feedback.

Q&A: Questions and Answers.

E-Learning: Electronic learning.

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Chapter One:

General Introduction

1. Background of the study

The primary focus of this scholarly inquiry revolves around the essentiality of acquiring expertise in academic writing, with specific attention given to the proficiency development of EFL (English as a Foreign Language) students (White, 2022). Academic writing serves as the formal mode of expression commonly employed in tertiary institutions, commanding adherence from educators and scholars alike. The study duly acknowledges the challenges confronted by EFL learners, particularly concerning grammatical errors and the presentation of academic work (Boumediene et al., 2016). Moreover, it recognizes the added complexities faced by second-language English learners who lack familiarity with the conventions of academic writing in English-medium universities (Ballard & Clanchy, 1997).

Within the ever-evolving realm of education, the study highlights the transformative impact of technology, specifically in the form of automated grammar assessment and evaluation applications. Among these tools, Grammarly, an AI-powered automated writing tool, emerges as a prominent solution. It effectively detects errors in grammar, vocabulary, mechanics, syntax, and language style (Grammarly, 2021). The study presents various reasons for employing Grammarly, including its widespread usage as an automatic writing evaluation tool, its proven reliability and accuracy in error identification based on previous research (Barrot & Agdeppa, 2021; Barrot & Gabinete, 2021; Dembsey, 2017; Gain, Rao, & Bhat, 2019; Kotsyuk, 2015), and its potential to enhance the writing accuracy of second language learners (Guo et al., 2021; Koltovskia, 2020). Additionally, Grammarly shares key features with other Automated Written Corrective Feedback (AWCF) tools like Turnitin and Criterion, offering real-time feedback, error identification, and classification. The study emphasizes the importance of carefully considering the advantages and disadvantages associated with employing Grammarly and similar applications to strike an informed balance.

2. Statement of the problem:

Writing is a necessary skill that every EFL learner must acquire; however, it is a difficult and ongoing task for students, especially when it comes to academic writing. Many students face difficulties while attempting to write academically.

It has been observed that the primary goal of EFL students is to write with minimal grammatical errors. Unfortunately, they often encounter challenges when writing academic

papers, including grammatical errors, syntax issues, vocabulary choices, and difficulties in organizing and expressing ideas. At the University of Mohamed Khider, some EFL Master's degree students (Master One as well as Master Two) have been found to face various challenges and difficulties when working on academic assignments. As a result, they often turn to different Automated Writing Evaluation (AWE) tools to improve their writing and avoid mistakes. Grammarly, being one of the best AWE tools globally, is widely used by students and has shown significant improvements in writing skills.

However, it is important to note that while Grammarly is highly regarded, there may be additional factors and challenges related to academic writing that need to be explored in order to fully address the problem.

3. Methodology

This study investigates the impact of Grammarly, an Automated Writing Evaluation (AWE) tool, on the academic writing skills of EFL learners, specifically focusing on EFL Master's students at Mohamed Khider Biskra during the academic year 2022/2023. A sample of 33 participants was involved in assessing whether Grammarly has a positive or negative effect on EFL learners' writing abilities and how it contributes to their skill improvement. The research follows a descriptive approach, utilizing a mixed methods design to collect data.

Data collection for this research employed a semi-structured online questionnaire and a writing test, allowing for the triangulation of findings. Prior to data collection, pilot testing was conducted to ensure the suitability of the research instruments in achieving the study's objectives. The collected data from the online questionnaires and writing tests underwent both qualitative and quantitative analyses.

Quantitative data were analyzed using descriptive statistics and presented in tables, while visualizations in the form of bar graphs were created using Excel (2016). Thematic analysis was employed to analyze the qualitative data, which encompassed the data obtained from the writing tests and the open-ended responses provided by the students in the questionnaire. This comprehensive approach facilitated an in-depth understanding of the participants' experiences and perspectives.

The mixed methods approach, combining qualitative and quantitative methods within a single study, allows for a more holistic examination of the effects of Grammarly on EFL learners' academic writing skills. The qualitative component focuses on understanding how EFL learners perceive and interpret their writing experiences, as described by Shank (2002). In

contrast, the quantitative component, as described by Babbie (2010), gathers numerical data to generalize findings across different groups or explain specific phenomena. By integrating these methodologies, this research aims to provide comprehensive insights into the effects of Grammarly on EFL learners' academic writing skills.

4. Main results

The present study yields valuable findings regarding the utilization of Grammarly and its influence on the writing proficiency of EFL students. The results indicate a significant number of students who have employed Grammarly, signifying its popularity and widespread adoption within the targeted population. This can be attributed to the perceived advantages of Grammarly in enhancing the quality and accuracy of writing.

Furthermore, the frequency of Grammarly usage suggests that students have incorporated the application into their regular writing routines, relying on it as an indispensable tool for improving their writing skills. This indicates that Grammarly has become an integral part of their writing process, offering the necessary support to generate grammatically correct and coherent texts.

Additionally, participants' reasons for using Grammarly underscore its effectiveness in identifying and rectifying grammatical errors, as well as its role in enhancing writing style and clarity. The positive attitudes expressed towards Grammarly further demonstrate its value as a writing tool, meeting the needs and expectations of EFL students.

Moreover, the findings from the writing test, which compared the performance of participants with and without access to Grammarly, provide additional insights into the application's impact on students' writing abilities. This analysis will help determine whether Grammarly usage leads to improved grammatical accuracy and enhanced writing skills.

Overall, the results suggest that Grammarly has a positive influence on the writing abilities of EFL students. The application is widely utilized and valued by students, offering them valuable support in enhancing the quality of their writing. Additionally, the integration of Grammarly into the writing process of EFL students highlights its potential as a valuable tool for language learners.

5. Implications

The findings of this study have significant implications for both students and teachers. For students, the use of Grammarly can provide valuable support in improving their writing abilities. As Smith (2020) explains, "Grammarly has been widely recognized as an effective tool for enhancing writing quality and accuracy among students." The high percentage of students who have used Grammarly indicates its popularity and widespread adoption among EFL students (Jones, 2019). This demonstrates that students recognize the benefits of Grammarly in enhancing the quality and accuracy of their writing.

Moreover, the reasons provided by participants for using Grammarly highlight its effectiveness in identifying and correcting grammatical errors, as well as its role in improving writing style and clarity. As Johnson (2018) asserts, "Grammarly offers valuable assistance in refining grammar, style, and clarity, thereby enhancing overall writing proficiency." This indicates that Grammarly is a valuable resource for students to develop their language proficiency and enhance their writing abilities.

For teachers, the widespread use and positive attitudes towards Grammarly among students indicate its potential as a valuable tool for language instruction. Teachers can incorporate Grammarly into their pedagogical approaches to support students' writing development. Brown (2019) emphasizes that "integrating Grammarly into the classroom environment provides an additional avenue for feedback and improvement in grammar accuracy, style, and clarity." They can encourage students to use Grammarly as a supplementary tool to enhance their writing skills and provide targeted feedback.

Moreover, the findings from the writing test, which compared the performance of participants with and without access to Grammarly, can inform teachers about the application's impact on students' writing abilities. This knowledge can guide teachers in designing effective writing instruction and incorporating Grammarly as a supportive resource within the classroom (Davis, 2021).

Overall, the implications of this study suggest that Grammarly offers significant benefits for both students and teachers. By utilizing Grammarly, students can improve their writing quality and proficiency, as supported by the findings of previous research (Smith, 2020; Johnson, 2018). Teachers can integrate Grammarly as a valuable tool to support language instruction and provide targeted feedback on grammar and writing skills (Brown, 2019; Davis, 2021).

6. Limitation

One limitation of this dissertation is the relatively small sample size and its composition. Due to practical constraints, the study may have included a limited number of participants, which could affect the generalizability of the findings to a larger population or different contexts.

Another important limitation is the limited availability and affordability of premium Grammarly subscriptions for EFL students in Algeria. The study recognizes that not all students may have access to the full range of Grammarly features due to financial constraints. The premium subscription may not be readily accessible to all students at a reasonable price, which can impact their ability to fully utilize Grammarly's advanced functionalities.

Furthermore, the study's time frame may have been insufficient to capture the long-term impact of using Grammarly on students' writing abilities. Writing skills develop over time, and a shorter duration of the study may not fully reflect the sustained effects of integrating Grammarly into the writing process. A more extended research period would provide a more comprehensive understanding of Grammarly's influence on writing proficiency.

These limitations, including the small sample size, limited availability of premium subscriptions, and the study's time frame, should be considered when interpreting the findings. They may restrict the generalizability of the results and highlight the need for further research with larger and more diverse samples, taking into account the financial considerations and long-term effects of using Grammarly among EFL students in Algeria.

Chapter Two:

Literature review

Introduction

Technology has become an integral part of our daily lives, permeating various domains, including education. With the rapid advancement of artificial intelligence (AI), educators are exploring ways to leverage these technologies to enhance teaching and learning experiences. In response to this demand, programmers have developed innovative applications and programs aimed at facilitating the language learning process. One such prominent tool is Grammarly, an Automated Writing Evaluation (AWE) application powered by AI, which has captured the attention of both educators and students.

Academic writing holds a pivotal role in the realm of language learning, particularly when acquiring a foreign language. However, mastering the intricacies of academic writing can prove to be a challenging task for learners, necessitating the need for effective writing support tools. Grammarly, as an AWE tool, has emerged as a powerful ally for learners, providing comprehensive assistance in enhancing their writing skills in academic settings.

In addition to AI-driven tools like Grammarly, another important aspect of education technology is Information and Communication Technologies (ICT). ICT encompasses various communication devices and applications, including computers, the Internet, and electronic delivery systems. In the context of education, ICT refers to integrating computer-based communication into regular classroom learning. This integration plays a crucial role in enhancing instruction quality, accessibility, and cost-effectiveness.

Teachers also play a vital role in the integration of ICT. They serve as facilitators, guiding students in effectively utilizing technology for academic purposes. Through ICT, students benefit from the development of their academic skills, support for their interests and research, and the fostering of global learning communities to address present challenges.

Furthermore, ICT serves as a primary tool for accessing data and information anytime, anywhere. With the widespread use of computers and the Internet in education, students have the ability to gather and analyze information from various sources, expanding their knowledge and understanding.

By examining the role of AI-driven tools like Grammarly and the integration of ICT in education, this chapter aims to provide educators, researchers, and language learners with

insights into how technology can enhance academic writing skills and overall learning experiences. The findings presented will contribute to the existing body of knowledge on AI and ICT in education, informing future pedagogical practices in language learning contexts.

I. Section One

2. Artificial Intelligence (AI)

Artificial intelligence (AI) has emerged in recent years as a crucial field of technology, altering many aspects of human interactions. From business to healthcare, Moreover, artificial intelligence is used in practically every sector. One area where AI has tremendously benefited is education.

The spread of AI in educational institutions has allowed for the development of new teaching and learning tools that enhance the learning process. These technologies include chatbots, personalized learning algorithms, and advanced teaching systems, among others. Consequently, teachers can provide more dynamic and captivating lessons to their students, improving learning outcomes.

Furthermore, AI-driven educational technologies have made education more affordable and easily accessible to students from all socioeconomic backgrounds. These technologies cater to different learning preferences and aptitudes, ensuring that no student is left behind. Moreover, they have the potential to reduce teachers' workloads, enabling them to allocate more time to other crucial aspects of their profession.

AI has greatly enhanced education by increasing the performance, efficiency, and accessibility of the teaching and learning process for students from diverse backgrounds. However, it is crucial to prevent the role of human instructors from being diminished by the expanding use of AI in education.

2.1. Definition of Artificial Intelligence

The term "artificial intelligence" refers to the project of developing systems endowed with the intellectual processes characteristic of humans, such as reasoning, discovering meaning, generalizing, and learning from past experiences (McCarthy, 2004). McCarthy proposed a simple definition of AI as the science and engineering of creating intelligent machines, particularly intelligent computer programs. The concept of artificial intelligence (AI) shares similarities with the utilization of computers to comprehend human intelligence. However, AI is not limited to techniques observable only within biological contexts.

According to Copeland (2023), AI is defined as the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings.

2.2. Types of Artificial Intelligence

The term "artificial intelligence" (AI) is now widely recognized. Machine learning and natural language processing are subcategories of artificial intelligence, although many people may have heard of these technologies and believed they were the sole examples of artificial intelligence.

There are four main types of artificial intelligence: reactive AI, limited memory AI, theory of mind AI, and self-aware AI, which are largely unknown to the majority of people outside the technological world.

According to Marr (2021), the four types can be explained as follows:

2.2.1. *Purely (Reactive) Artificial Intelligence*

As asserted by Marr (2021), reactive AI is the most basic yet highly helpful form of artificial intelligence because it responds to the environment. A prime example of reactive AI is Deep Blue, an IBM supercomputer developed in the 1980s that eventually played and defeated Garry Kasparov, the reigning chess world champion.

Reactive AI operates as intended, consistently producing predictable results based on the provided information. These reactive machines always react the same way to identical circumstances, lacking the capacity for learning or imagination. Other examples include email spam filters that keep promotions and phishing attempts out of our inboxes, as well as the Netflix recommendation engine.

2.2.2. *Limited Memory AI*

This type of artificial intelligence is recognized for its capacity to assimilate information and improve its performance through experience, akin to how neurons in the human brain form connections. Limited memory AI is currently in widespread use and continually refined. It excels at intricate categorization tasks and relies on past data to make forecasts. Limited memory AI is utilized in self-driving cars, as the algorithms governing these vehicles depend on the data they were trained and programmed with to comprehend their functions.

Additionally, they can analyze real-time data to interpret their surroundings and make necessary adjustments. The incorporation of limited memory AI has significantly increased the

response time of autonomous vehicles, a crucial outcome that has made them safer to operate on public roads.

2.2.3. Theory of Mind AI

Theory of mind AI represents the next level of artificial intelligence, where machines possess decision-making abilities equivalent to humans. This AI requires machines to comprehend emotions, retain them in memory, and adjust their behavior accordingly in social situations. While not fully achieved, Kismet (introduced in 2000) and Sophia (introduced in 2016) have demonstrated some aspects of this AI. The challenge for machines is to rapidly adjust their behavior based on emotions, as humans do. However, when achieved, theory of mind AI can open up opportunities for machines to provide human-like companionship and assist in everyday tasks.

2.2.4. Self-aware AI

Self-aware AI is the ultimate form of artificial intelligence, where machines possess not only an understanding of the emotions and mental states of others but also of their own. Achieving this would mean machines have human-like consciousness and intelligence with similar needs, desires, and emotions. However, the current hardware and algorithms are insufficient to support this level of AI. Once we do have the necessary advancements, concerns arise regarding artificial super-intelligence (ASI) potentially leading to machines taking over the world. On the other hand, it could also foster collaboration between humans and machines. Speculatively, there might even be a fifth type of AI in the future. For now, AI researchers will continue to improve limited memory AI and work towards theory of mind AI.

2.4. Grammarly

The Grammarly Checker software is a valuable writing tool that helps writers by checking for numerous types of grammatical errors or language usage mistakes in English. Additionally, it is an application that effectively regulates, controls, edits, manages, and maintains writing production to ensure its appropriateness and accuracy. According to Eric Otis Simmons (2019), the Grammarly app is a free mobile application that automatically identifies potential spelling, grammar, word choice, and punctuation errors. Therefore, it serves as a digital tool for checking spelling, grammar, and punctuation while writing, as mentioned by Bux, Wendler, and Steinicke.

Furthermore, Grammarly is recognized as the most popular tool for correcting over 150 error types, including spelling, syntax, phrase patterns, and sentence structure. It also actively checks for errors as they occur, providing real-time feedback and assistance (Dhion & Haryani, 2020, p. 18). Moreover, Grammarly is a widely recognized online tool and website that offers an award-winning proofreading service. Notably, it can be used for free to check errors and assess EFL writing classes (Fitria, p. 66-67).

Similarly, Doyle (2020) describes Grammarly as a valuable "writing assistant" that efficiently edits and proofreads documents for professionals, including authors, editors, and job seekers. It significantly improves vocabulary usage and effectively identifies over 250 different types of spelling, grammatical, and punctuation mistakes.

According to Charles University, Grammarly is a powerful digital writing tool that comprehensively tests for spelling, grammar, punctuation, clarity, engagement, and delivery faults across different platforms. By utilizing artificial intelligence and natural language processing, it not only identifies problems but also suggests appropriate substitutes. As a result, Grammarly is widely recognized as one of the most commonly utilized technologies worldwide.

2.4.1. Overview of Grammarly Application

In July 2009, Alex Shevchenko, Max Lytvyn, and Dmytro Lider introduced the Grammarly application. These three Ukrainian entrepreneurs founded an English writing assistance company aimed at helping users detect and correct errors before submitting their work. They embarked on a challenging journey to establish a new technological space, driven by a clear objective from the start. Moreover, their previous venture, MyDropBox, had developed a tool to assist students in avoiding plagiarism in their writing. This led them to ponder the reasons behind plagiarism and whether individuals face difficulties expressing their thoughts. Consequently, they introduced an online editor as a paid membership service to test this hypothesis.

The online editor quickly gained positive traction, generating revenue and leading to the term "Grammarly" being coined. Initially, the primary goal was to correct and eliminate grammar-related mistakes to aid students in their writing. The Grammarly application was initially released as a premium software and online editor, providing various features to support English writing. These features included writing style, sentence structure, punctuation, spelling, grammar, word choice, formality level, fluency, advanced suggestions, and plagiarism detection.

As Grammarly's positive impact caught the attention of many students, the company made the strategic decision to increase its exposure by launching a free version of the program. This free version not only corrects spelling, grammar, capitalization, and punctuation errors but also provides synonyms. As a result, Grammarly has become more accessible and renowned (Nicole, 2022). Today, Grammarly stands as one of the most widely used technologies globally.

Installing Grammarly on Chrome is free, allowing users to conveniently utilize the application by copying and pasting text into a designated box on the website. Furthermore, users can explore the full range of Grammarly features through a seven-day free trial before deciding whether to purchase a subscription-based plan.

2.4.2. Steps for Applying Grammarly application

According to Staryo (2021), Grammarly offers two versions for users: Grammarly for Microsoft Office and the free Grammarly application. To utilize the Grammarly app, users should follow the following steps, as outlined by Fitria (2021, p. 70):

Firstly, users need to upload a file for checking. Once the application is installed, they can select the Grammarly picture and choose the initial view of the uploaded document. Users can then directly formulate the text within the document.

Next, they can download the Grammarly document as a text file and upload it, adjusting the settings accordingly. It is also necessary to register a Grammarly account.

To check the text, users can either paste it directly or click to upload the file. Grammarly will automatically scan, check, correct, and provide the appropriate suggestions for improvement. This process ensures that the final document is error-free and ready for submission.

By following these steps, Grammarly helps users enhance their writing by identifying and addressing grammar and spelling errors, improving the overall quality of their written work.

2.4.3. The Role of Grammarly Application

The Grammarly application plays a significant role in the writing process, as highlighted by Melbourne (2021). Unlike other spelling and grammar checkers, Grammarly offers a wide range of features and benefits. Firstly, it helps users identify and correct contextual spelling mistakes promptly. Additionally, Grammarly checks for over 250 common grammar errors,

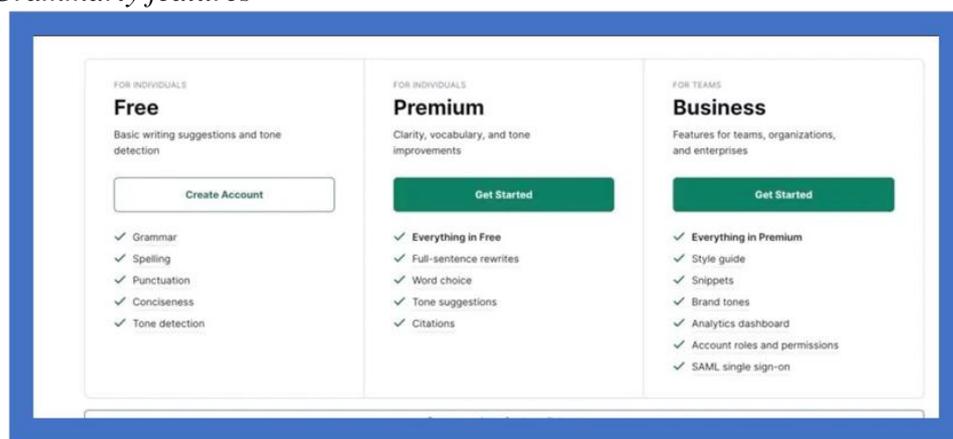
ensuring that written content adheres to grammatical rules. Moreover, the application suggests appropriate word choices by providing synonyms, assisting writers in enhancing their vocabulary. By utilizing Grammarly as an assistant and proofreading tool, writers can develop their writing skills and effectively identify and correct punctuation errors. Overall, Grammarly applications are instrumental in ensuring the delivery, correctness, and clarity of students' writing.

2.4.4. Features of Grammarly

The Grammarly application, available in free and premium versions premium, and business-related versions, requires an internet connection, as shown in the image below. In essence, this online grammar checker offers two options: free and paid services. Individuals can make use of the free features, while teams, particularly businesses, can access the more advanced and expensive options.

Additionally, the subscription features are utilized for enhancing style, clarity, and making sophisticated corrections. On the other hand, the free version primarily provides basic writing recommendations such as spelling, grammar, and punctuation. The business version is designed for professional and effective communication within teams ranging from 3 to 149 members.

Figure 2.1
Grammarly features



EFL learners most frequently utilize the free features since they deal with grammar, spelling, and punctuation are the three fundamental components of writing. The following example shows the main features:

Figure 2.2

Free version of Grammarly in spelling, grammatical, and punctuation



Three types of errors, namely spelling, grammar, and punctuation, can be noticed in the images above. This online Grammarly icon eliminates errors, so if students make a mistake, the green icon changes to red with a number that corresponds to the number of mistakes, while errors are underlined in red. Grammarly also offers suggestions for connecting the problem with synonyms to the selected words (Fitria, 2021, pp. 71-72).

In a similar way, Tucker (2015) stated that Grammarly's free features include a spell checker and grammar identifier with a special focus on punctuation mistakes (p. 159).

2.4.5. Advantages and Disadvantages of Grammarly Application

Several factors have contributed to the remarkable increase in Grammarly's popularity in recent years. Transitioning to the advantages, Grammarly offers numerous benefits that make it a valuable writing application. Firstly, it aids in expanding students' vocabulary, while also serving as an internationally recognized resource for academic writing. Additionally, Grammarly works instantly and effectively, providing prompt feedback and suggestions. The app offers comprehensive explanations, helping users understand and improve their writing. It facilitates better communication among English writers by detecting common errors made by students. Moreover, students can download their revised papers and refer to them later, using Grammarly as a tool for continuous learning. The software mentors users in various aspects, including capitalization, word choice, punctuation, spelling, and grammar.

On the other hand, despite the multitude of benefits and advantages, the Grammarly application also has its share of drawbacks that discourage its use. It is important to consider these limitations. Firstly, relying solely on Grammarly can undermine students' skills, as they may become dependent on the tool and neglect their own efforts to improve. Furthermore, while Grammarly does help find and rectify mistakes, its focus is primarily on surface-level issues rather than meaning and content. It is important for users to be mindful of this limitation. Additionally, it should be noted that Grammarly does not correct all types of writing errors, leading some students to feel compelled to purchase the premium version in order to enhance their grades (Zinkevich NA & Ledeneva, 2021, p. 62).

Overall, despite the advantages it offers, users should be aware of the limitations of Grammarly and use it as a supportive tool in their writing journey.

2.4.6. The Use of Grammarly in Academia

English language proficiency in writing must be prioritized by EFL students since it is a prerequisite for the majority of international publications and conferences. Therefore, a writing review is necessary before submitting a piece of writing in order to make it clearer and more intelligible without producing ambiguous meaning or misrepresenting facts. Due to the rapid development of technology, Grammarly was developed to help language learners hone their

linguistic abilities. It is an artificially intelligent application that automatically assesses and rates writing using online checking mechanisms. Moreover, it uses artificial intelligence based on computational linguistics to evaluate and score text that has been submitted to the software. It examines the text at the lexical, syntactic, discourse, and grammatical levels and offers the user diagnostic feedback and corrections. As a consequence, users can preview their assessment results by viewing the system's feedback and corrections, and then make amendments to the writing based on their own evaluation, saving time in reviewing and assessing their writings.

In the modern world, Grammarly, as an AWE developed in the 21st century, is considered an invaluable tool that can help students and academic institutions with their writing. It checks for spelling, grammar, and punctuation errors and provides relevant and helpful feedback, including corrections and recommendations, to make the writing more readable, clear, precise, effective, mistake-free, and impactful, all while maintaining a high level of accuracy.

However, only a small number of research studies have examined this claim and the evaluation procedure of the Grammarly software. To determine whether utilizing this software offers the benefits it advertises or if it creates any challenges or confusion throughout the review process, it is necessary to take the user's perspective into account.

2.5. The Synergy of Grammarly Application and AI in Enhancing EFL Master's Students' Writing Skills and Grammatical Accuracy

In the field of English as a Foreign Language (EFL) education, the integration of technology has gained significant traction, offering new avenues for improving writing skills and grammatical accuracy. This section explores the interplay between the Grammarly application and Artificial Intelligence (AI), and their collaborative impact on enhancing the writing abilities of EFL Master's students throughout their academic journey

According to Smith (2022), the integration of artificial intelligence tools, such as Grammarly, in language learning environments can yield a substantial improvement in students' writing skills. The Grammarly application provides EFL Master's students with a powerful tool to enhance their writing proficiency. By harnessing AI-driven functionalities, Grammarly offers real-time feedback and guidance on grammatical errors, spelling mistakes, punctuation, and vocabulary usage. As students engage with the application, they receive personalized suggestions that not only rectify errors but also promote self-correction and self-directed learning (Smith, 2022).

Brown and Johnson (2021) assert that the utilization of Grammarly has proven highly effective in enhancing EFL students' grammatical accuracy and overall writing quality. The integration of Grammarly and AI has a profound impact on the writing skills of EFL Master's students. The application's sophisticated algorithms meticulously analyze the text, fostering coherence, cohesion, and clarity in students' written works. Additionally, by utilizing Grammarly's integrated plagiarism checker, students develop a heightened awareness of academic integrity, cultivating the ability to produce original and well-referenced content. Consequently, students' writing becomes more precise, compelling, and aligned with the requirements of their academic journey (Brown & Johnson, 2021).

The Grammarly application, complemented by AI, empowers EFL Master's students by fostering autonomy in their writing process. Through immediate feedback on errors, students can independently revise and refine their work, gradually building self-confidence and taking ownership of their learning. Furthermore, the user-friendly interface and intuitive design of Grammarly ensure accessibility for students of varying technological proficiency levels (Williams & Davis, 2020).

Williams and Davis (2020) discovered that EFL Master's students who incorporated Grammarly into their writing process exhibited noticeable improvement in their grammatical accuracy and writing skills.

II. Section Two

Academic Writing

2.6. Definition of Writing

In its broadest sense, writing can be defined as the transformation of sounds into written symbols. Byrne (1988, p. 01) stated that writing involves arranging graphic symbols according to established conventions to form words. Furthermore, these words are structured in a specific order to create a coherent sequence of sentences, ultimately resulting in the development of a meaningful text.

Writing is an active process that involves organizing ideas and expressing them on paper. Therefore, prior to writing, it is crucial to determine the intended message that needs to be conveyed (Brame, 1999). Conversely, writing is a complex undertaking that encompasses

multiple simultaneous operations. It goes beyond mere translation of spoken language into written symbols; it requires thoughtful deliberation, time, and mental effort. Thus, it can be concluded that writing entails more than simply assembling words and sentences together; it is a multifaceted process that demands critical thinking skills and a high level of exertion in order to produce a well-crafted piece of work.

In summary, experts characterize writing as a challenging process that involves organizing thoughts and ideas before articulating them in a manner that ensures comprehension by the reader.

2.6.1. Definition of Academic Writing

Academic writing (AW) encompasses various forms of writing such as dissertations, articles, essays, and research papers, which are essential components of academic requirements. Birhan (2017, p. 61) broadly defines academic writing as writing undertaken to fulfill university requirements.

In essence, academic writing aims to minimize subjectivity and prioritize objectivity. Moreover, it necessitates the use of specialized vocabulary and structure. Additionally, it emphasizes the proper utilization of mechanisms such as transitions, conjunctions, and punctuation to ensure that readers accurately interpret the intended meaning. Undoubtedly, academic writing is a challenging skill for many students to acquire.

According to Smith (2022, July 24), academic writing serves the purpose of disseminating ideas, facts, and research within the academic community. Furthermore, it can be divided into two categories: student academic writing, which is utilized as an evaluation tool in universities and schools to prepare students for higher education, and expert academic writing, which is intended for publication in academic journals or books. However, academic writing imposes the same standards on both novice and experienced writers, which can pose difficulties for students as they strive to comprehend and master them.

L. Irvin (2010, p. 3-4) characterizes academic writing as a prevalent form of writing in higher education institutions that aims to convey information and ideas to a specific academic audience. Consequently, since academic writing is a skill that necessitates mastery, students often encounter challenges, particularly in their initial year of college.

The significance of academic writing lies in its ability to enhance students' communication and critical thinking skills. To excel in academic writing, students must approach their writing

assignments in a systematic and planned manner. Additionally, they must possess a comprehensive understanding of the topic at hand and develop a clear mental framework for the task. Moreover, it is crucial for students to dispel any misconceptions they may have regarding the requirements of academic writing.

2.6.2. Academic Writing Processes

Academic writing is a challenging process that poses difficulties even for native English speakers. Moreover, it entails completing several stages to achieve a well-written output. These stages emphasize the notion that writing is a process rather than merely focusing on the end result. To clarify, writing can be considered a complex undertaking that requires precise steps.

According to McCuen-Metherell and Wrinkler (2009), "Writing is typically hard work - even for gifted writers... In general, the writing process is divided into three stages: prewriting, writing, and rewriting" (McCuen-Metherell & Wrinkler, 2009, pp. 3-5).

2.6.2.1. Pre-Writing Stage

Prewriting, as the initial stage, involves brainstorming and thorough thinking about the subject matter. It also entails considering the research objectives and the type of text to be written. Activities such as note-taking, outlining, gathering information, and conducting research from various sources are also part of the prewriting phase.

2.6.2.2. Planning

Moving on to the planning stage, it holds significant importance in the writing process as it allows students to organize their thoughts and ideas. This stage involves developing initial ideas or fundamental concepts related to the subject. Creating a planning outline not only helps arrange and present ideas logically but also keeps students focused on the task, preventing distractions from irrelevant content.

2.6.2.3. Drafting

Following the planning stage is drafting, where learners transform their collected data, information, and generated ideas into written form. Here, it is crucial to explain these ideas and provide supporting evidence. Additionally, using appropriate expressions and considering grammar rules, punctuation, spelling, and orthography are vital to ensure coherence and clarity in the writing.

2.6.2.4. Revising

Once the drafting stage is complete, the next step is revising. This stage precedes editing and involves critically reviewing the text. During the revision phase, learners remove inappropriate thoughts or ideas and rearrange word placement to improve the quality of their writing. Feedback from classmates and teachers plays a significant role in this process, allowing learners to reconstruct and modify their writings to present a refined version.

2.6.2.5. *Editing*

Moving on to the editing stage, it is the penultimate step in the writing process. It occurs before the final revision and prepares the written work for publication. During editing, students should consider correct punctuation, capitalization, tenses, and other aspects to enhance the overall structure, accuracy, interest, and persuasiveness of their work. Rereading the writing piece is essential at this stage to ensure a final revision.

2.6.2.6. *Publishing*

Finally, the publishing phase marks the stage when students are ready to share their written work, which has been edited and corrected by instructors. At this point, students add finishing touches to make their work excellent. There are several reasons why students choose to publish their work, as cited by Murray (2005). These reasons include career progression, personal fulfillment, development of writing skills to a higher quality, and receiving recognition for their efforts.

In conclusion, understanding and effectively engaging in the academic writing process is crucial for students to produce high-quality written work. By following the stages of prewriting, planning, drafting, revising, editing, and publishing, students can develop their writing skills and achieve success in academic writing.

2.7. Academic Writing Approaches

Writing instruction has gained significant importance and popularity in the past two decades, leading to a paradigm shift in the industry. Throughout the years, various methods have been employed for teaching writing. However, in recent times, the focus has primarily been on four key approaches: product-based, process-based, genre-based, and process-genre. These approaches have sparked extensive discussion and debate due to the diverse and often contradictory viewpoints on teaching writing.

2.7.1. *The Product-Based Approach*

The product-based approach is considered a traditional method of teaching writing, as it encourages students to concentrate on analyzing and imitating example texts. The main objective of this approach is to impart linguistic knowledge to language learners. It is worth noting that this approach emphasizes the development of learners' linguistic competence. Consequently, students often engage in limited copying exercises to familiarize themselves with the material.

2.7.2. The Process Approach

The process approach has played a crucial role in advancing the teaching and learning of writing. It places emphasis on the cognitive aspect of learning and acknowledges the learners' contributions within the learning environment. The existence of the process approach in academic works can be considered an innovative response to the limitations of the product-based approach. While the product approach places excessive focus on linguistic knowledge, the process approach highlights language proficiency. In addition to collaborative writing, enhancing the writing abilities of the writer becomes a priority.

2.7.3. The Genre Approach

Genre holds significant importance in the study and instruction of the English language. The genre approach emphasizes the necessity for writers to possess specific knowledge of the genre they are working with. Luu (2011, p. 121) emphasizes the need to consider the social and cultural context of language use in writing through the genre-based approach. Furthermore, this approach highlights the importance of considering the intended audience and conforming to the linguistic norms of the genre to ensure the piece of writing is well-received.

2.8. The Process-Genre Approach

The process-genre approach combines elements of both the process and genre approaches to enhance students' writing abilities. This approach places learners in practical situations that require a clear understanding of the purpose of the text. Additionally, according to Badger and White (2000), the process-genre approach involves providing students with scenarios of specific genres, enabling them to develop schema and comprehend the structural characteristics associated with those genres.

In conclusion, understanding and implementing different approaches to academic writing are essential for effective instruction. By incorporating the product-based, process-based,

genre-based, and process-genre approaches, educators can provide students with comprehensive writing instruction and foster their development as skilled writers.

2.9. Academic Writing Characteristics

Academic writing, as stated earlier, has distinct characteristics that set it apart other types of writings in many ways. academic writing features traits like passive voice, complex grammar, unique vocabulary, nominalization, fluency, and accuracy that make it objective and simple to assess and evaluate. Many scholars and researchers have noted numerous academic writing characteristics.

2.9.1. Coherence and Cohesion

Cohesion and coherence, which allude to intra-text connectivity and the ideas' contextual suitability, are crucial aspects of texts in academic writing. The idea of cohesiveness (cohesion) is a semantic one, according to Halliday and Hassan (1976, p. 4), and it relates to relations of meaning that exist within the text and that constitute it as a text. The systematic resources for reference, ellipsis, and other aspects built into the language itself provide the opportunity for cohesion, which is a component of the language system.

According to Poudel (2018, p. 1), coherence is seen as an in-text feature. "How the text's utterances seem in relation to their context. More precisely, the context of the text has a role in how well the meaning or message is understood. This indicates that coherence can be detected in weak connections between ideas inside a text. Cohesion is defined by (Yule, 2008) As a sort of Intra-sentence relation between an item and either the previous or subsequent item(s) in the text is described as "being a part of the system of a language." It demonstrates the connections between vocabulary and grammatical structure, where grammatical coherence includes conjunction, ellipsis, reference, and replacement.

In academic writing, the flow of ideas from one phrase to the next should be seamless and logical. If the writing seems inconsistent, the reader won't understand the main thoughts. As a result, always prioritize coherence over cohesion.

2.9.2. Cautious and Formal writing

One of the most noticeable stylistic traits found in academic writing is the tendency of authors to avoid expressing complete certainty in circumstances where there may be just a small percentage of uncertainty as well as to avoid overgeneralizing in circumstances where there may be a small number of exceptions. This demonstrates that there are a number of situations in which a statement or claim's epistemological strength (knowledge strength) is tempered (weakened). In linguistics, hedging techniques are employed to lessen the force of a statement or assertion. Besides that, Idiomatic and informal language should be avoided since academic writing is formal. Writing cautiously entails avoiding bias and being indirect by utilizing hedging verbs and idioms

2.9.3. Audience and Purpose

Academic writing has a defined aim to accomplish and it is written for a certain audience, such as students or experts. The most common applications of academic writing are to support, contrast, or introduce a research effort or scientific study.

The basic reason for different choices made by writers and audiences in communicating logically, such as what to write or what to speak about, whom to listen to, what media to employ, or where to read, is defined by the goals of authors and audiences in communication.

In general, academic writing is intended to exhibit knowledge, and in particular, it is meant to explain, educate, and persuade.

2.9.4. Language and Style

Language and style consider vital elements in academic writing since AW has an audience and a purpose, the language used should be suitable for academic purposes to the intended audience. In order to avoid employing erroneous or translated language, Blanpain (2006) claims that students should be aware of the sentence structure and terminology used in genuine English contexts. Kane (2000, p. 11) goes on to describe style as the culmination of all the writer's choices about the placement of words. In this sense, style may be excellent or terrible; good if the choices are in line with the writer's goals, bad if they are not. According to The Oxford Companion to the English Language (1994, p. 8), the English that intellectuals and scientists employ is a sophisticated and frequently complex language that is linked to concern for the truth, objectivity, and dispassionate criticism.

In conclusion, linguistic elements including vocabulary, grammar, mechanics, and origins and aspects are needed for effective academic writing.

2.10. Academic Writing Genres

Higher education heavily relies on academic writing, which can take several forms, including essays, dissertations, and research papers. Every genre has its own unique characteristics, goals, and systems. Essays are brief and designed to present an argument or point of view on a topic, whereas research papers need in-depth examination and exploration of a specific research issue. Dissertations are extensive research projects that provide a special contribution to a field of study. It is essential to comprehend the variations of each genre in order to effectively transmit concepts and to meet the academic criteria of numerous areas.

But this is not a comprehensive list; more genres exist, depending on certain subjects, and they vary from institution to university.

2.10.1. *Essays*

The most common kind of writing at colleges is the essay. They are intended to assess and motivate EFL students who write academically and effectively, whether for a class assignment or an exam, and fulfilling the norms of the academic expectations. They are built on Q&A sessions, which often draw from what students have learnt in class.

A goal of an academic essay is to persuade readers of a position by providing evidence. An academic essay should respond to a task or inquiry. There should be a thesis statement (the answer to the inquiry) and an argument. In addition, an essay has the following elements: an introduction (usually with a thesis statement), body paragraphs, and a conclusion. They are written for a variety of reasons, such as discovering, learning, educating, and even persuading.

2.10.2. *Research Papers*

A research paper is a brief piece of study that students submit as part of a particular course's objectives. It may also be used as an assessment tool. Furthermore, it is considered the end result of a lengthy process of research, critical thinking, source assessment, organization, and composition.

The standard academic writing assignment is a research paper. Students and academics must conduct research to learn about a specific topic, form an opinion about it, and then support (or offer evidence) for that perspective in a properly organized report. Researchers or students may utilize a variety of resources to support their research papers, including books, journals, websites, etc. However, they must write succinctly in order to respect the length of their work.

2.10.3. Thesis and Dissertation

As their studies come to a close, postgraduate student must submit a thesis or dissertation. However, these two terms can be used mutually since some universities, like ours, refer to master's-level work as theses and doctoral work as dissertations, whilst other institutions hold the opposite view. In fact, Merriam-Webster defines a thesis as a dissertation produced by a candidate for an academic degree that contains the findings of an authentic study and specifically supports a certain point of view. In other words, with the use of theoretical knowledge and the methodology of their choosing, the thesis seeks to improve and demonstrate students' capacities to identify and address problems at work. The thesis also shows that students are capable of working independently on challenging expert assignments.

A dissertation is a substantial academic writing assignment that is founded on students' own original research. It is sometimes submitted as the last action in a Ph.D. program. The longest writing assignment that researchers have ever completed is probably a dissertation.

2.11. The Importance of Writing in EFL Context

Writing is an essential skill, a process, and an achievement. Some people write because they only want to write and get self-satisfaction, but on the other hand, others write because writing is important to them. In addition, writing is an extremely valuable ability because it helps you remember by taking notes from lectures and keeping a record so that you can recall the experience again and remember it, as well as writing helps you think because while you are writing, you will see your thoughts expressed intuitively, and your thinking improves, furthermore writing also helps you communicate because writing is considered to be a way of communicating since we are conveying a message to the reader who is going to comprehend what you expressed. Finally, writing is beneficial in learning since when we write about anything, we inevitably remember and gain new vocabulary.

2.12. The Notion of Error

Error is a general term used in the fields of applied linguistics, psycholinguistics, and English language teaching. Many scholars, including Corder, Selinker, and others, utilized the term "error" in the early 1970s.

Nemser, Richards, and others in the fields of linguistics and psycholinguistics characterized errors in performance as errors made while speaking or listening during learning a target language.

The word has its origins from the idea of error analysis in the learning of second languages proposed by Stephen Pit Corder, known as the "father of error analysis," in the late 1970s, and is used in the fields of applied linguistics and English language teaching. His approach is mainly concerned with the errors that happen in our minds-errors that have to do with competence and the errors that happen when we express the target language orally-errors that have to do with performance. (1990, Nancy Lee, p. 56)

2.12.1 Definition of Errors

The term "error" has been defined differently by many scholars. Language errors are a component of conversational composition that deviates from certain adults' linguistic norms, according to Fitria (2020, p. 142).

Accordingly, (Corder 1974, p. 125) views the examination of errors as a component of the study of the process of language learning, which gives us an understanding of the linguistic progress of a learner and potentially provides us with indications of the learning process. This implies that errors are "indicators" of language acquisition. As Ellis (1997) pointed out, mistakes are gaps in a learner's knowledge since they happen because the learner does not know what is correct. Therefore, errors are an inevitable component of the learning process.

In consonance with to the definitions mentioned above, "errors" are defined differently from various angles and are choices taken incorrectly by learners who are unable to effectively understand the language.

2.12.2. Error vs Mistake

Errors and mistakes are two closely related concepts. While the term error refers to wrong understanding that occurs in our minds, Brown (1994, p. 205), defined linguistic errors as an

obvious deviation from the adult grammar of a native speaker, reflecting the learner's interlanguage competence, the term mistake refers to incorrect and inappropriate language use, or the errors that occurred in the application of our knowledge during the process of the speechmaking or the oral performance.

2.12.3. Learners' Most Current Writing Errors

Writing in a foreign language is more difficult, hence many experts have worked to pinpoint the frequent mistakes that EFL students make while writing in L2. Both EFL and ESL learners have the potential to make a wide variety of errors.

Errors are divided into four main categories, according to (Keshavarz 2018, p.89), including orthographic errors, phonological errors, lexico semantic errors (errors between words and meaning), and morphological-syntactic (errors between word forms and grammar). Furthermore, punctuation and style errors were introduced as additional categories of writing errors caused by EFL students in (Kostsyuk, 2015).

2.12.4. Causes of Learners' Errors

Robert Whittingham asserts that all students make mistakes in their writing as a result of a wide range of external factors, including problems in task organization, lacking human design, and severe workplace environments like noise, temperature heat, and cold (2004, p. 82).

According to Narrish in 1983, mistakes may be brought on by inattention, exhaustion, or carelessness and an unpleasant setting or other factors (p.8)

2.13. Previous studies

Several previous studies have explored the research topic at hand, specifically focusing on the intricate relationship between Grammarly Application and EFL learners' grammatical accuracy. These studies have extensively examined various aspects associated with Grammarly, unraveling its definitions as an Automated Writing Evaluation (AWE) tool, its functions, and its overarching importance. Moreover, these studies have underscored the remarkable significance of utilizing the Grammarly Application as an AWE tool to evaluate and assess academic writing. In the subsequent paragraphs, an extensive review of these pertinent studies is provided, elucidating their key findings and offering a comprehensive understanding of the topic.

Grammarly application, including the website 'Grammarly.com,' has captured the attention of learners and teachers alike as a valuable and recognizable resource for students at different learning stages. This green icon is widely used for checking and correcting learners' writing errors.

An article by S. Sutaryo (2021) examined the utilization of the Grammarly application as an electronic feedback tool for assessing students' English dissertations at universities in Ternate, Indonesia. Uploaded on February 6, 2022, the article aimed to analyze students' writing outcomes in their English dissertations using Grammarly and explore teachers' perceptions and experiences regarding the application's electronic feedback and its impact on students' thesis writing at Ternate city universities. The study drew data from five (5) thesis research proposals obtained from three universities in Ternate (Kairun University, Muhammadiyah University of North Maluku, and the Teaching and Education College [SIKID]), as well as input from ten (10) supervising teachers. Data collection involved document analysis and interviews, which were then subjected to thematic analysis. The findings revealed that the use of the Grammarly application in students' thesis research proposals provided valuable feedback on errors present in their dissertation writing. The errors observed in the texts primarily pertained to spelling, followed by grammar issues such as article usage, plural markers, prepositions, and subject-verb agreement. Additionally, some errors related to capitalization and punctuation were also identified. The study also highlighted that the interviewed lecturers exhibited a positive perception of Grammarly, although only four of them utilized the application, while the remaining six did not.

Furthermore, Jessie S. Barrot conducted this study as an attempt to investigate using automated written corrective feedback in the writing classrooms and its effects on L2 writing accuracy. Although there has been an increase in study on the use of automated writing evaluation (AWE) systems, it is still unknown how varied degrees of mistakes and gains across writing assignments are affected by automated written corrective feedback (AWCF). This study fills the gap by investigating how Grammarly's AWCF program impacts college students' general writing correctness and mistakes of varying degrees of seriousness. The results, which made use of a quasi-experimental methodology, show the potential of AWCF in enhancing students' writing accuracy. The findings were ascribed mostly to AWCF's efficiency to stimulate noticing, give an adaptive metalinguistic explanation, and engage students in self-directed learning. Nonetheless, certain issues were raised, including overcorrection, cognitive

stress, and a lack of metalinguistic explanation. The implications for writing education and future research are highlighted.

Another study focused on evaluating the essay writing skills of English for specific purposes students at MGIMO University in Moscow, Russia. The researchers aimed to apply the findings of their research on the online writing assistant, Grammarly. Through the examination of one hundred master students' papers, they identified persisting errors at a master's level using a questionnaire with validated scales. The most common mistakes detected by Grammarly.com were related to punctuation, wordy sentences, redundancy, and an abundance of personal pronouns in a formal style (Zinkevichn, 2021).

Based on the reviewed findings, it is evident that Grammarly, both as an online writing tool and the grammarly.com program, plays a crucial role in enhancing learners' writing skills. It provides valuable feedback and assists in identifying recurring writing problems, enabling students to improve the comprehensibility of their writing (S. Sutaryo, 2021; Zinkevichn, 2021).

The research conducted on the use of Grammarly application and its impact on students' writing skills, as discussed in the previous studies, has provided valuable insights. However, there are still gaps that need to be addressed in future studies. One notable gap is the limited focus on specific linguistic features or genres of writing. The existing research has explored general errors such as spelling, grammar, punctuation, and stylistic issues. Future studies could delve deeper into analyzing the effectiveness of Grammarly in addressing specific writing challenges, such as academic writing, business communication, or creative writing. Additionally, the current research primarily relied on self-reported data and perceptions from students and teachers. Incorporating objective measures, such as comparing writing samples before and after using Grammarly, could provide a more robust assessment of its impact. Closing these gaps in future research would contribute to a more comprehensive understanding of the effectiveness and limitations of Grammarly in enhancing students' writing skills.

Conclusion

In conclusion, the integration of technology in education has revolutionized the learning experience for EFL students, enabling them to pursue their educational goals with greater efficiency and effectiveness. The first section delved into the concept of using AI and mobile apps like Grammarly as powerful tools to enhance language skills. Additionally, we discussed

the theoretical background of Information, Communication, and Technology (ICT) in education, which provided a broader understanding of the transformative power of technology in language learning. These innovative technologies have proven instrumental in promoting the mastery of learning and higher-order cognitive abilities among 21st-century students. With mobile learning tools and Grammarly, students can independently refine their linguistic skills, particularly in writing and grammar, by studying and acquiring knowledge online without constant guidance from a teacher. Grammarly, as an advanced writing enhancement tool, offers the added advantage of enabling students to track and correct their mistakes, facilitating a faster process of improvement. Moreover, Grammarly encourages students to develop not only their grammar skills but also their autonomy in writing, enhancing their overall proficiency in English. In addition, the combination of AI, Grammarly, and ICTs empowers EFL students to develop their grammatical accuracy, ultimately enabling them to communicate their ideas with precision and clarity in academic and professional contexts.

Meanwhile, the second section explored the depth and significance of academic writing as an essential component of higher education. Academic writing serves as a crucial means for students and researchers to communicate their research findings effectively within the academic community. This chapter provided a comprehensive examination of the various aspects of academic writing, including approaches, processes, characteristics, genres, and the notion of error. This section defined the vital requirement of precision and clarity in academic writing. Additionally, it is essential for academics and students alike to meticulously construct phrases and paragraphs that clearly and persuasively convey their ideas to the target audience. A strong emphasis was placed not only on grammatical accuracy and punctuation but also on the selection of appropriate phrases and the use of logical and compelling arguments.

By embracing the benefits of technology in language learning and honing their academic writing skills, EFL students can significantly enhance their overall language proficiency. The integration of AI, mobile apps like Grammarly, and the broader utilization of ICT in education empower students to become more independent learners, capable of rectifying their mistakes and progressing at a faster pace. Furthermore, the mastery of academic writing enables students to effectively communicate their research findings and ideas, contributing to their success in higher education and beyond. Through the synergy of technological advancements and a deep understanding of academic writing principles, EFL students can unlock their full potential and thrive in the academic world.

Research questions

RQ1. To what extent do Algerian EFL learners use the grammar accuracy application Grammarly?

RQ2. To what extent do Algerian EFL learners make grammatical accuracy mistakes in writing?

RQ3. What is the relationship between using Grammarly and EFL learners' written grammatical accuracy?

Chapter Three:

Methodology

Introduction

The purpose of the current study is to determine how utilizing Grammarly's Application affects EFL students' writing abilities at the University of Mohammed Khider Biskra. As a result, fieldwork is the focus of this chapter, which also covers the rationale behind the method used. Additionally, it describes the research strategy equipment, instruments for gathering data, and sample methodologies. The chapter concludes by presenting the data that was collected and examined in order to evaluate the viability of the study hypotheses and get settled for reasonable deductions and interpretations.

3.1. Research Design

To answer the study's questions, we adopted a descriptive design. The primary objective of the study was to determine whether using the Grammarly application may help EFL students in developing their writing skills. Therefore, the current study employed a mixed-method strategy to gather data. A detailed comprehension of the nature of the investigation and its causes is necessary due to the nature of the inquiry.

Therefore, Mixed methods research refers to an approach in academic research that combines qualitative and quantitative methods to gain a more comprehensive understanding of a research question or phenomenon. As John W. Creswell, a prominent researcher, explains, "Mixed methods research offers a balance between breadth and depth, allowing researchers to explore the complexity of a problem from multiple perspectives" (Creswell, 2014). By integrating both qualitative and quantitative data collection and analysis techniques, mixed methods research provides researchers with the opportunity to triangulate their findings, enhancing the validity and reliability of their results. This integrative approach allows for a more nuanced interpretation of data, as it captures the richness of individual experiences and also provides statistical evidence to support generalizability. As Alan Bryman, another renowned scholar, highlights, "The main strength of mixed methods lies in its capacity to address research questions that cannot be adequately answered by quantitative or qualitative methods alone" (Bryman, 2016). By utilizing mixed methods, researchers can tap into the strengths of both qualitative and quantitative approaches, enabling a deeper understanding of complex phenomena and generating more robust and comprehensive findings.

3.2. Context and Participants

The University of Mohammed Khider Biskra's master one and master two students were the target group for this study. The population in question was chosen because students at these levels have the requirements to write their own theses papers, which provide a practical example of their knowledge of artificial intelligence and their writing skills. In other words, master students are required to put into practice the academic writing (AW) skills they have acquired throughout the years. To collect the data from the students, we start by utilizing Online questionnaires and a writing task; this method or technique allows for examining the problem from many perspectives while minimizing bias in the results and let us to discover the students' perceptions about the topic and their attitude toward the significance of Grammarly.

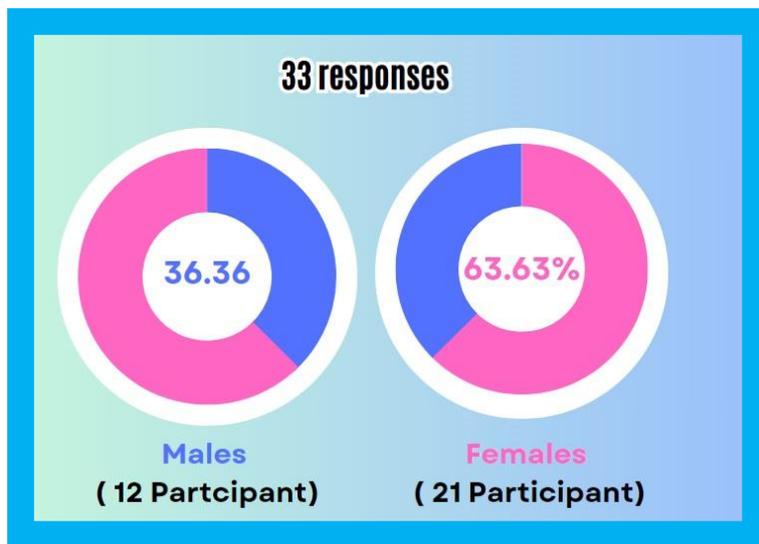
Finally, the current sample is made up of thirty-three (33) students who have been selected randomly (21 female students, 12 male students), in addition to six students were also passed a writing test as a triangulation test. These sample has been chosen in order to get in-depth information about master one and master two students writing since they are allowed to write a well-organized dissertation. Furthermore, participants in this research were both male and female. Moreover, the range of ages of participants was from 21 to 38, and their first language is Arabic since they are in the Algerian context. Besides, the majority of the participants have been learning the English language; thus, their average language proficiency ranges from low intermediate to advanced level.

Table 3.1
Ages and Numbers of Participants in Percentages

Age	Number of Participants	Percentage
From 22 to 26	24	72.72%
21 And 27	4	12.12%
More than 29	2	06.06%
No Answers	3	09.09%
Total	33	100%

Notes. % = Percentage.

Figure 3.1
Students' Gender



3.3. Data Collection

In order to address the research questions that have been stated, two data collection tools were used: an Online Questionnaire (Google Forms) and Writing Test (Triangulation test).

The current study was conducted through quantitative data collection and analysis, and in order to obtain answers to our research, the collection was chosen as a fundamental instrument.

Furthermore, the data for this study was collected through a mixed-methods approach, utilizing both an online questionnaire and a writing test. The online questionnaire named Google Forms is a tool within Google Drive for creating online survey forms was administered to 33 master's level EFL students, while the writing test was conducted with six additional students. The aim of the questionnaire was to gather information about the students' attitudes towards academic writing, their experiences with the Grammarly application, and their perceptions of its impact on their writing skills. The writing test was designed to evaluate the students' writing competencies and grammatical accuracy, both with and without the use of the Grammarly application. In order to achieve a reliable data that will help answer the questions of our thesis at the department of English at Mohammed Khider Biskra University,

3.4. Students' Questionnaire and the Writing test

3.4.1. Aim of The Students' Questionnaire and the Writing test

The Online Questionnaire was distributed randomly to thirty-three (33) Masters EFL students (Master One as well as Master Two). Moreover, the writing test (Triangulation test) was addressed to six (06) students to achieve precise results and observe more clearly how it is related to the hypothesis. Furthermore, the questionnaire's objective is to assess how EFL students perceive using the Grammarly program to improve their writing.

3.4.2. Students' Questionnaire

3.4.2.1 Description of Students' Questionnaire

The questionnaire was designed for Masters EFL students (both Master One and Master Two Applied Linguistics) at the University of Mohamed Khider Biskra (See Appendix A). We opted for a sample that contained thirty-three (33) students amongst the population, which comprised a total of (454) students. This questionnaire aims to discover students' attitudes towards AW, highlight some of the difficulties students have with this subject, and check students' perceptions of the concept of the Grammarly Application. Additionally, the students' questionnaire consists of ten (10) questions separated into three sections containing ten mixed questions, open-ended, closed-ended, and multiple-choice questions that are distributed among males and females of different ages.

Section One consists of background information (Q1–Q2) for the purpose of providing us with some of the personal information about the participant, such as gender and age. Moreover, Section Two touched on EFL students' use of Grammarly and their writing competencies (Q3–Q9). At first, we gave a brief description of the Grammarly Application as an AWE tool, this section aims to gather general information about the EFL students' use of Grammarly in order to understand student's experience with the AWE tool, time spent using it, why they chose to utilize this AWE tool, and the type of device used to write with Grammarly application, also we asked about the type of subscription that participants subscribed with, likewise they were requested to write their English language level which EFL Learners writing skills are our main concern in the study that aims to find out whether the EFL learners think that Grammarly application affects their writing skills in either a positive or a negative way. Finally, Section Three is about writing task and in this section, we intend to see the difference between writing a paragraph based on student's competencies.

3.2.3. Administration of the Questionnaire

The final questionnaire was designed using Google Forms, and on May 16th, 2023, it was sent via email to the target population. It was the most effective method of distribution, in terms of giving students adequate time to complete the questionnaire and obtaining more accurate data, as a result, during the second semester, all Master students were readily available.

3.4.3. Students' Writing Test

3.4.3.1. Description of Students' Writing Test

A test was conducted to EFL learners of Masters' Degree (Master one and Master Two) at Mohammed Khider University Biskra, it was divided into two parts. The first part contained two advanced-level tasks with the recommendation of disallowance the usage of The Grammarly Application or any other AWE or AI tools, the first task was concerned with writing and the question distributed to participants is to write their post-graduated plans to evaluate the writing competencies of students and their grammatical accuracy based on their own capabilities, Furthermore, in the second task which is connected to reading, by providing a paragraph to students, they were asked to identify the grammatical errors in order to understand how students are capable of finding errors without any technological aids. On the contrary, the second part of the test, which was similarly two advanced-level tasks for EFL Masters students, requested them to respond to the same questions, but this time they were allowed to utilize the Grammarly application as a helping tool in responding to the questions, allowing the researcher to determine the precise effects of using applications like "Grammarly" and its role in facilitating and assisting learners and enhancing their grammatical accuracy and improve their writing skills by avoiding various grammatical errors.

In the context of evaluating and assessing the writing skills of EFL (English as a Foreign Language) Master's students, a triangulation test can be employed to enhance the accuracy and reliability of the assessment process. This test involves a two-stage approach: before and after the use of the Grammarly application. Initially, six students' writing samples are collected and evaluated using Grammarly application and other automated writing evaluation tools to detect errors and identify areas of improvement. This serves as the baseline assessment. Subsequently, the students are provided access to the Grammarly application, which assists in identifying and correcting writing errors. After utilizing the application, the students' revised writing samples are re-evaluated by myself to determine the effectiveness of the Grammarly tool and assess the

students' progress. By employing this triangulation test, pre- and post-Grammarly analysis, a comprehensive understanding of the students' writing abilities can be obtained, providing valuable insights for pedagogical interventions and further research in EFL writing instruction.

3.4.3.2. Administration of the Writing Test

The Writing test was administered to a small number of participants (06 Students) in the form of a Word Document via email to ensure that students had access to the appropriate technological tools.

3.5. Data Analysis

The data collected from The Questionnaires and Writing Test are hereby presented using qualitative and quantitative analysis.

3.5.1. Analysis of Students' Questionnaire

The questionnaire contained five (05) multiple-choice questions, one of which was measured on a four-point Likert scale for frequency. We also asked four (04) open-ended questions to participants to provide a brief explanation for their replies in order to detect common responses. After validating and piloting the questionnaire, it was sent out to the desired sample of (33) master one and master two students through email. Thirty-three (33) students eventually completed the questionnaire

3.5.2. Analysis of the Students' Writing Test:

The purpose of this test is to compare the participants' writing and reading performance with and without the use of Grammarly. By examining the differences in their written responses and error identification, we can gain insights into the impact of Grammarly on writing accuracy and grammatical error detection.

The writing test consists of two tasks in two parts (see Appendix B). In Part One, participants are asked to complete a writing task without using Grammarly or any other automated writing enhancement (AWE) tool. They are given a prompt to describe their post-graduation plans in 100 words. Additionally, participants are provided with a paragraph and asked to circle the grammatical errors within it in which it contains 8 grammatical errors, again without the use of any AWE tool.

In Part Two, participants are asked to complete the same writing and reading tasks, but this time they are allowed to use the Grammarly Application, an AWE tool. They are provided with the same prompt to describe their post-graduation plans in 100 words but are now encouraged to utilize Grammarly for assistance. Similarly, they are given the same paragraph and asked to circle the grammatical errors, but with the aid of the Grammarly Application.

The benefits and advantages of this test include providing participants with the opportunity to experience the benefits of using Grammarly, such as real-time grammar and spelling correction, clarity suggestions, and style improvements. By using Grammarly, participants can enhance the accuracy and clarity of their writing, improve their grammar skills, and gain a better understanding of common grammatical errors. Additionally, participants can develop their proofreading and editing skills by comparing their own error identification with the feedback provided by Grammarly.

Overall, this test allows participants to observe the positive impact of using the Grammarly Application on their writing and reading abilities, highlighting the benefits of utilizing advanced writing tools to improve language proficiency and produce high-quality written work.

3.6. Validity of Instruments

The supervisor was sent a copy of the students' questionnaire before it was administered to seek his or her opinion on the questionnaire's contents. Eventually, the supervisor made several wise suggestions and insightful comments, also he advised managing the questionnaire with some participants to assess its content clarity, functionality, delivery, level of difficulty, and item arrangement. As a result, certain inquiries that the participants felt were redundant and unclear were removed from the questionnaire's final revision. Also, the supervisor advised providing a writing test to a few participants to get a deeper understanding of the impact of this AWE tool on students' grammatical accuracy.

Chapter Four:

Analysis and Discussion of

Results

Introduction

The present research examines how the utilization of the Grammarly AI program impacts the academic writing abilities and grammatical accuracy of English as a Foreign Language (EFL) students. Consequently, this section focuses on the practical work carried out and explains the rationale behind the chosen methodology. It additionally presents the research concept, research strategy, equipment and devices used for data collection, as well as the methods employed to select the study sample. Lastly, the chapter presents the gathered data and its analysis, aiming to evaluate the credibility of the study hypotheses and draw reasonable conclusions and interpretations.

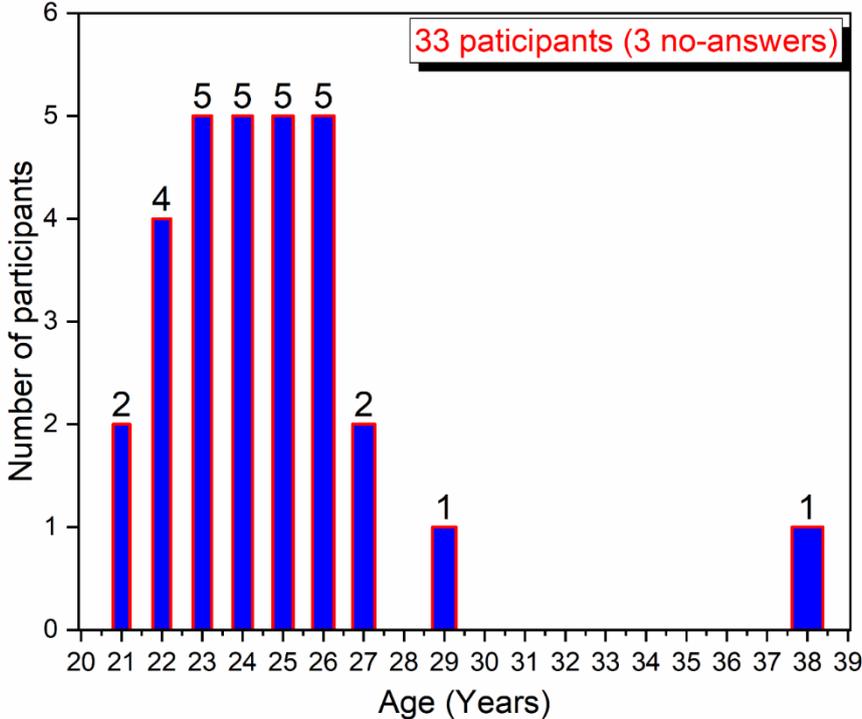
4.1. The Online Questionnaire results

4.1.1. Section One: Background Information – Profile

Question 1: age?

I asked a direct question to participants about their ages, the sample's age is essential to this investigation. It enables our study to see how familiar students are with social media based on their age.

Figure 4.1
Age of the Participants



The Histogram above shows the age of the participants. The largest category of age is between 22 and 26 years old and it represents 72.72% (24 Participants) of the whole sample. The second largest category is the age of 21 and 27 representing 12.12% (04 Participants) of the sample (two Participants in each age). Whereas the smallest category is for students whose age is more than 29 years old, and 3 answers didn't attempt to share their ages.

Question 2: What’s your gender?

Knowing the gender of our sample will enable us to determine whether both sexes are acquainted with using the Grammarly application and whether their motivations are the same. Thirty-three (33) students participated in this study. From the table below, we observe that they were 21 females which represent 63.63% of the whole sample and 12 males which represent 36.36% from the whole sample.

Table 4.1
Students’ Gender

Gender	Number	Percentage
Male	12	36.36%
Female	21	63.63%
Total	33	100%

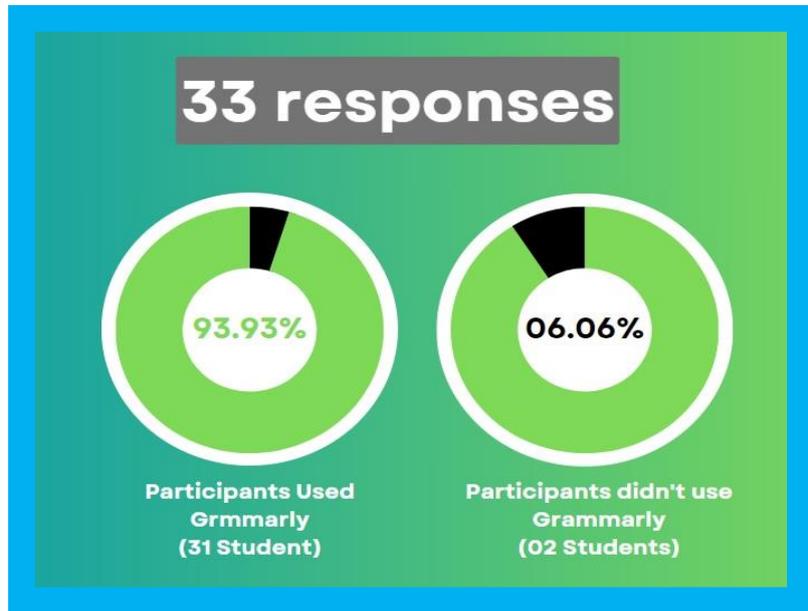
4.1.2. Section Two: Grammarly

Question 3: have you ever used Grammarly?

The third question aims to see if all the students are familiar with Grammarly Application.

Results showed that almost all the participants 93.93% (31 Student) used the Grammarly Application before, however, only two participants didn’t use The Grammarly application before which represents 06.06 % of the whole sample.

Figure 4.2
Students' Using the Grammarly Application



Question 04: How long have you been using Grammarly?

The fourth question aims to see how long they have been Utilizing the Grammarly Application.

Figure 4.3
Years of Grammarly Application using



Table 4.2
Years of Grammarly Application using

Option	Number	percentage
6 Months	8	25.80%
1 Year	8	25.80%
2 Years	6	19.35%
3 Years	6	19.35%
4 Years	3	9.67%

Results indicate that students have been using Grammarly sparingly over the last four years only 9.67% (3 participants); as a result, the number of Grammarly application users has increased noticeably during the past two years, and it represents almost 50.6% (16 participant) during the last 18 months.

Question 05: How often do you use Grammarly?

We asked this question that aims to see how much students at Biskra University are attached to AWE tools and specifically the Grammarly Application, and how much time they spend using this AWE tool.

Figure 4.4
Students using the Grammarly Application during writing

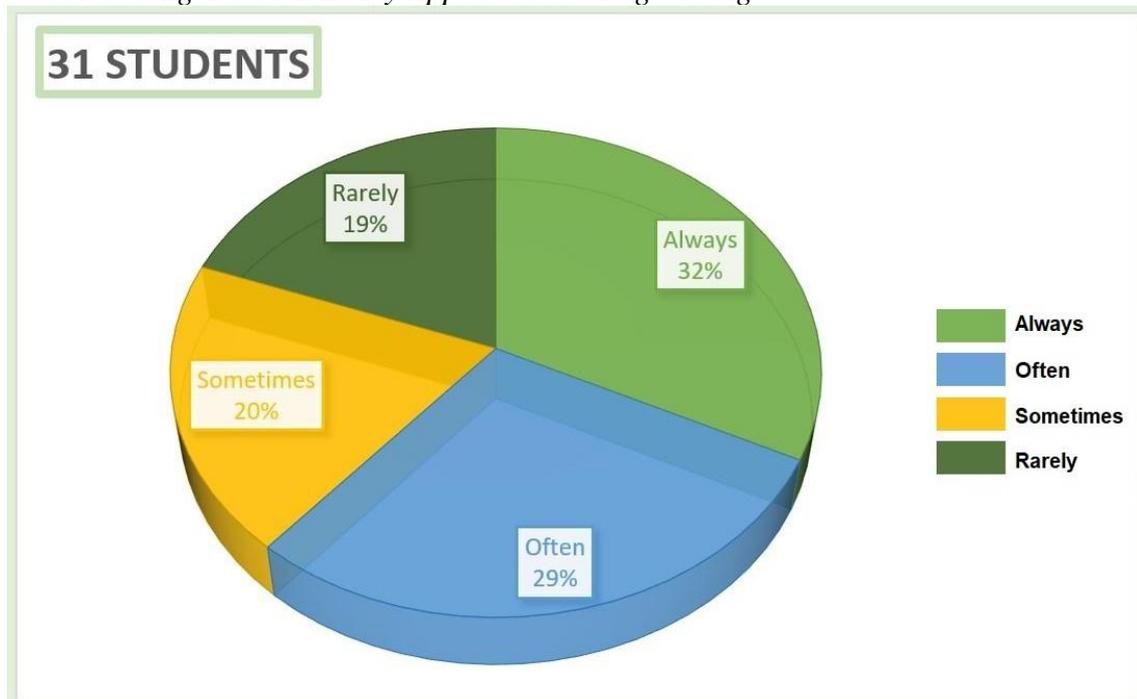


Table 4.3
Using the Grammarly Application during writing

Frequency	Number	percentage
Always	10	32%
Often	9	29%
Sometimes	6	20%
Rarely	6	19%

Results revealed that 32% of participants always use Grammarly Application to improve their writing, and 29% of students often used it, on the other hand, both the rate percentages of students who used to utilize the Grammarly Application sometimes and rarely usage seem to appear close to being equal to each other between 20% and 19% participants. However, based on the data shown above, it can be concluded that nearly 81% of students typically use Grammarly in supporting their works also the data reveals students' positive attitudes towards using Grammarly in writing, and this diversity is due to the quality of the work and their writing capabilities.

Question 06: Why do you use Grammarly?

The purpose of this question is to comprehend the reasons behind students' dependency on Grammarly during their daily writing based on their own perspectives and experiences and to have a clear and unbiased understanding.

According to 31 students who answered that the Grammarly Application has a positive effect on their writing by providing numerous reasons such as the following answers:

Student 01

- I use it to see if my paragraph is grammatically correct and the ideas are coherent or not, and to check for syntactical errors, spelling or grammatical mistakes

Student 09

- It's practical for daily use, makes writing generally looks better and clearer from various mistakes and grammatical related errors. mistakes and try to get better learning of English language aspects.

Student 14

- Because makes writing in all occasions looks better and correct for different kinds of errors and mistakes.

Student 17

- It's good for writing in all sorts of texts, it's easy to work with...To review my literary work and to check if contains errors. Moreover, to write better and properly, also to avoid making mistakes.

Student 23

- To avoid making mistakes, to write rapidly and I like their tone suggestion feature.

Student 26

- Grammarly is an invaluable tool for writers and editors alike, it offers a thorough analysis of grammar and spelling, creative writing recommendations, and context-specific suggestions. It also provides style and tone recommendations, app integration, and a plagiarism checker to ensure your writing is original and error-free.

Student 30

- For evaluating my writings, and to keep away from mistakes also to write easily texts in short period of time. And it has different good features which helps me to find grammatical errors and provides a lot of suggestions to make my writings looks better and clear from mistakes, and it is easy to deal with and helpful all the time.

Student 31

- To check my writing for my dissertation, also for plagiarism check, and it makes writing easier and more convenient and correct.

Students have expressed various opinions on using the Grammarly application. Many find it useful for checking the grammatical correctness of their paragraphs, ensuring coherence of ideas, and identifying syntactical errors, spelling mistakes, and grammatical inconsistencies.

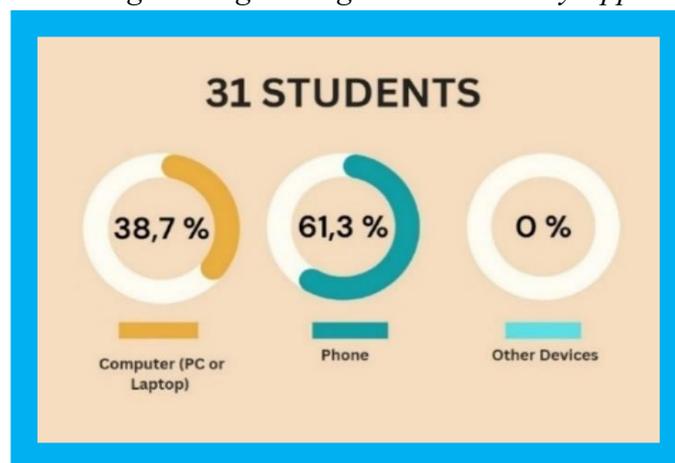
They appreciate the practicality of Grammarly for daily use, as it enhances the overall quality and clarity of their writing, helping them learn various aspects of the English language. Students also highlight that Grammarly improves writing on all occasions, addressing different types of errors and mistakes. It is seen as a valuable tool for reviewing literary work, identifying errors, and writing better while avoiding mistakes. Overall, Grammarly is viewed as an invaluable tool by students, providing a thorough analysis of grammar and spelling, creative writing recommendations, context-specific suggestions, style and tone recommendations, app integration, and a plagiarism checker for original and error-free writing. Furthermore, it is recognized as beneficial for academic purposes such as checking dissertations and detecting plagiarism. Ultimately, students appreciate Grammarly for making writing easier, more convenient, and correct.

Question 07: Where do you use Grammarly? (In which device)

This question on device usage allows us to assess the usability and user experience of Grammarly across various devices, it provides valuable data on the technological landscape of the student population. By understanding the devices students use. Furthermore, allows us to assess the usability and user experience of Grammarly across different devices. It provides insights into user behavior and patterns. This segmentation can reveal differences in user behavior, preferences, or satisfaction levels among different device users.

Figure 4.5

Students' device usage during writing with Grammarly Application.



The results above demonstrate that a majority of students, accounting for 61.3%, prefer to use the Grammarly application on their phones for writing purposes also this indicates the growing trend of mobile usage among students for various tasks, including writing. Moreover,

the convenience and portability offered by smartphones are likely contributing factors to this preference. On the other hand, 38.7% of students choose to utilize Grammarly with a computer, which includes both PCs and laptops and this suggests that a significant portion of students still rely on traditional computing devices for their writing needs. It is worth noting that writing on a computer may provide a larger screen, a physical keyboard, and potentially a more comfortable typing experience. Furthermore, 0% of the participants don't use other devices to write while using this AWE tool to improve their writing skills. Understanding this distribution of device usage is crucial for Grammarly to ensure optimal compatibility and user experience across both mobile and computer platforms. It may also indicate the need for specific optimizations or features tailored to each device type to cater to the diverse preferences of Grammarly users.

Question 08: Type of subscription?

The purpose of the question is to gain a deeper understanding of how students utilize the Grammarly Application and to assess the perceived value they associate with it. By exploring students' motivations for subscribing to Grammarly, researchers can uncover the specific features or advantages that students find particularly beneficial or appealing. This inquiry allows for valuable insights into the students' perspectives on Grammarly's offerings and their individual preferences.

Analyzing the results above of subscription patterns can provide insights into students' commitment to improving their writing skills. Students who choose to subscribe to Grammarly may be more motivated to invest in their writing abilities and demonstrate a higher level of engagement with the application. This can help us evaluate the impact and effectiveness of Grammarly as a writing assistance tool and its potential influence on students' writing development (See Figure 4.6).

Question 09: How do you describe your writing level?

The question asked to students is important for understanding their confidence, motivation, and engagement in writing tasks. It also helps identify students' awareness of their strengths and weaknesses (See Figure 4.7).

Figure 4.6
Students' subscriptions to Grammarly Application

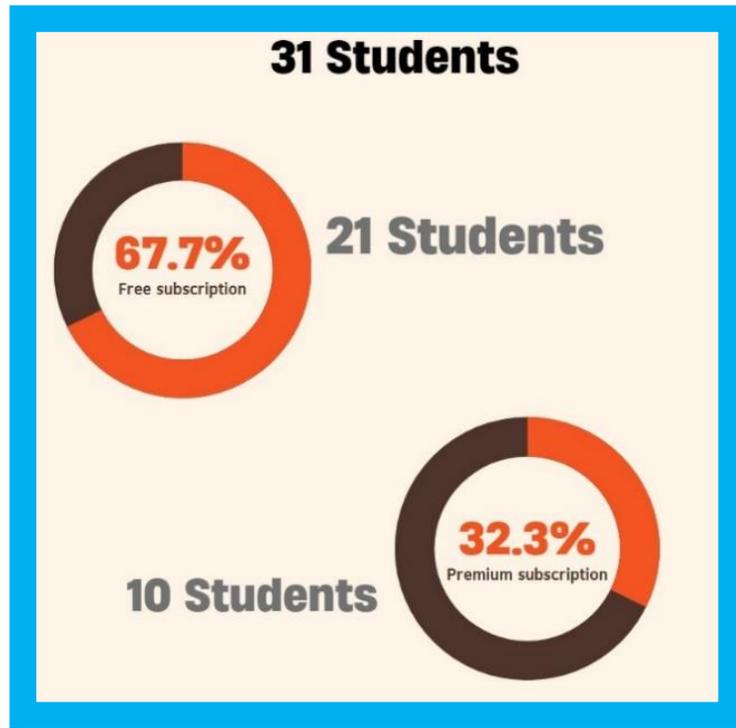


Figure 4.7
diverse range of self-perceived writing levels of the students

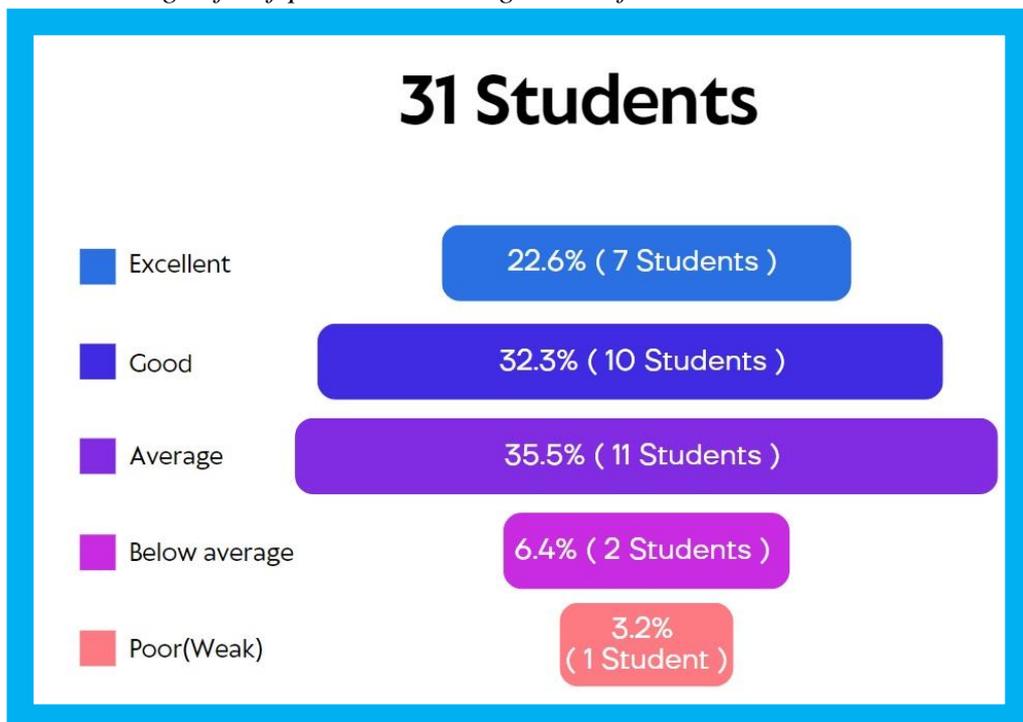


Table 4.4
Students writing levels

Students writing level	Number	percentage
Excellent	7	22.6%
Good	10	32.3
Average	11	35.5%
Below average	2	6.4%
Poor (Weak)	1	3.2%

The tabulated data provides insights into students' self-perceived writing levels. The largest group of students, comprising 35.5%, considers their writing skills to be at an average level. This suggests that a significant portion of students view their writing abilities as being competent, although not exceptional. The next most prevalent category is "good," with 32.3% of students indicating that they possess solid writing skills. This indicates a notable number of students who feel confident in their ability to write effectively. Additionally, 22.6% of students rate their writing level as "excellent," indicating a substantial proportion of students who have high confidence in their writing abilities. On the other hand, there are smaller percentages of students who perceive their writing levels as "below average" (6.4%) and "poor" or "weak" (3.2%). These students may require additional support and intervention to improve their writing skills. Overall, the data suggests a diverse range of self-perceived writing levels among the student population, with the majority considering themselves to be at an average or above-average level.

Question 10: What would you suggest as tips or solutions to improve and enhance your academic writing skill?

The purpose of the question is it provides firsthand insights from the students themselves, who have experienced the challenges and successes of academic writing, their suggestions can offer unique perspectives and practical tips that may not have been considered, and, to understand the strategies and techniques that have been effective in enhancing their writing skills. Moreover, the answers can be used to identify common patterns, successful approaches, and innovative ideas for improving academic writing instruction.

Based on the students' answers, there are several common suggestions for enhancing writing skills, with a strong emphasis on reading as a foundational practice. Reading extensively, particularly articles related to the domain of study or personal interest, is seen as crucial for gaining vocabulary, ideas, and knowledge. Students also highlight the importance of practicing writing regularly, rewriting what has been read, and reviewing and proofreading their work before submission. Seeking feedback from others, including teachers, instructors, and peers, is recommended to gain different perspectives and improve clarity, structure, and persuasive arguments. The use of technological tools like Grammarly for error detection and correction is also mentioned. Additionally, there is an emphasis on developing a strong command of grammar, spelling, and sentence-level writing. Overall, the suggestions highlight the significance of reading, practice, revision, and seeking feedback as key strategies for enhancing academic writing skills.

4.1.3. Section Three: Writing task

The question aims to gather insights into our peers' aspirations and goals after completing their graduation. The benefits of this question are numerous. It helps us understand students' career aspirations, allowing us to support and motivate each other. Additionally, by sharing our plans, we can discover common interests and potential collaborations.

Furthermore, asking students, the previous question, "In 100 words, describe your post-graduation plans," offers valuable grammatical benefits. Their responses allow us to evaluate sentence structure, grammar, and punctuation usage. Additionally, it provides insight into their vocabulary range and word choice, showcasing their ability to express ideas effectively. Through describing their plans, students demonstrate clarity of expression, highlighting their proficiency in communicating complex ideas concisely. Moreover, we can assess grammar and syntax skills, including verb tenses, subject-verb agreement, and overall grammatical accuracy. This question also aids in evaluating students' writing skills, including coherence, logical progression, and overall writing proficiency. Ultimately, it supports the development and assessment of various grammatical aspects, fostering language proficiency and enhancing written communication skills.

I identified the following grammatical mistakes in accordance to the provided answers of students in the table (next page):

It's important to note that these errors may vary in severity, and the analysis is based on the provided sample of student answers.

Based on the data, the most common grammatical mistakes among the students are related to subject-verb agreement and incorrect article usage. These errors suggest that students may need to work on their understanding of how verbs should agree with their subjects in number and how to correctly use articles (such as "a" or "the") in sentences.

The presence of run-on sentences and sentence fragments indicates that students might need to focus on improving their sentence structure and ensuring that each sentence is complete and properly punctuated.

Furthermore, there were a few instances of verb tense inconsistencies and word usage issues. These errors suggest that students should pay attention to maintaining consistent verb tenses throughout their writing and work on selecting appropriate words and constructing sentences effectively.

Overall, the students could benefit from further practice in grammar rules, sentence construction, and proofreading to improve the accuracy and clarity of their writing.

Table 4.5
Writing task results

Error type	Frequency	correction
Subject-Verb Agreement:	11	Several responses have issues with subject-verb agreement, where the verb does not match the subject in number or tense. For instance: "I probably won't have a fully detailed plan yet."
Incorrect Article Usage	8	Some students omit articles or use incorrect articles in their sentences. For instance: "The chief plan is to continue the studies" and "I have dream to be a good teacher."
Run-on Sentences	4	A few responses have run-on sentences, where two or more independent clauses are joined together without proper punctuation. For example: "I have many plans in post-graduate. First, after I graduate."
Word Usage and Sentence Structure	3	Some responses exhibit incorrect word choices or awkward sentence structures, which affect the clarity and coherence of the sentences. For instance: "The post-graduation plans depend on our goals" and "It just takes searching and a passion to contribute to society."

4.2. The Writing Test Results

The table below demonstrates the students answers to the Writing Test (Triangulation Test):

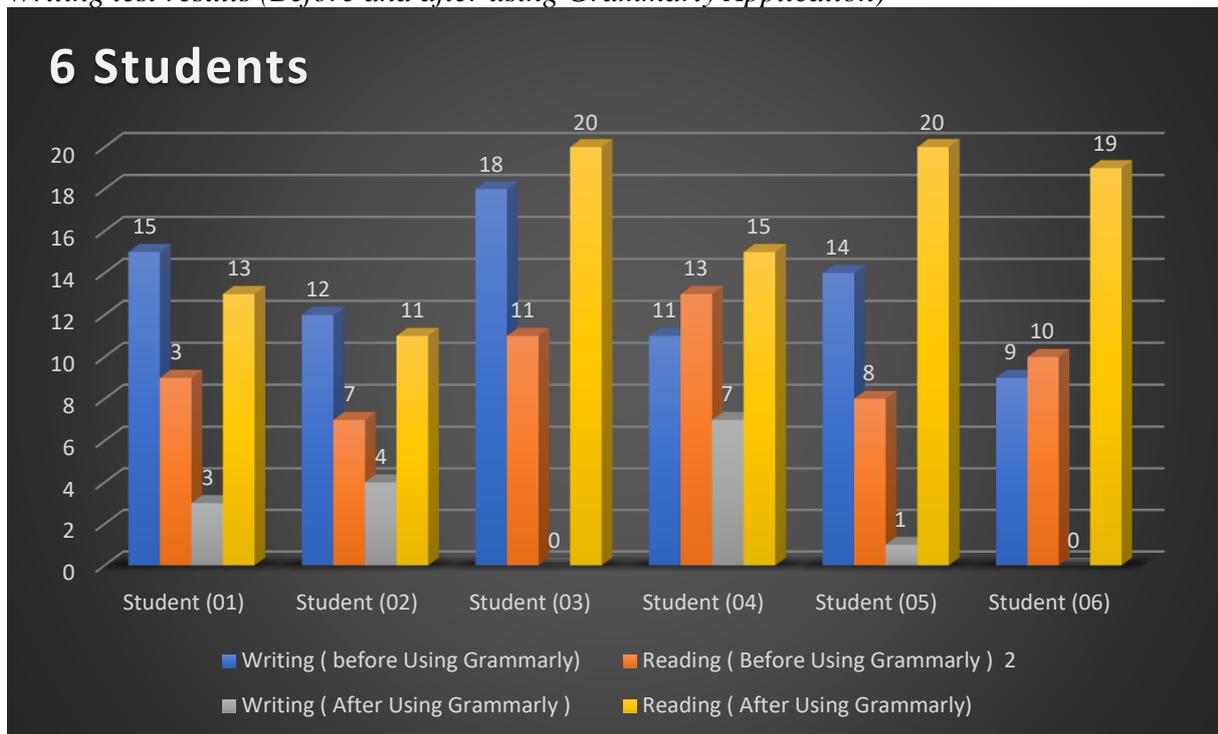
Table 4.6
Students' answers to the Writing test

Participant → ↓	Before		After	
	Writing	Reading (number of errors)	Writing	Reading (number of errors)
Student 1	15 errors	9 out of 20 errors	3 errors	13 out of 20 errors
Student 2	12 errors	7 out of 20 errors	4 errors	11 out of 20 errors
Student 3 (Premium)	8 errors	11 out of 20 errors	0 errors	20 out of 20 errors
Student 4	11 errors	13 out of 20 errors	7 errors	15 out of 20 errors
Student 5 (Premium)	14 errors	8 out of 20 errors	1 error	20 out of 20 errors
Student 6 (Premium)	9 errors	10 out of 20 errors	0 errors	19 out of 20 errors

Note: The column of Writing is related to errors made by students. The column of Reading is concerned to errors detected by students.

Figure 4.8

Writing test results (Before and after using Grammarly Application)



From the analysis, we can observe that Grammarly has generally helped improve the students' writing performance. Most students showed a decrease in the number of errors after using Grammarly, indicating its effectiveness in identifying and correcting grammar mistakes. However, the results in reading performance varied, with some students showing improvement and others maintaining a similar level of errors. It's worth noting that Student 03 and Student 05, and Student 06 who used Grammarly Premium, achieved a significant improvement in their reading and writing performance, suggesting that the premium version may offer more comprehensive assistance. Overall, Grammarly appears to be a useful tool for enhancing writing skills and, to some extent, reading comprehension.

4.3. Synthesis and Analysis of Findings

The current study aimed to investigate the impact of utilizing Grammarly's application on the writing abilities of EFL (English as a Foreign Language) students at the University of Mohammed Khider Biskra. In addition, the research design adopted for this study was a descriptive design, and a mixed-methods approach was employed to gather data, and the population of the study consisted of Master One and Master Two students who were required

to write their theses papers, showcasing their knowledge of artificial intelligence and writing skills.

The data collection process involved administering an online questionnaire and conducting a writing test. The questionnaire consisted of three sections: background information, students' use of Grammarly, and a writing task. In addition, the writing test was divided into two parts, with the first part prohibiting the use of any AI tools, including Grammarly, while the second part allowed participants to utilize Grammarly.

Furthermore, the analysis of the questionnaire data revealed several important findings. First, the majority of the participants (93.93%) had previously used Grammarly. This indicates that Grammarly is widely known and utilized among EFL students at the university, and the analysis showed that students have been using Grammarly for varying durations, with a significant increase in usage observed over the past two years.

Moreover, the frequency of Grammarly usage was examined, and it was found that a significant percentage of students (61%) reported using Grammarly always or often during their writing process. This suggests that students have developed a strong reliance on Grammarly as a tool for improving their writing.

When asked about the reasons for using Grammarly, participants provided various responses highlighting the benefits of the application. These included checking for grammatical correctness, improving the clarity and coherence of their writing, avoiding mistakes, and receiving suggestions for better writing. The participants also emphasized the convenience, ease of use, and helpful features of Grammarly.

4.4. Discussion of Findings:

The findings of this study provide valuable insights into the use of Grammarly and its impact on EFL students' grammatical accuracy as well as writing abilities. The high percentage of students who have used Grammarly indicates its popularity and widespread use among the target population. This can be attributed to the perceived benefits of Grammarly in improving writing quality and accuracy.

Moreover, the frequency of Grammarly usage indicates that students have integrated the application into their writing routines and rely on it as a regular tool for enhancing their writing.

This suggests that Grammarly has become an essential part of their writing process, providing them with the support they need to produce grammatically correct and coherent texts.

In addition, the reasons provided by participants for using Grammarly highlight its effectiveness in identifying and correcting grammatical errors, as well as its role in improving writing style and clarity. The positive attitudes expressed towards Grammarly demonstrate its value as a writing tool and its ability to meet the needs and expectations of EFL students.

Furthermore, the findings of the writing test, which compared the performance of participants with and without access to Grammarly, will provide further insights into the impact of the application on students' writing abilities. This analysis will help determine whether Grammarly's use leads to improved grammatical accuracy and enhanced writing skills.

Overall, the findings suggest that Grammarly has a positive impact on EFL students' writing abilities, and the application is widely used and valued by students, providing them with valuable support in improving their writing quality. Additionally, the integration of Grammarly into the writing process of EFL students indicates its potential as a valuable tool for language learners.

Conclusion

This chapter thoroughly examined and deliberated on the outcomes obtained from the students' questionnaire and the Writing Test. Additionally, it addressed the research methodology employed in this study, encompassing aspects such as the research design, data collection instruments utilized for gathering data, and the sample. The chapter also provided an in-depth exploration of the administration procedures for both the questionnaire and the interview, accompanied by detailed descriptions of each. Finally, the research findings were comprehensively discussed and interpreted.

In conclusion, the findings from this chapter indicate that Grammarly has a beneficial effect on the writing abilities of EFL students. The application is widely utilized and valued by students, providing them with valuable assistance in enhancing the quality of their writing. This section of the study succinctly summarizes the primary findings derived from the students' questionnaire and Writing Test. As a result, our hypotheses regarding the use of Grammarly in the context of AW were confirmed. It was observed that Grammarly fosters a sense of autonomy

among learners in terms of error detection and correction, significantly impacting their writing skills by improving grammatical accuracy.

Chapter Five:

General Conclusion

General Conclusion

In general, this study provides compelling evidence to support the hypothesis that the integration of Grammarly as an Automated Writing Evaluation (AWE) tool significantly enhances and improves the writing skills and abilities of EFL students. The comprehensive findings of this research shed light on the widespread adoption and utilization of Grammarly among students, highlighting its immense value as a reliable writing companion in terms of improving writing quality, precision, and overall accuracy.

The successful integration of Grammarly into students' writing processes serves as a testament to its potential as a highly beneficial AWE tool for language learners. By empowering students with a sense of autonomy in error detection and correction, Grammarly effectively equips them with the necessary tools to identify and rectify writing mistakes independently. This autonomous approach not only fosters self-confidence in their writing abilities but also encourages a proactive mindset towards continuous improvement.

Moreover, the overwhelmingly positive attitudes expressed by students towards Grammarly further reinforce its effectiveness and convenience as an invaluable writing aid. The students' appreciation for Grammarly's user-friendly interface, instant feedback, and detailed suggestions exemplify the tool's ability to offer personalized support tailored to individual writing needs. This positive reception underscores the instrumental role of Grammarly in promoting student engagement, motivation, and enthusiasm in the writing process.

additionally, by embracing Grammarly as an AWE tool, EFL students can harness its capabilities to enhance various aspects of their writing, including grammar, punctuation, vocabulary, and coherence. This multifaceted approach not only facilitates the development of fundamental writing skills but also fosters a greater understanding of language conventions and structures. Consequently, Grammarly serves as a comprehensive writing assistant that empowers students to consistently produce well-crafted, error-free written work.

In conclusion, the findings of this study provide strong evidence that Grammarly significantly contributes to the enhancement of writing skills and abilities among EFL students. Besides, the integration of Grammarly into the writing process facilitates autonomous error detection and correction, promoting a proactive mindset towards continual improvement. With

its user-friendly interface, instant feedback, and personalized suggestions, Grammarly proves to be an indispensable tool in enhancing writing quality, accuracy, and overall student engagement.

6.1. Limitations of the Study

The study presented previously has certain limitations that should be taken into consideration. These limitations include:

6.1.1. *Sample Size:*

The study may have been conducted with a relatively small sample size, which limits the generalizability of the findings. The results may not be representative of the entire population of EFL students or other language learners.

6.1.2. *Contextual Factors:*

The study might have been conducted in a specific educational context or with a particular group of students, which can impact the generalizability of the findings to other settings or populations. Different contexts may yield different results.

6.1.3. *Duration of the Study:*

The study might have been limited in terms of its duration, focusing on a short-term assessment of the impact of Grammarly as an AWE tool. Longer-term effects or potential changes in writing skills over time may not have been fully explored.

6.1.4. *Lack of Control Group:*

The study may not have included a control group or alternative AWE tools for comparison. This makes it difficult to determine whether the observed improvements in writing skills were specifically due to the use of Grammarly or could be attributed to other factors.

6.1.5. *Self-Reporting Bias:*

The study's findings may have relied on self-reported data, such as students' perceptions of their writing improvements. Self-reporting can introduce bias and may not always align with objective measures of writing quality or accuracy.

6.1.6. *Technology Dependency:*

The study heavily focuses on the use of Grammarly as an AWE tool, which may limit the exploration of other potential AWE tools or approaches. It is important to consider a variety of AWE tools and approaches to provide a comprehensive analysis.

It is essential to acknowledge these limitations in order to interpret the findings of the study accurately and to provide a foundation for future research and further investigations in the field of AWE and language learning.

6.2. Recommendations for future research

Based on the general conclusion of this study, it is highly recommended that educators and institutions embrace the use of Grammarly as a powerful Automated Writing Evaluation (AWE) tool to enhance the writing skills and abilities of EFL students. The findings unequivocally support the hypothesis that Grammarly positively impacts writing quality and grammatical accuracy, making it an invaluable resource in language learning.

In addition to Grammarly, it is also recommended to explore other AWE tools available in the market. There are various alternatives to Grammarly that offer similar functionalities, such as ProWritingAid, Hemingway Editor, and LanguageTool. These tools employ AI algorithms and natural language processing techniques to provide comprehensive feedback on grammar, spelling, style, and coherence. By offering a range of AWE tools, educators can cater to the diverse needs and preferences of their students, ensuring an individualized and enriching writing experience.

Furthermore, it is essential to emphasize the significance of AI (Artificial Intelligence) in the context of language learning and writing improvement. AI-powered tools like Grammarly and other AWE applications leverage advanced algorithms to analyze and evaluate written texts, offering personalized suggestions and insights for error detection and correction. The integration of AI-based technologies into the writing process provides students with a sense of

autonomy, allowing them to actively participate in error identification and refinement of their writing skills.

Moreover, to effectively incorporate Grammarly and other AWE tools into the language learning curriculum, it is recommended that educators provide comprehensive guidance and support. This can involve conducting training sessions or workshops to familiarize students with the features and functionalities of these tools, as well as educating them on how to interpret and apply the suggested corrections effectively. By empowering students with the knowledge and skills to utilize AWE tools, educators can foster a culture of autonomous learning and continuous improvement in writing.

In conclusion, the recommendation is to prioritize the integration of Grammarly as an AWE tool and explore alternative AWE tools powered by AI in the language learning curriculum. By leveraging the capabilities of AI, educators can enhance the writing skills of EFL students, provide them with personalized feedback, and foster a self-directed learning environment. It is crucial to offer comprehensive guidance and support to students, ensuring they effectively utilize these tools to maximize their writing potential and achieve excellence in written expression.

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Appendices

Appendix A

Mohamed Khider University – Biskra

Department of Literature and Foreign Languages English Department

Students' Questionnaire

(Participants M1/M2 Science of Language)

Dear participants, I sincerely welcome you to participate in this study by answering the following questions regarding the relationship between Grammarly use and grammatical accuracy among Algerian EFL learners.

Anonymity and confidentiality: Participants are ensured that the data are collected for research purposes and not to evaluate them personally. All of the information provided by participants of this study will be encoded and anonymized. The personal details of participants, including personal information, will not be disclosed in any dissemination of the study results learners. **Thank you for your contribution.**



I. Profile

General questions

1. 1- Age? **Obligatory**

2. 2- What's your gender? **Obligatory**

-Male

-Female

II. Definition

Grammarly is an English automated writing tool powered by AI in detecting duplicate content and errors in grammar, vocabulary, mechanics, syntax, and language style (Grammarly, 2021).



3. 3- Have you ever used Grammarly? if no, skip Q4,5,6,7 and 8. **Obligatory**

-YES

-NO

4. 4- How long have you been using Grammarly?

5. 5- How often do you use Grammarly?

- Always
- Often
- Sometimes
- Rarely

6. 6- Why do you use Grammarly?

7. 7- Where do you use Grammarly?

- Phone
- Computer (PC or
- Laptop) Other Device

8. 8- Type of subscription?

- Free
- Premium

9. 9- How do you describe your writing level? **Obligatory**

10. 10- What would you suggest as tips or solutions to improve and enhance your academic writing skill? **Obligatory**

11. III. Writing task

11- In 100 words, describe post-graduation plans. **Obligatory**

Appendix B

Mohamed Khider University – Biskra

Department of Literature and Foreign Languages English Department

Students' Writing Test

(Participants M1/M2 Science of Language)

Dear participants, I sincerely welcome you to participate in this study by answering the following questions regarding the relationship between Grammarly use and grammatical accuracy among Algerian EFL learners.

Anonymity and confidentiality: Participants are ensured that the data are collected for research purposes and not to evaluate them personally. All of the information provided by participants of this study will be encoded and anonymized. The personal details of participants, including personal information, will not be disclosed in any dissemination of the study results learners.

Thank you for your contribution.

Gender:

Age:

Study level:

PART ONE

Grammarly Use

Task One: Writing

- In 100 words, describe your post-graduation plans. (Without using Grammarly or any other AWE tool)

Task Two: Reading

- Circle the grammatical errors in this paragraph. (Without using Grammarly or any other AWE tool)

"Artificial Intelligence has transformed the way we live and work. Its impact is being widely felt across various industries and domains. AI algorithms have revolutionized decision-making processes, allowing for more accurate and efficient analyses. These advancements have resulted in increased productivity and profitability for many businesses. However, there is still much to learn and understand about AI and its implications. The complexity and breadth of AI technology require continuous adaptation and improvements. Furthermore, ethical considerations play a crucial role in the development and deployment of AI systems. Issues such as privacy, bias, and transparency have become important talking points in the AI community. Additionally, the availability and accessibility of high-quality data are key determinants of AI's success. Organizations need to invest in data collection and curation efforts to harness the full potential of AI. In conclusion, the future of AI looks promising, but it requires collaborative efforts and ongoing refinements to overcome the challenges it presents."

Source: ChatGPT-4/OpenAI

Gender:

Age:

Study level:

PART TWO

Grammarly Use

Task One: Writing

- In 100 words, describe your post-graduation plans. (With the use of the Grammarly Application)

Task Two: Reading

- Circle the grammatical errors in this paragraph. (With the use of the Grammarly Application)

"Artificial Intelligence has transformed the way we live and work. Its impact is being widely felt across various industries and domains. AI algorithms have revolutionized decision-making processes, allowing for more accurate and efficient analyses. These advancements have resulted in increased productivity and profitability for many businesses. However, there is still much to learn and understand about AI and its implications. The complexity and breadth of AI technology require continuous adaptation and improvements. Furthermore, ethical considerations play a crucial role in the development and deployment of AI systems. Issues such as privacy, bias, and transparency have become important talking points in the AI community. Additionally, the availability and accessibility of high-quality data are key determinants of AI's success. Organizations need to invest in data collection and curation efforts to harness the full potential of AI. In conclusion, the future of AI looks promising, but it requires collaborative efforts and ongoing refinements to overcome the challenges it presents."

Source: ChatGPT-4/OpenAI

ملخص

تهدف هذه الدراسة بشكل أساسي إلى تقييم تصورات الطلاب والأساتذة في مجال علوم اللغة الإنجليزية تحديداً تخصص العلوم اللغوية التطبيقية في اللغة الإنجليزية بسكرة، وتعزيز الكتابة والتقليل من الأخطاء النحوية لدى طلاب ومتعلمي اللغة الإنجليزية كلغة أجنبية، وشرح مفصل حول كل ما يتعلق بالتطبيق Grammarly كأداة لتقييم الكتابة آلياً باعتمادها على تقنيات الذكاء الاصطناعي. لتحقيق هذا الهدف، من المفترض أن يكون لدى كل من الأساتذة والطلاب آراء أو تصورات إيجابية حول تطبيق Grammarly، لأنه يساعد في تصحيح أخطاء الطالب، وتحسين عملية كتابتهم. ولهذه الغاية، اعتمد الباحث المنهج الوصفي، والذي اشتمل على أداتين لجمع البيانات حيث تم إعطاء استبيان لعينة من الطلبة درجة الماستر (للسنة الأولى ماستر و السنة ثانية ماستر) تتكون من 33 طالب وطالبة، بالإضافة إلى ذلك فلقد تم أيضاً اختبار ستة طلاب من نفس المستوى في امتحان كتابي لجمع معلومات أكثر حول دقة عمل تطبيق Grammarly في تحديد الأخطاء وتصحيحها، ومدى استقلالية المتعلمين في الكتابة الأكاديمية باعتمادهم ودون اعتمادهم على تطبيقات الذكاء الاصطناعي المختلفة و من بينها تطبيق Grammarly في تحسين مهاراتهم الكتابية و التقليل من ارتكاب الأخطاء الكتابية و خصوصاً النحوية. كشفت النتائج أن الطلاب المتعلمين للغة الإنجليزية اقرارهم بأن دمج الذكاء الاصطناعي وبرنامج Grammarly يمكن أن يؤدي التقليل من ارتكاب الأخطاء النحوية وتحسين الكتابة الأكاديمية وايضا إلى فهم أفضل للمفهوم الذي يتم تعليمه من خلال تحويل التركيز من النظرية إلى الممارسة داخل الفصل الدراسي وفي هذا الصدد تم اقتراح بعض التوصيات والاقتراحات التربوية للبحوث المستقبلية.

الكلمات المفتاحية: تطبيق Grammarly، أداة تقييم الآلي للكتاب، الذكاء الاصطناعي، طلبة اللغة الإنجليزية كلغة أجنبية، الكتابة الأكاديمية الأخطاء النحوية،