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**Investigating the Impact of AI-Powered Tools  
in Developing Writing Skills. The Case of  
Second-Year EFL Students at Saida  
University**

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## **Declaration of Originality**

I hereby declare that this submission is my work and that it contains no material previously published or written by another person, nor material that has been accepted for the qualification of any other degree or diploma of a university or other institution.

Date: Sunday, June 14<sup>th</sup>, 2026

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***Dedication***

***To***

***My father***

***My Mother***

***My Brothers***

***All My Family***

***And my friends Yousra and Nesrine.***

## **Abstract**

Mastering academic writing is considered as a significant challenge for English as Foreign Language (EFL) learners. It is particularly relevant in higher education contexts where effective written communication is essential for academic success. Despite the growing use of artificial intelligence (AI) technologies in language learning, limited research has examined the impact of AI-powered writing tools on EFL students' writing development in Algerian universities. Therefore, this study seeks to investigate the influence of ChatGPT, Grammarly, and QuillBot on the development of writing skills among second-year EFL undergraduate students at Dr. Moulay Tahar University of Saida. Hence, the study banks on a mixed-methods research design and employed methodological triangulation in order to test the validity and reliability of the findings. In this regard, data were collected through a questionnaire administered to 64 students, semi-structured interviews with 10 instructors, and direct classroom observations. This comprehensive approach provided diverse perspectives on the integration of AI-powered tools in the EFL learning environment. Accordingly, the findings revealed that AI tools could be effective in which students showed positive perceptions regarding their use in writing instruction. They have also reported improvements in several writing sub-skills, including grammatical accuracy, vocabulary use, mechanics, and rhetorical organization. The findings also indicated an increased learner engagement and motivation during writing activities which were conducted with AI tools. However, concerns were raised about the potential negative consequences of excessive reliance on AI tools, especially with regard to writing autonomy and creative expression. Therefore, the study suggests that AI-powered writing tools can serve as valuable pedagogical supports that complement, rather than replace, teachers' feedback. The findings contribute to the growing body of research on AI-assisted language learning in which it provides practical insights for educators seeking to integrate AI technologies effectively into EFL writing instruction within higher education.

**Keywords:** AI-powered tools, AI-assisted language learning AI Effectiveness EFL writing skills, AI-assisted language learning,

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## **List of Abbreviations and Acronyms**

**EFL** : English as a Foreign Language

**AI** : Artificial Intelligence

**ICTS** : Information Communication Technologies

**ICT** : Information Communication Technology

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Appendix A: students' questionnaire

Appendix B: Teachers' interview

Appendix C: Classroom Observation Scheme

### **GENERAL INTRODUCTION:**

The rapid development of technology has significantly transformed modern societies, particularly in the field of education. In recent years, artificial intelligence (AI) has emerged as one of the most influential technological innovations. AI refers to computer systems and digital technologies capable of performing tasks that usually require human intelligence, such as language processing, problem-solving, text generation, and feedback provision (Holmes et al., 2019). Today, AI-powered applications such as ChatGPT, Grammarly, QuillBot, and Gemini are increasingly integrated into educational contexts; in which their uses are increased by students and teachers for academic purposes.

The integration of AI-tools into education has become noticeable in language learning especially in academic writing. Writing is considered one of the most essential academic skills. It enables students to communicate ideas, develop arguments, and express critical thinking effectively. However, mastering this skill remains difficult for university students, particularly for learners studying English as a foreign language (Richards & Renandya, 2002). Students often struggle with grammar, vocabulary, organization, coherence, and argument development; which negatively influence their academic performance.

Many university students have turned to AI-technologies as supportive learning resources to improve their writing. These tools provide learners with immediate feedback, grammar correction, paraphrasing assistance, vocabulary suggestions, and idea generation, making writing tasks easier and more accessible (Kasneci et al., 2023). Moreover, they allow students to practice writing outside the classroom and receive continuous support without time or location limitations.

In higher education institutions, students rely on AI-applications not only to improve language accuracy but also to support autonomous learning and increase academic productivity. AI-generative systems has particularly accelerated this transformation by introducing advanced conversational technologies capable of generating human-like responses and assisting with academic tasks (OpenAI, 2023). These innovations have attracted the attention of educators and researchers, who seek to understand the educational potential of AI-tools and their influence on students' learning outcomes.

Nevertheless, despite the growing popularity of AI in education, its integration remains controversial. Many researchers emphasize the positive role of AI in improving

language learning, motivation, engagement, and personalized learning experiences (Zawacki-Richter et al., 2019). On the other hand, several scholars warn the possible negative consequences of excessive dependence on AI technologies. In addition to that, concerns related to plagiarism, academic dishonesty, and passive learning attitudes.

The use of AI-tools among university students, particularly second-year students has become more common in recent years. Second-year university students represent an important academic stage; they are expected to develop stronger academic writing skills and greater independence in learning. At this level, students are required to produce more analytical and organized academic texts. Therefore, investigating the impact of AI-tools in influencing students' writing development is both relevant and necessary.

Although several scholars studied this topic, in Algeria there is a significant gap concerning the efficacy of AI-applications on the writing skill of second-year EFL students. For this reason, the present study focuses on "Investigating the impact of AI Tools on Developing Second-Year Algerian University Students' Writing Skills." It seeks to examine how AI technologies contribute to improving students' writing abilities, motivation, engagement, and overall learning experiences. Furthermore, the study aims to explore both students' and teachers' perceptions regarding the effectiveness, opportunities, and limitations of AI integration in education.

The main problem addressed in this research is about the uncertainty of the actual effect of AI-tools in academic writing development. Although these technologies are widely used by university students, it remains unclear whether they genuinely improve writing skills or merely provide temporary assistance. In addition, the widespread use of AI-generated content has raised important concerns regarding academic integrity and the future role of teachers in the educational process.

Accordingly, this study attempts to answer the following main research question:

Q1: How effective are AI-tools in developing students' writing skills?

from this main question, several sub-questions emerge:

Q2: What are the differences between AI-tools and traditional methods for improving students' writing performance?

Q3: Do AI-applications marginalize the teacher's role in correcting students' writing?

Q4: Do AI-applications develop students' writing skills or restrict their knowledge?

Based on the research questions, the study highlights the following hypotheses:

H: AI tools contribute positively to the development of students' writing skills.

H1: It is suggested that AI tools are more effective than traditional methods in improving students' writing performance because they provide immediate feedback, grammar correction, vocabulary enhancement, and writing organization.

H2: AI-applications do not marginalize the teacher's role completely; instead, they function as supportive educational tools that complement teachers' guidance in correcting students' writing.

H3: AI-applications contribute positively to the development of students' writing skills; however, excessive dependence on these technologies may restrict students' critical thinking, creativity, and independent learning abilities.

This study aims to:

- Examine the effectiveness of AI-tools on developing second-year university students' academic writing skills.
- Identify the most commonly used AI-tools among university students.
- Investigate the influence of AI-technologies on students' motivation and engagement.
- Explore students' and teachers' perceptions regarding AI integration in education.
- Analyze the advantages and limitations of AI-tools in academic writing contexts.

This research is important for several reasons. First, it contributes to the growing body of research on Artificial Intelligence in education, particularly in relation to academic writing. Because of the excessive development, understanding their educational implications has become a significant academic concern (Dwivedi et al., 2023). Second, the study provides insights into how university students use AI-tools and how they influence their writing

performance. Third, the research may help teachers and educational institutions understand both the advantages and challenges of integrating AI-technologies in university education.

Furthermore, it addresses a contemporary educational issue that directly affects students, teachers, and universities. The findings may help educators develop balanced strategies for integrating AI-tools into teaching practices. In addition, the study may guide students toward more responsible and effective use of AI-technologies in academic contexts.

Methodologically, this research adopts a mixed-method approach combining quantitative and qualitative methods. The quantitative aspect relies on questionnaires administered to second-year university students in order to collect data regarding their use of AI-tools, attitudes, and perceptions. The qualitative aspect includes interviews with teachers and classroom observations to obtain deeper insights into the effectiveness of AI technologies on teaching and learning processes (Creswell & Creswell, 2018).

The collected data will be analyzed using descriptive and interpretative methods. Statistical analysis will be applied to examine questionnaires, while thematic analysis will be used to interpret qualitative data collected through interviews and classroom observations. Combining these methods allowed for a comprehensive understanding of the research problem and enhanced the reliability of the study findings.

This thesis is organized into four main chapters in addition to the general introduction and general conclusion. The first chapter presents the theoretical framework of the study. It discusses the concept of artificial intelligence, the different types of AI tools used in education, and the notion of academic writing. It also reviews previous studies related to AI integration in language learning and writing development. In addition, it highlights both advantages and challenges of these tools. The second chapter focuses on the research methodology. It explains the research design, population, sampling procedures, research instruments, and methods of data collection and analysis. Ethical considerations and methodological limitations are also discussed.

The third chapter is devoted to the analysis and interpretation of the collected data. It presents the findings obtained from students' questionnaires, teachers' interviews, and classroom observations. The chapter analyzes the results in relation to the research questions and hypotheses and discusses their educational implications. The fourth chapter discussed the major findings of the study. It evaluates the research hypotheses and the educational



implications of AI integration. Also, it identifies the limitations of the research and proposes recommendations for future studies and educational practices.

Overall, the increasing integration of Artificial Intelligence into education has created both advantages and challenges for students and teachers. Therefore, investigating the efficiency of AI tools on enhancing second-year university students' writing skills is essential. This study seeks to contribute to this understanding by providing a balanced analysis of the educational impact of AI technologies in academic writing and university learning context

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### 1.1 Introduction:

Writing is an essential skill in the EFL context, enabling students to communicate ideas effectively and achieve academic success. With the advancement of technology, ICTs and Artificial Intelligence (AI) have become important tools that support language learning and writing development.

This chapter provides a theoretical review of the concepts related to the present study. It begins with the definition of Writing, its Importance in the EFL Context, and the Major Theories and Approaches that support the Teaching and Learning of Writing. The chapter then examines Information and Communication Technologies (ICTs) and their Role in education, followed by a discussion of Artificial Intelligence and its Applications in language learning. Furthermore, it explores AI-powered Writing Tools, namely ChatGPT, Grammarly, and QuillBot, highlighting their features and educational uses. Finally, the chapter reviews previous studies and discusses the Impact of these technologies in Enhancing Students' Writing Performance.

### 1.2 Writing Skills in EFL Context

#### 1.2.1. Definition of Writing

Writing is among the hardest skills that learners face. It is considered as the final stage of mastering the language, especially when writing in a foreign language which is totally different from the native language. Numerous EFL students think that writing is only about organizing words, using the right grammar for sentences in order to write a proper text (Jamoom, 2021), in fact it is a complex skill that requires many talents in generating clear and structured thoughts. It is also defined by Nunan as

*“ it is both a physical and a mental act. At the most basic level, writing is the physical act of committing words or ideas to some medium, whether it is hieroglyphics inked onto parchment or an e-mail message typed into a computer. On the other hand, writing is the mental work of inventing ideas, thinking about how to express them, and organizing them into statements and paragraphs that will be clear to the reader”*

(Nunan, 2003, p. 88)

This claim means that writing is physically about building words or thoughts on computers, and mentally is about creating ideas, knowing how to produce them in order to design clear paragraphs for the reader. EFL students need to be fluent in English writing to develop in their academic context and also for their professions in the future (Abdalkader, 2022).

The cognitive process theory by Flower and Hayes (1981) supports the idea that writing is not about writing simple texts but it is a cognitive process that helps students pass through stages such as deciding what to write including the topic that you are going to tackle, organizing the ideas involved, selecting the right vocabulary, choosing the correct grammar, and structuring them into clear sentences, writing, then revising and correcting the piece of writing. Effective writing depends on being able to produce a text or a paragraph without any mistakes.

### **1.2.2 The Importance of Writing for EFL Learners**

Writing is crucial for EFL students as it helps them express their ideas and feelings clearly. According to El Ouidani and el Baghdadi (2022) writing extends learners' perspectives, helps them succeed academically, and reach their purposes in classroom and in real life situations. It plays an important role in communicating messages, enriches one's vocabulary, and helps them become fluent in writing. Fodil-cherif said that

*“creative writing is said to increase self confidence and self esteem among learners who have tendency to uncover hidden things about the language and about themselves too, hence it promotes personal and linguistic growth as well as motivation to continue writing”*

(Fodil-cherif, 2021, p. 4)

In simple terms, effective writing aids students in developing their confidence and they will feel relaxed, it enables them to express their thoughts and emotions clearly, and they will know about their own capacities, this motivates them to continue writing. Despite that writing is the final stage after reading, listening, and speaking, it is the most challenging skill that learners suffer from indicating its importance in EFL context. It aids learners to communicate well and spreads their ability to think and rethink about their ideas. According to Harmer (2004), writing supports the knowledge that learners have learned, and it serves as a tool that helps in developing sentence structure. In addition to that, Walsh (2010) highlighted

the power of writing in higher education and occupational contexts, stated that students who don't have the personal ability to write, they will lack the effective way of communication with teachers, colleagues, and others, because many formal communication requires writing professional e-mails, reports, projects, and they take place in the natural life of students careers.

### **1.3 Teaching and Learning Writing**

Teaching and learning writing in EFL context is not as easy as many people think, it requires concentration, choosing the right way to teach and being sure that the method used fits learners effectively. Over time the teaching process has been changed and many scholars identified approaches to teaching writing, the product approach, the process approach, genre-based, and the task-based approach.

#### **1.3.1 The Product Approach:**

The main focus of the product approach is on the final stage of a text ignoring the stages that the writing skill passes through. According to El Ouidani and el Baghdadi (2022) before 1970s, writing was seen only as an activity done in classroom. In addition, this approach focused on developing particular skills such as grammar, vocabulary, and form of the sentence in order to write a coherent final version. According to Silva (1990) the product approach should emphasize the structure of sentence and syntax, which strengthens language features through providing models.

It involves the teacher to give the learners a model and then they imitate the text for example in writing tasks. Despite its benefits, Hedge (2000) criticizes the model approach through his research, which says that it leads learners to neglect the creative part of writing and focus only on imitation; which will reduce their capacity for independent and creative writing.

This model makes students passive. They will emphasize the ready work made neglecting the importance of innovation and critical thinking as Hyland (2003) indicates that the product approach neglects the importance of the content and supports copying the work. Students in this approach will not follow the stages of academic writing; highlighting the limitation of this model. According to Tuffs (1993) the product approach does not show how the writer comes up with the last stage of writing.

### **1.3.2 The Process Approach**

According to Tuffs (1993), in the process approach the writers should focus on the steps of writing a text not only the conclusive product. Adding to that, Namouchi (2014) stated the stages of writing process:

a) **Pre-writing:** this stage students choose the topic, plan what to write, it is about brainstorming the thoughts .

b) **Drafting:** indicates the second stage, which is about starting writing without giving importance to the form, grammar, and vocabulary.

c) **Revising:** it focuses on the coherence, which learners in this step review their thoughts, enhance their writing to be clear for the teachers or the readers.

d) **Editing:** here the writers check their grammar, vocabulary, punctuation to be sure that their writing is free from mistakes.

e) **Publishing:** which is the final stage of the writing process that students submit and share their work.

The process approach helps learners to develop, increases their writing proficiency. Tribble (1996) defined this method as a creative tool that enables learners to produce an effective writing through moving across the stages of writing. It encourages learners to become active learners rather than just following the teacher, it focuses on the writer-centered approach, and the teacher is only a feedback provider, acting as a guide for learners. Moreover, Despite that it takes long time when following the stages, it promotes creativity and decreases learners anxiety.

### **1.3.3 The Genre-based Approach**

Unlike the previous approaches, the genre-based approach focuses on the writing context and the purpose behind writing instead of modeling a given text or following the stages of writing. Swales gives a definition of the genre approach:

*“A genre comprises a class of communicative events, the members of which share some set of communicative purpose. The expert genre recognizes them. This rational shapes the shematic structure of the discourse, and influence and constraints choice and of content and style”* (Swales, 1990, p. 85)

Means that genre is based on establishing communicative purpose of a group of texts, this goal helps identify the content and the structure. It gives preference to teaching the writer the structure and the features of different genres.

Tuffs (1993) asserted that the goal of the genre method is to recognize the features of a successful writing in numerous genres of texts and making the students understand these features. Moreover, it helps learners write a coherent texts in different genres through imitation, and makes them conscious about the purpose of writing. Conversely, many scholars criticize this idea such as Badger and White (2000) who said that the genre approach may limit learners' creativity and freedom for expression.

### 1.3.4 The Task-based Approach

The task-based approach sees that the appropriate way of teaching writing is through completing real-world tasks. According to Ellis (2010) a task is based on real practice of the target language for communication to construct specific findings. It gives the students freedom to write and they take responsibility for their own learning, it emphasizes the learner-centered rather than teacher-centered in which aids learners to become active learners and enhances their writing innovation. Kafipour et al. (2018) argues that task-based approach improves learners' vocabulary, grammar, sentence organization, which helps them master their writing, and makes them confident and motivated to write. Despite the multiple advantages of this approach, Ellis (1994) mentioned that it lacks accuracy.

Overall, writing is the most demanding skill in academic contexts and professions, and both learners struggle with learning it and teachers finding it difficult to teach. Teaching writing involves the teacher to act as a guide and facilitator to improve learners' writing in terms of generating the ideas, the formulation of a sentence, providing the styles and the strategies of writing, the genres of texts, giving feedback, evaluating, and showing the effectiveness of using technology or AI-tools.

**Table 1 the Main Approaches of Teaching Writing**

| Approaches       | Strengths                                                                                                         | Limitations                               |
|------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Product approach | Focuses on the final stage of writing.<br>Focuses on vocabulary, grammar, and structure.<br>Emphasizes imitation. | Limited independent and creative writing. |
| Process approach | Emphasizes the steps of writing.                                                                                  | Time consuming.                           |

|                      |                                                                |                                              |
|----------------------|----------------------------------------------------------------|----------------------------------------------|
| Genre-based approach | focuses on the writing context and the purpose behind writing. | Limits creativity and freedom of expression. |
| Task-based approach  | Emphasizes real tasks.                                         | Lacks accuracy.                              |

The researcher reviewed the writing skill in EFL context, now he explores the technological tools that support this instruction.

### 1.4 ICT's in EFL Context

ICT's are the acronyms of Information and Communications Technologies which are the different kinds of technological instruments that facilitate learning and working by providing many solutions. Toomey defined it, and explain that :

*“... Generally relates to those technologies that are used for accessing , gathering, manipulating and presenting or communicating information. the technologies could include hardware (e.g. computers and other devices ); software applications ;and connectivity (e.g. access to internet, local networking infrastructure, and videoconferencing). What is the most significant about ICT is the increasing convergence of computer-based, multimidea and communications technologies and the rapid rate of change that characterizes both the technologies and their use”*

(Toomey, 2001, p. 3)

In other words, ICT helps in generating ideas, collecting information, organization, and publication. It has many types of technologies as computers and internet, and it is relevant because it is useful in daily life. The acronyms of ICT and ICTs are not the same as the first one is singular Information Communication Technology which is the broad term of technology emphasising the general use of technology in several fields, while ICTs are plural which refers to the tools of technology.

According to Cakici (2016) learners develop the sense of creativity and learning becomes fresh when using ICT. Hence, learning shifts from only depending on a teacher as a source of information to a learner-centered which will improve learners critical thinking, motivate them and learning will become enjoyable through implementing digital tools.

The benefits of ICT are multiple according to Isisag (2012):

1. It boosts students' knowledge about the history and the language of the contry.
2. It allows the use of genuine data .



3. It gives learners the freedom when learning.
4. Through the digital tools learners will be exposed to the original (native) speakers of language.
5. Improves the learning environment by incorporating group and collaborative work.
6. Supports learners' engagement and motivation.

Although ICT has many advantages, it shares also disadvantages. Livingstone (2012) highlighted that ICT does not fit all the positions and the aims of learners, and it needs practice to utilize it perfectly. ICT is difficult to implement in EFL classroom or in education as it is not available for all students and not all countries have equal access to internet and its means. Cakici (2016) supported this idea by denoting the challenges that teachers face with ICT such as: problems to organize classroom, teachers insufficient training, restricted accessibility to technology, expensive price, and issues in choosing the right tools for the course.

In spite of that, it is an effective method that enhances the teaching and learning process it is difficult for regular use due to its hard integration. According to Haydn and Counsell (2003) one of the difficult activity is implementing ICT in lessons significantly. Moreover, many under developed countries suffer from irregular electricity which makes them incapable to integrate such tools in their educational systems.

Also, they may reduce learners critical thinking. Reliance on ICTs is not always a good thing especially for students, they will develop the habit of depending on internet and its tools to get quick responses without making efforts and reflect about them. Additionally, they can be a distractive tools when integrating them in classroom, students are going to use them in a bad way as utilizing them for non-school objectives.

Teachers play an essential role in making ICT a successful tool for learning. According to Mumtaz (2000) teachers should take their time to practice using ICT unless they will fail to integrate such tools in teaching. Teachers are among the most influential figures on students, their behaviors and gestures towards using ICT will affect learners either positively or negatively.

### **1.5 ICTs and The Learning Theories**

Many learning theories support the use of technology as a medium that helps the teaching and learning process by providing modern and developed learning followed the advancement of the world, which learners will be engaged and encouraged to learn.

### **1.5.1 Behaviorism Theory**

A learning theory that focuses on learners behaviors, Skinner (1974) demonstrated that learning happened through the visual difference of learner's behavior that is derived from extrinsic impacts. Skinner was one of the pioneers of this theory who present his research about the operant conditioning and sees that learners acquire knowledge through reward and punishment.

In this stance, ICTs play an important role in addressing and helping students to gather information, as they are available all the time, they provide immediate feedback and may some apps give rewards to motivate students to continue their progress. According to Blanskat et al. (2006) through their study, indicated that ICT improves learners with low level and even the advanced learners in many sides such as motivation, engagement, attention, collaborative work. Which helps learners by providing the positive reinforcement.

Furthermore, Nah et al. (2013) reported that gamified tools use motivation strategies, positively reinforce people by rewarding them such as giving points that support the learners, aims to encourage learners through positive feedback on their actions, and make them engage by lowering anxiety which lead to delightful learning. One of these tools is Duolingo, a Mobile-assisted language learning that encourages the behaviourisit fundamentals.

### **1.5.2 Humanism Theory**

Humanistic Learning Theory views writing as a personal and meaningful process in which students express their thoughts, emotions, and experiences in an authentic way. It emphasizes learner autonomy, motivation, and self-expression, meaning that students improve their writing skills when they feel emotionally engaged, supported, and free to develop their own voice.

In the context of AI-assisted writing, this theory becomes highly relevant because AI tools can function as supportive environments that guide students without taking away their independence. For instance, AI writing assistants can provide feedback on grammar, vocabulary, and organization while still allowing students to make their own decisions and revisions. Mas Torrecillas (2024) argues that even in AI-driven educational contexts, the

human dimension of learning must be preserved, ensuring that learners remain active agents in their educational development. From this perspective, AI tools can enhance students' writing development by reducing anxiety, offering immediate support, and encouraging continuous revision, while still respecting the humanistic principles of creativity, autonomy, and personal growth (Mas Torrecillas, 2024).

### **1.5.2 The Constructivism Theory**

One of the supportive theories to ICTs use in the learning process is the constructivism theory, a model of learning that places learner in the central point of learning. Saunders (1992) described constructivism as the philosophical action that denotes reality as subjective based on human mental experiences who examined it. It means that learning depends on previous information that learners already know over life.

Based on Holzer (1994) view constructivism emphasises the active role of the learner which is going to be the principle source of knowledge rather than focusing on the teacher for delivering information. Which means that the emphasis is on learner's construction of information, instead of being a passive receiver who listens quietly and waits for the ready knowledge, students should actively think and rethink about the facts .

Even though the role of the learner is important, the role of the teacher can't be neglected. The teacher is an essential part that makes learners aware of the constructivist idea, through Brooks and Brooks (1993) strategies: first, fostering students autonomy by making them control their learning by their own. Second, conducting interactive resources through the utility of raw materials which will engage students. Third, making students scrutinize, forecast, and invent their own solutions for activities. Fourth, giving students the opportunity to control the lessons by using their answers, which will build their confidence, fifth, teachers before giving their lecture try to understand students knowledge. Sixth, immersing learners in teacher-student and student-student dialogue by which learners will exchange ideas and interact with their friends. Seventh, asking them questions that requires critical thinking. Eighth, asking them for explanation and clarification. Ninth, promoting discussion. Even if their answers are correct criticize them.

Constructivism encourages the use of ICTs in classroom in order to make learners more comfortable and learning more delightful. Such tools facilitate learning according to Petraglia (1998) stated that computer can act as a guide that helps learners noticing their challenges and solving tasks. In addition to that, recently Internet becomes one of the

necessaries for learning, especially AI-tools that provide flexible knowledge, where learners will take control to learn by their own. Such tools make learning interactive, successeful, and relevant. These tools match with the constructivism perspectives according to Jalil et al.(2023) AI apps aids for independent learning, enables simulations for genuine cases, and provide speedy control for learners.This promotes the active learning and learners participation.

### **1.5.3 Multiple Intelligences Theory**

Multiple Intelligences Theory, proposed by Gardner (1983), suggests that students do not all learn or express knowledge in the same way, but rather through different types of intelligence such as linguistic, spatial, interpersonal, and intrapersonal abilities. In relation to writing, this theory helps explain why students may have different strengths when producing written texts, such as generating ideas, organizing paragraphs, or expressing creativity. AI-tools can support these differences by offering personalized assistance that adapts to students' individual needs, for example by suggesting vocabulary for linguistic learners, providing structure for logical thinkers, or offering visual prompts for spatial learners. In this sense, AI-powered writing tools contribute to differentiated instruction by helping students develop their writing skills according to their specific intelligence profiles. Gardner (1983) emphasizes that recognizing multiple intelligences allows educators to move beyond a one-size-fits-all approach, which is particularly important in writing development where learners often face diverse challenges in idea generation, coherence, and expression. Therefore, integrating AI tools in writing instruction can support a more inclusive and adaptive learning environment that aligns with the principles of Multiple Intelligences Theory (Gardner, 1983).

Though the connectivist model is beneficial, it contains limitations such as giving too much importance to the learner by making all the information easily available. In addition, not all the countries can use it due to their slow access to internet which will make learning ineffective.

### **1.5.1 Connectivism Theory**

It is considered as a new learning theory that views learning from the technological world. Siemens (2004) ancient theories lack the real life use (technology). Students nowadays are following the digital world for studying which seems to render this theory useful. Technology has deleted the the linear learning of the classical theories. ICTs transformed

learning to an independent process which learners are capable to learn anywhere and everywhere. This theory focuses on making connections. Duke et al. (2013) demonstrated that in order to enhance the regular learning, learners should identify the relationships between the source of information and analyze their truthfulness for meaningful use. In addition, Siemens (2005) stated some rules of connectivism:

- Learning happens through different viewpoints.
- Learning is about linking particular nodes.
- Learning can happen outside human minds.
- Being able to understand new information is better than sticking with older knowledge.
- Preserves connections to reinforce the ongoing learning.
- An important skill is being capable to view links between thoughts, words, and fields.
- The main objective of the connectivist tasks is the contemporary information.
- Among the learning activities is making decision. students should be able to recognize the crucial information, because what is correct nowadays may become incorrect later.

The progressive instruction Kop and Hill (2008) underlined that the classical learning theories can include the connectivism theory, where different instructional models are impacted by variety of technologies. Connectivism model boosts learners ability of acquisition through training the actual world, it fosters student autonomy in learning and developing the ability to take responsibility for learning.

### **1.6 Artificial Intelligence:**

One of the greatest discoveries of Turing in 1950 and was introduced by McCarthy in 1956 which changed the world, and turned it into a simple area, replacing the human minds and facilitate knowledge for all the domains. There were many scholars who defined AI as McCarthy et al. (2006) who views that AI is:

*“the science and engineering of making intelligent machines “*

(McCarthy et al, 2006, p. 13)

In other words, it is about inventing machines that are smart and could generate knowledge as humans do or better than them. AI has the ability to think, summarize, paraphrase, predict, create, and do many things in a short time which makes it relevant and useful in daily life. Another definition by Khan (2017) who suggested that AI is systems or computers that perform and act exactly as humans which they are capable to store knowledge, find solutions for tasks and problems, create and produce thoughts in a smart way. Acemoglu and Restrepo (2019) gave another definition for AI as it is the capacity to enhance systems such as software algorithms to collaborate and react with world.

AI has taken part of individual's lives by facilitating the teaching and learning process and giving help for all the fields including education, medicine, engineering, psychology, and even can people use it for playing games. Spyros (2017) through his study explained that the main aim of AI is not about storing information, producing a huge number of data, or finding quick solutions, while its principle purpose is being able to produce systematic, or semi-systematic knowledge from different types that matches particular goal. According to Sabira and Falaq (2021) Artificial Intelligence has many features including:

- The use of Artificial Intelligence is effective for finding answers for several issues.
- It has the capacity to analyze, develop, master knowledge, use ancient information to solve new problems.
- The ability to use errors as experience to discover recent cases.
- It is flexible when dealing with obscure and challenging situations even with insignificant knowledge.

The characteristics of AI are multiple, and over time it is continuing in its development which will invade all aspects of human lives, and that indicates that its integration remains essential nowadays in all domains specifically in education and EFL context. As it acts as a guide, facilitator, organizer, and promoter for both teachers and learners. AI has shown improvement in EFL context through various studies, highlighting that it enhances the instructional process by modifying the traditional ways of teaching and learning. Zhao and Nazir (2022) identified that Artificial Intelligence boosts the teaching and learning methods using variety of tools which turned learning into an interactive and progressive process.

Although AI is fundamental and has many positive aspects in EFL context ; its disadvantages are numerous as it may reduce students creativity through the overdependence,

also the use of AI makes learners feel that there is no need to study in classrooms and paying attention to teacher's explanation as everything is ready and well explained in AI.

### **1.7 AI-Tools**

The utility of Artificial Intelligence becomes popular due to its valuable tools that provide control in all domains. In education particularly in English as a foreign language context, AI-apps show greater impact on learners as well as teachers.

Moreover, AI tools are a good method to teach, study, and also for work when the world is suffering from many issues such as pandemics. And there is no other great example as COVID-19 that influenced all aspects of humans lives, it scared many people and led them imprisoned themselves in their houses, leaving their studies, jobs, and other priorities. During the era of COVID-19, people turned to the online method to finish their works, institutions and companies used the AI-apps to accomplish what have stopped because of the pandemic, which raises the importance of these apps and become an essential part of the world.

Furthermore, they reinforce children knowledge by incorporating games with meaningful information like Duolingo, which not only kids benefit from it but also adults. This app opens learners minds to entertain as well as gathering knowledge.

Xu et al. (2022) explored the effects of AI-powered applications on the learning process; which revealed that AI tools serve as a productive method that enhances student's performance. In this vein, Walter (2024) explained that AI apps maintain engagement and interaction in learning, by keeping the instruction meaningful. These apps provide insightful feedback, grammar correction, varied vocabulary, checking errors, and information about all the domains. According to Mohamed (2023) many EFL learners struggle to make their writing coherent, and their ideas linked; AI tools act as a corrector by providing organized feedback.

They act as a facilitator for students and help teachers to transform an effective guidance rather than replacing them (Sadiku et.al., 2022). Which indicates that teachers' role is essential for students and can not be eliminated. According to Blannin (2021) the teacher has many characteristics that AI can not marginalize.

#### **1.7.1. ChatGPT**

One of the famous AI-apps in the world and in Algeria is Generative Pre-trained Transformer known as ChatGPT. It started in 2018 by OpenAI, according to Thorp (2023) ChatGPT is a new method that strengthen learning based on individuals feedback which aids to achieve responses using discussion. And many other scholars such as Kalla et al. (2023) defined it as:

*“A revolutionary technology that uses advanced artificial intelligence techniques to generate natural language responses to a given prompt or input .”*

( Kalla et al., 2023, p. 827)

In a clear words, ChatGPT is a technological modal which utilizes AI strategies in order to produce answers as humans do. It has the ability to interact with individuals using messages or voice discussion, which makes it flexible model, and nowadays many people are using it as a method not only for learning or working but also for guiding them in their natural lives.

According to Mintz (2023) ChatGPT is beneficial because it helps achieving the instructional objectives such as providing references, and giving responses which can influence learners and their thinking. In the same vein, Murphy et al. (2023) added that it supports learners through promoting personalized learning, providing speedy answers in wich decreases stress on learners, as a result they gain more energy to learn.

Also, it is a communicative tool which can communicate about any topic using different languages, and EFL learners can benefit from it to enhance their pronunciation skill. Khan et al. (2023) stated the advantages of ChatGPT:

- It aids teachers through providing quick grades for learners answers.
- It controls teachers in the instructional process.
- It helps learners by giving them answers based on their needs.
- It assists students by encouraging their investigation.
- It offers accessible knowledge anywhere and everywhere.
- It creates different scenarios and stories based on real life situations.
- It makes learning easy through outlining or developing certain topics
- It acts as a translator for multiple languages .

Adding to that, Toma and Yànez-Pérez (2024) demonstrated that it promotes learners outputs and boosts their creativity. For these reasons learners are using it as the primary source of information for answering assignments, participating in class, and revising for



exams (Khurma et al.,2023). Even though it is advantageous, it contains downsides. According to Lee et al. (2024) ChatGPT includes risks concerning the ethical considerations. In which the information provided lack credibility and validity . Also, Yu (2024) asserted that ChatGPT's responses are not all the time correct, and the study of Rajan and Niranjana (2025) denoted that it has negative impact on student innovation .

### **1.7.2. Grammarly**

Another AI and software application which was created to check and correct individuals writing. Qassemzadeh and Soleimani (2016) explained that the beginning of Grammarly was in 2009 and it was situated in San Francisco, California. And the innovators of this application are Alex Shevchenko and Max Lytvyn.

According to Ghufroon and Rosyida (2018) Grammarly is a digital proofreading application that aids students by detecting their mistakes linking to the selection of vocabulary, grammar, and structure of the sentence. In the same line, Roughton et al. (2019) stated that Grammarly is an internet-based app which corrects grammar, punctuation, spelling, improves the choice of words, and it can detect plagiarism. Grammarly is among the useful and effective tool for checking grammar, which 20 million around the world are using it (Fitria, 2021).

This app can provide feedback about students writing without waiting for teacher's correction, Saadi and Saadat (2015) illustrated that digital feedback like Grammarly builds an encouraging atmosphere for learners . In which they will develop the sense of comfort leading to more engagement and creativity. Also, the Grammarly tool is used as a paraphrasing and summarising application, according to Fitri and Dewi (2024) Grammarly is a paraphrasing tool that aids its users by making them changing the words but keeping the same meaning for sentences for sentences and texts. Which makes it an effective tool for enhancing student's written performance.

Nova (2018) highlighted the benefits and the drawbacks of Grammarly. The strengths contain: it is easy to access for learners to get feedback about their writing, it is available all the time, it provides fast responses concerning the evaluation, it has a free version with basic features; a premium version is available. And its weaknesses are: it may provide wrong answers, it gives too much importance to the references, sometimes it lacks the comprehension of certain ideas.

### **1.7.3. QuillBot**

An online tool that is based on Artificial Intelligence, known by its successful paraphrasing for different texts. It was produced by Rohit Gupta, Anil Jason, and David Silin in 2017. It includes the premium and the free forms. According to Baker (2023) QuillBot is an efficient paraphrasing application which improves terms, texts, and articles using different AI strategies.

Due to the challenges that individuals especially students face when it comes to writing skill, QuillBot appears as a helpful tool that facilitates this process (Amyatun & Kholis, 2023). Williams and Davis (2017) explained that QuillBot app assists its users to not fall in plagiarism by rephrasing texts or paragraphs, summarizing, and enhancing the grammatical structure of sentences to be appropriate. In which this model is not only a paraphrasing tool but also serves its clients in different ways.

Based on Fitria (2021) study, QuillBot consists of many characteristics the first one is the standard style, which changes the original terms without changing the meaning. The second one is the proficiency style, emphasises producing a text that is clear without grammar errors in English. The third one is the innovation style, focuses on generating a rephrasing text that is dissimilar from the first version, which may lead to different idea and organization. The fourth one is the innovative + mode, which is about adjusting the grammatical structure for instance: common expressions and sentences. The fifth model is the structured style, it is about making a text suitable for professional public. The sixth mode is the summarizing style, which focuses on summarizing the original text with protecting the original idea. The last modal is the spread style, aiding through enlarging the text such as using other information. Although not all the styles are available in the free version, just the standard and the proficiency models are for free, and the others are accessible in the paid version.

Moreover, Mohammad et al. (2024) denoted that QuillBot enables reluctant students, who are shy and do not ask for help; by enhancing their vocabulary and grammar. In which they will concentrate more and turned to active students. Though, the research of Mohammad et al. (2024) reported some weaknesses of this tool for example: it doesn't fit the passive students, it decreases inventiveness through the overreliance on the app, sometimes it gives incorrect paraphrasing, and it requires strong internet.

## **1.8 The Role of AI-tools in Improving the EFL Students Writing Performance**

AI-tools are one of the best inventions that turned the world in small circle due to its different services in all the fields, particularly in English as a Foreign Language “EFL” context by providing solutions for students issues. And among these issues that learners struggle with there is writing that requires clear, coherent, and structured performance.

### **1.8.1. The Influence of ChatGPT on Students’ Writing**

Many researchers have indicated the role of ChatGPT as an effective writing tool such as Domenech (2023) and Cheong and Hong (2023) reveal that ChatGPT is relevant tool that develops learner’s writing activities through the individualized feedback which enhances the the writing ability of EFL students. Also, it has a great impact when it comes to the grammatical patterns. In the same line, Nazari et al. (2021) suggested that undergraduate students who work with ChatGPT, level up their lexicon and boost their ability to use the appropriate sentences in writing tasks. According to a study done by Burrill (2024) showed that university students and through their utility to ChatGPT, resulting a positive influence in writing connected and organized essays.

Students will remain confident when using ChatGPT to write their assignments without being afraid of making mistakes, Ningrum (2023) views that ChatGPT promotes the writing skill, enhances the writing thoroughness, and boosts students trust when writing. Which means that ChatGPT impacted not only student’s writing but also their emotional side by raising their confidence to write simple texts and complex ones.

However, many scholars draw attention to ChatGPT’s limitations for students such as dependency on this tool and and loss of validity in their writing, Sok and Heng (2023) supported this by demonstrating that learners who depend on ChatGPT, they struggle to create their own responses and it impedes their liberty to accomplish writing activities.

### **1.8.2.The Influence of Grammarly on Students’ Writing:**

Grammarly or known as Grammarly checker have earned the satisfaction of teachers, EFL students, and all the people who used it, due to its numerous features in the writing process. Ghuftron and Rosyida (2018) and Hockly (2019) reveal a positive impact on students’ writing by enhancing their vocabulary, writing marks, syntax, and orthography.

It offers fast feedback on students' writing performance and providing clarification followed by a model, so that they can redraft and correct their piece of writing individually (Chen & Cheng, 2008). They will be able to make mistakes and learn from them in order to produce a structured and organized work free from errors. Moreover, the investigation done by Fitriana and Nurazni (2022) about the positive and negative aspects of Grammarly reported that it enables students to practice writing beyond academic contexts and attain comments which promote the quality of their writing.

On the other hand, Fitriana and Nurazni (2022) stated that the feedback provided from this app is not true all the time. In which It requires more focus before depending on this app. Adding to that, sometimes it neglects the sentence structure for instance the passive and active form, resulted a unique meaning from the original (Cavaleri & Dianati, 2016).

### **1.8.3. The Impact of QuillBot on students' Writing**

QuillBot is a digital tool that aids students in their writing due to its distinctive capabilities and strategies of writing. The most famous function of QuillBot is paraphrasing, though it has many other offerings.

Several studies examine the effectiveness of QuillBot for students writing such as Amyatun and Kholis (2023) and Fitria (2021) who confirmed that QuillBot has positive effect on students writing, it helps them with paraphrasing, adjusting their phrases to be suitable, and provide different strategies for writing appropriately. Thus, they will master the process of writing by showing development in all the components (grammar, vocabulary, and the flow of thoughts), due to the app they can practice not only in university, but also in different places. Chui (2022) examination encouraged this idea and adding that it helps to prevent plagiarism. Nevertheless, it may cause dependency on the tool, which lowers students writing level (Mohammad et al., 2024). ChatGPT, Grammarly, and QuillBot are useful for student's writing according to multiple studies, however in Algerian contexts there is a gap in examining their effects on writing for second year EFL students.

## **1.9 Conclusion**

This chapter has examined the previous studies linked to Writing in EFL Context, the Importance of Writing, and the vital Approaches of Teaching writing (the Product, Process, Genre-based, and Task-based). Also, it reviewed the ICT in EFL context and the main learning theories that integrated ICT in their learning such as the Behaviourism, Humanism,

## ***Chapter one Literature review***

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Constructivism, Multiple Intelligence, and connectivism theories including their benefits and drawbacks. Additionally, it mentioned the definition of Artificial Intelligence, AI-applications (ChatGPT, Grammarly, and QuillBot), and their influence on learners' writing.

The next chapter presents The Learning Situation Analysis and The Research Design, including the participants, data collection instruments, and procedures used to conduct this study.

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## **Chapter two: The Learning Situation Analysis and The Research Design**

- 2.1. Introduction
- 2.2 Research Design
- 2.3 Methodological Limitations
- 2.4 Research Setting
- 2.5 Participants
- 2.6 Research Instruments
  - 2.6.1. Students' Questionnaire
  - 2.6.2. Teachers' Interview Guide
  - 2.6.3. Non-Participant Observation
- 2.7 Data Collection Procedure
- 2.8 Data Analyses Plan
  - 2.8.1. Quantitative Analysis
  - 2.8.2. Qualitative Analysis
- 2.9 Conclusion

## **Chapter two: The Learning Situation Analysis and The Research Design**

### **2.1 Introduction**

This chapter outlines the methodological framework adopted to investigate the research problem, providing a clear and systematic account of how the study was designed and conducted. It explains the overall research approach, which integrates both quantitative and qualitative methods to ensure a comprehensive understanding of the phenomenon under investigation. By combining data collected through student questionnaires, teacher interviews, and classroom observations, the study employs a mixed-methods or triangulation design to enhance the validity and reliability of the findings. This chapter also describes the research setting, participant characteristics, sampling procedures, data collection instruments, and the step-by-step process followed during the study. In addition, it presents the strategies used for data analysis, including statistical and thematic techniques, and highlights the ethical considerations observed throughout the research process. Overall, this chapter provides the foundation that ensures the rigor, transparency, and credibility of the study.

### **2.2 Research Design**

The research design refers to the comprehensive plan developed by researchers to guide the entire investigation process. It outlines both the structure and the implementation of the study (Balnaves & Caputi, 2001, pp. 27–29). In this sense, a well-developed research design presents a systematic sequence of steps necessary to conduct the study effectively and to ensure the collection of objective, reliable, and valid data (Mauch & Park, 2003, p. 123). In different words, the research design is a detailed plan that guides the entire research process, outlining the study's structure and implementation. A well-developed design provides a systematic sequence of steps to conduct the study effectively. It also ensures that the data collected are objective, reliable, and valid.

Therefore, any investigation should contribute meaningfully to the knowledge base and be advantageous for future researchers. As Dawson (2019) notes, both quantitative and qualitative research have their respective strengths and limitations, meaning neither approach

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is inherently superior. In this study, a mixed-methods design, also referred to as triangulation design, is implemented to examine the effectiveness of AI tools in enhancing students' writing skills.

The mixed-methods approach integrates quantitative and qualitative data to ensure that the study's findings are both reliable and meaningful. This combination provides a more comprehensive understanding of the research context and highlights the main advantage of mixed-methods research : the ability to generate nuanced, well-rounded insights by merging statistical analysis with rich, descriptive data.

In this study, the quantitative component involves using questionnaires to collect measurable statistics, while the qualitative component relies on interviews and classroom observations to gather non-numerical insights. Together, these methods allow for a thorough examination of how AI tools impact students' writing skills, offering both statistical evidence and contextual understanding.

### **2.3. Methodological Limitations**

Despite the advantages of the mixed-methods design adopted in this study, several methodological limitations should be acknowledged. First, the study relied on a relatively limited sample drawn from one university only, which may restrict the generalizability of the findings to other educational contexts or institutions. Second, the data collected through questionnaires depended largely on students' self-reported perceptions and experiences. Therefore, some responses may have been influenced by personal bias, exaggeration, or social desirability.

In addition, although classroom observations provided valuable real-time insights into students' behaviors and interactions with AI tools, the observational data may have been affected by the Hawthorne effect, where participants modify their behavior because they are aware of being observed. This may have influenced the naturalness of students' classroom participation and engagement.

Another limitation concerns the integration of quantitative and qualitative data. Combining different forms of data required considerable time and careful interpretation to ensure consistency between statistical findings and thematic analysis results. Moreover, conducting interviews, observations, transcription, coding, and data analysis was time-



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consuming and required extensive organization. Finally, because AI technologies evolve rapidly, the findings of this study may reflect only the current stage of AI integration in education and may change as new AI tools and educational practices continue to emerge.

## **2.4. Research Setting**

The research setting refers to the specific context, environment, or location in which the study is conducted. It includes the physical, social, and institutional conditions that may influence the research process and outcomes (Creswell, 2014, pp. 189–191). Moreover, describing the research setting enables the reader to understand the circumstances under which the data were collected and helps in interpreting the findings accurately (Denscombe, 2007, pp. 15–16). That is to say, The research setting is the environment or context where the study takes place, including physical and social conditions.

Therefore, it may influence how the research is conducted and the results obtained. Also, describing it helps readers understand the context of data collection and interpret findings more accurately. The study was conducted in an academic environment at the University of Saida (Dr. Moulay Taher), Faculty of Letters and Languages, English Department. The university provides structured undergraduate programs and is located in the city of Saida, in western Algeria.

The research took place during the second semester of the 2025–2026 academic year, over a period of three months, and focused on second-year EFL Licence students. The study specifically targeted the Written Expression course, in which students attended two sessions per week. Instruction was delivered through a combination of face-to-face sessions and online platforms, including Moodle. The English Department authorized the use of online applications for writing tasks, allowing students to integrate digital tools into their learning process.

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## **2.5 Participants**

In any research study, the selection of participants is a fundamental step. Participants are the individuals who receive treatment, respond to questions, or are observed during the research process, and the method used to select them largely depends on the nature of the study (Lodico et al., 2006, pp. 139–140). In qualitative research, participants are typically chosen based on their characteristics and their ability to provide in-depth and relevant insights, without the aim of generalizing the findings.

In contrast, quantitative research often seeks to generalize results from a sample to a larger population (ibid). The sample thus represents the primary source of data, enabling the researcher to address research questions or test hypotheses (Perry, 2005, pp. 55–56), as it consists of the individuals expected to supply the necessary information. Therefore, the significance of the sample lies in how it is selected and how well it aligns with the objectives of the study.

## **2.6 Research Instruments**

A research instrument is a tool used to collect, measure, and analyze data in a systematic way. Therefore, researchers choose the appropriate instrument depending on whether the study is quantitative, qualitative, or mixed-method. Moreover, common instruments include questionnaires, interviews, tests, and observations, each with its own advantages and limitations (Obeni, 2021, p. 114).

This study employed multiple instruments to collect both quantitative and qualitative data, ensuring a comprehensive understanding of the role of AI tools in enhancing students' writing skills. The instruments included a structured student questionnaire, a semi-structured interview with teachers, and classroom observations to complement the data.

### **2.6.1. Students' Questionnaire**

The student questionnaire is a widely used instrument for gathering data from a large number of participants efficiently and systematically. According to Creswell and Creswell (2018), questionnaires enable respondents to provide honest and anonymous feedback, making them particularly suitable for collecting quantitative data in educational research.

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In the present study, a structured questionnaire was administered to 64 second-year EFL students at the University of Saida. The questionnaire was adapted from previous studies related to AI-assisted learning and writing instruction and was modified to suit the Algerian EFL context and the objectives of the present research. The adaptation process involved simplifying certain items, adding questions related specifically to AI writing tools, and adjusting the wording to ensure clarity and relevance for Algerian university students.

### **2.6.2. Teachers' Interview Guide**

The second research instrument consisted of a semi-structured interview conducted with ten EFL teachers from the English Department at the University of Saida. According to Creswell and Creswell (2018), interviews are effective qualitative tools that allow researchers to explore participants' attitudes, experiences, and perspectives in depth.

All interviews were conducted face-to-face, recorded with participants' consent, and later transcribed to ensure accurate representation of teachers' responses and viewpoints.

To enhance the validity of the interview guide, the questions were examined by academic experts in language teaching and educational research. Their suggestions contributed to improving the wording, sequence, and relevance of the interview questions.

In addition, a pilot interview was conducted with two EFL teachers prior to the actual data collection process. This preliminary stage helped determine whether the questions were clear, understandable, and capable of generating detailed responses related to the research questions. Based on the pilot interview, some questions were reformulated and simplified to ensure better clarity and effectiveness during the final interviews.

### **2.6.3. Non-Participant Observation**

Non-participant observation is a research method in which the researcher observes participants in their natural environment without actively engaging in the activities being studied. According to Cohen et al. (2005, p. 376), this method enables researchers to collect unbiased, real-time data concerning behaviors, interactions, and classroom processes as they naturally occur. By remaining detached from classroom activities, the researcher can systematically record patterns of behavior and interaction using structured tools such as observation checklists.

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In the present study, non-participant classroom observation was employed as an additional data collection instrument to complement the findings obtained through questionnaires and interviews, thereby enhancing the validity and reliability of the study. The researcher remained an external observer throughout the observation sessions and did not intervene in classroom activities in order to maintain objectivity and preserve the natural learning environment.

## **2.7 Data Collection Procedure**

The data collection procedure refers to the systematic process through which the researcher gathers information from participants in order to answer the research questions. It outlines the specific steps, methods, and sequence followed in administering research instruments such as questionnaires, interviews, or observations, ensuring consistency and reliability in data gathering. Moreover, a well-defined data collection procedure helps maintain accuracy, ethical standards, and transparency throughout the research process, allowing the findings to be credible and replicable (Creswell, 2014, p. 148–149).

In brief, The data collection procedure is the organized process of gathering information from participants to answer research questions. It involves following specific steps and methods when using instruments like questionnaires, interviews, or observations to ensure reliability. Moreover, a clear procedure upholds accuracy, ethical standards, and transparency, making the findings credible and replicable.

The step-by-step procedure adopted in this study was designed to ensure that data collection was systematic, organized, and aligned with the research objectives. By carefully following a structured sequence of steps, the researcher was able to gather both quantitative data, through instruments such as questionnaires and tests, and qualitative data, through methods like interviews and observations. This dual approach allowed for the use of triangulation, which involves comparing and cross-verifying information from multiple sources to enhance the validity and reliability of the findings.

## **2.8. Data Analysis Plan**

The collected data were analyzed using both quantitative and qualitative techniques in order to answer the research questions and provide a comprehensive understanding of the effectiveness of AI tools in enhancing students' writing skills.

### **2.8.1. Quantitative Analysis**

The quantitative data obtained from the student questionnaires were analyzed statistically. Descriptive statistics, including frequency distributions, percentages, mean scores, and standard deviations, were used to summarize students' responses. These statistical measures helped identify trends and patterns related to students' perceptions of AI tools and their impact on writing performance.

More specifically, the quantitative analysis addressed the first and second research questions by examining students' views regarding the efficiency of AI tools in improving writing skills and comparing AI-based learning with traditional writing methods. The analysis focused on different writing components such as grammar, vocabulary, organization, coherence, and argumentation. Also, for reliable questionnaire the internal consistency of the Likert-scale items was acceptable ( $\alpha = 0.85$ ).

### **2.8.2. Qualitative Analysis**

Qualitative analysis refers to the examination of non-numerical data in order to identify patterns, themes, and meaningful insights. This method is widely used in fields such as education and social sciences to better understand human experiences, behaviors, and perceptions (Stewart, 2025).

The qualitative data collected through teacher interviews and classroom observations were analyzed using thematic analysis. The process involved transcribing, coding, and categorizing the data to identify recurring themes related to teachers' experiences, attitudes, and perceptions concerning the integration of AI tools in writing instruction.

This analysis mainly addressed the third and fourth research questions by exploring whether AI applications reduce the teacher's role in correcting students' writing and whether the use of AI tools genuinely develops students' writing skills or negatively affects their knowledge, autonomy, and critical thinking abilities. By combining statistical analysis with

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thematic analysis, the study adopted a triangulation approach to enhance the reliability, validity, and comprehensiveness of the findings.

## **2.9 Conclusion**

This chapter has outlined the methodological framework adopted for the present study, which aimed to investigate the effectiveness of AI tools in enhancing second-year EFL students' writing skills. A mixed-methods approach was employed to obtain comprehensive and reliable data through the use of students' questionnaires, teachers' interviews, and classroom observations. The chapter also described the research setting, participants, sampling procedures, data collection instruments, and the procedures followed throughout the study. These methodological choices were carefully selected to ensure the validity and reliability of the research findings and to provide a solid basis for addressing the research questions.

Having established the methodological foundations of the study, the following chapter focuses on the analysis and interpretation of the data collected from the different research instruments in order to examine the impact of AI tools on EFL students' writing development.

**Chapter three: Data analysis**

3.1. Introduction

3.2. Students' Questionnaire: Analysis and Interpretation

3.3. Teachers' Interview: Analysis and Interpretation

3.4. Classroom Observation: Analysis and Interpretation

3.5. Conclusion

## **Chapter three: Data analysis**

### **3.1 Introduction**

Having outlined the methodological framework of the study in the previous chapter, the present chapter focuses on the analysis and interpretation of the collected data. It aims to examine the effectiveness of AI tools in enhancing second-year EFL students' writing skills by analyzing the findings obtained from the students' questionnaire, the teachers' interview, and the classroom observation. The chapter begins with the analysis and interpretation of the questionnaire results, followed by the examination of the interview data and the classroom observation findings. It concludes with a summary of the main results that address the research questions and provide a basis for the discussion of the study.

### **3.2. Students' Questionnaire : Analysis and Interpretation :**

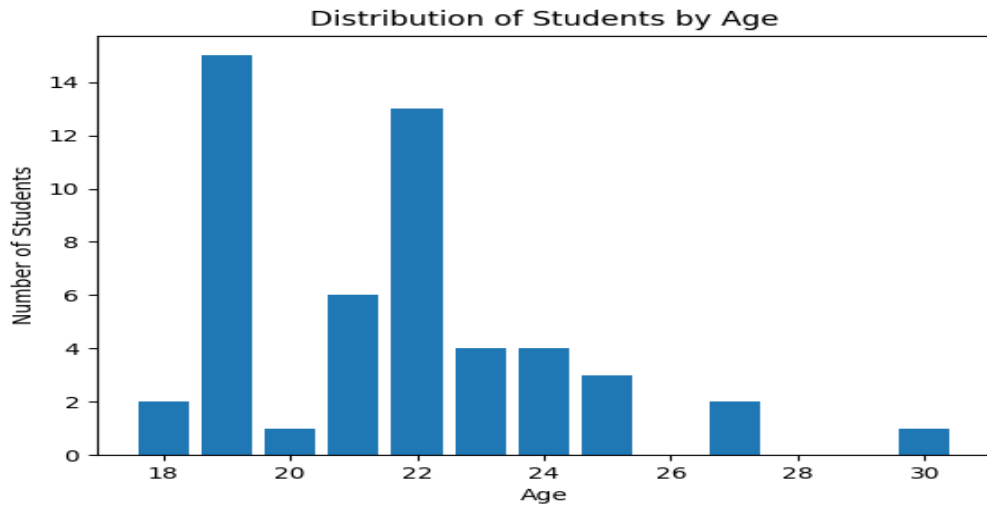
This section presents the analysis and interpretation of the data collected through the students' questionnaire. The questionnaire was administered to second-year EFL students to explore their perceptions, experiences, and attitudes regarding the use of AI tools in writing. The collected responses were analyzed quantitatively and presented through figures and tables. Each question was examined separately to identify patterns and trends in students' answers and to provide a clear understanding of the role of AI tools in enhancing writing skills.

#### **Question 1: What is your age?**

This question examined the age distribution of the respondents participating in the study.



**Figure 3.1. Age Distribution of the Respondents**



**Source:** student 's own work (based on questionnaire data).

The results showed that most respondents were between 19 and 22 years old. Students aged 19 represented the largest category (23.4%), followed by students aged 22 (20.3%). Only a small minority belonged to older age categories such as 25, 27, and 30 years old.

The findings indicated that the sample was relatively homogeneous, as the majority of participants belonged to the typical undergraduate age range. The limited number of older respondents suggested the presence of students who had returned to university studies or were pursuing advanced academic programs.

## Discussion

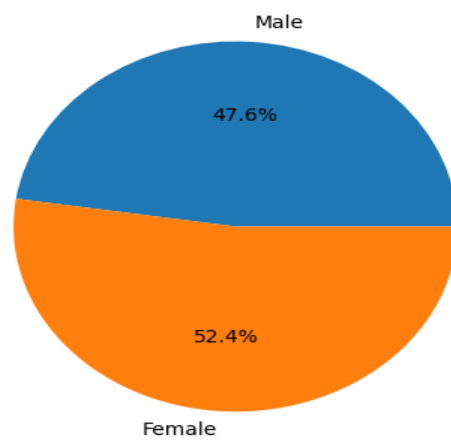
The age distribution revealed that the study mainly reflected the perspectives of young university students. Since most respondents belonged to a similar age group, their experiences with AI tools were likely influenced by comparable educational backgrounds and levels of digital literacy. The small proportion of older participants contributed little to the overall distribution and did not significantly affect the general profile of the sample.

Overall, future studies should include participants from a wider range of age groups to obtain more diverse perspectives. A more heterogeneous sample may provide a broader understanding of how learners of different ages perceive and use AI tools in academic writing.

### Question 2: What is your gender?

This question examined the gender distribution of the respondents participating in the study. It aimed to determine the proportion of male and female students among the second-year EFL learners. The results are presented in Figure 3.2.

**Figure 3.2. Students' Gender**



**Source : Student's own work (based on questionnaire data).**

The results showed a relatively balanced distribution between male and female respondents. Female students represented 52.4% of the sample, whereas male students accounted for 47.6%. Although females constituted the majority, the difference between the two groups remained limited, representing only 4.8%.

These findings indicated that both genders were adequately represented in the study. The distribution suggested that the collected data reflected the views of both male and female students, thereby providing a broad perspective on the use of AI tools in EFL writing.

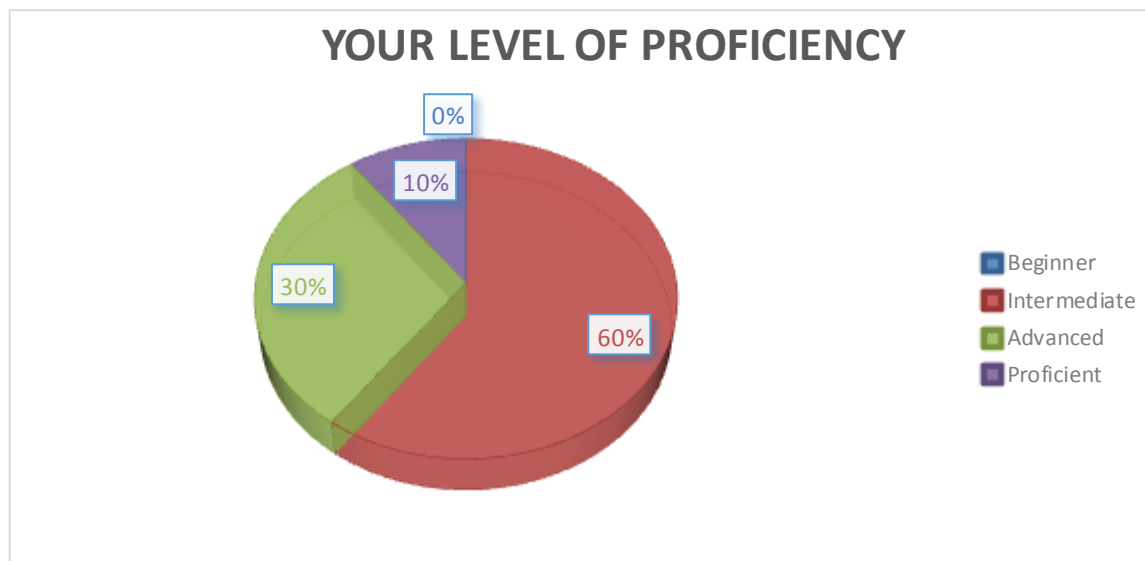
### Discussion

The gender distribution revealed that the sample was balanced and representative of the target population. The slight predominance of female participants did not significantly affect the overall composition of the sample. Since both genders were almost equally

represented, the findings were less likely to have been influenced by gender-related bias. Consequently, the responses provided a reliable basis for examining students' perceptions and experiences regarding the use of AI tools in writing.

**Question 3: How would you describe your level of English proficiency?**

This question examined the respondents' self-assessed level of English proficiency. It aimed to identify how students evaluated their language competence, ranging from beginner to proficient. The results are presented in Figure 3.4.



**Figure 3.4. Students' Level of English Proficiency**

**Source : Student's own work (based on questionnaire data).**

The results indicated that the majority of respondents (60%) considered themselves intermediate users of English. In contrast, 30% reported having an advanced level, while only 10% identified themselves as proficient users. No respondent classified himself or herself as a beginner (0%).

The findings demonstrated that most participants possessed at least a moderate level of English proficiency. The absence of beginners suggested that all respondents had already acquired a basic command of the language and were capable of engaging with academic tasks conducted in English.

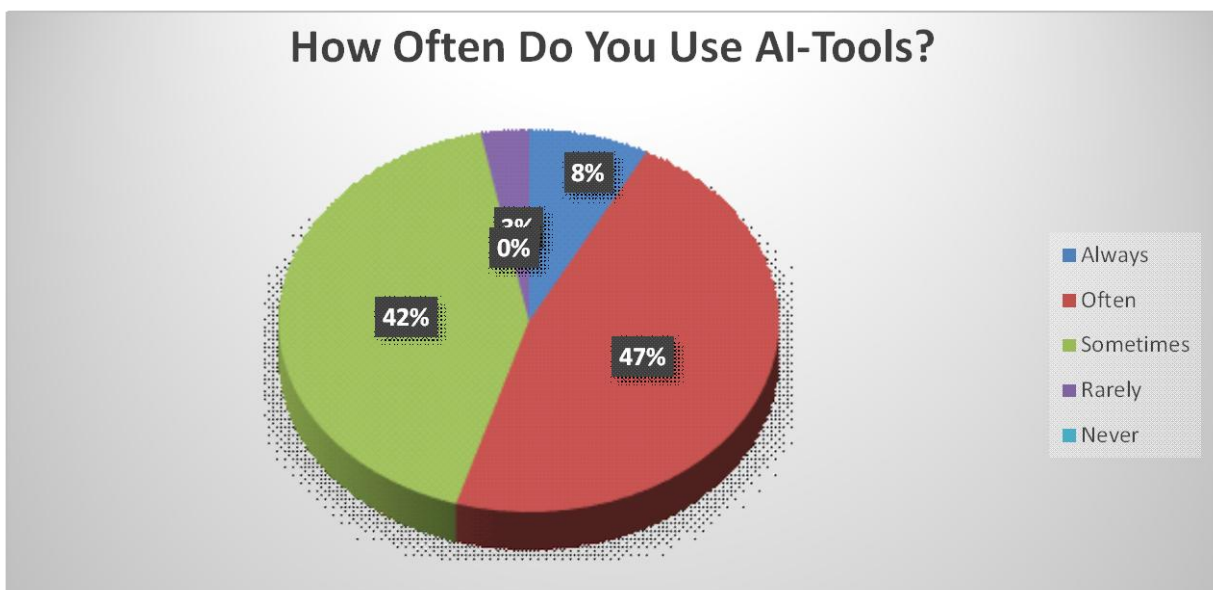
**Discussion**

The distribution of proficiency levels revealed that the sample consisted mainly of students with intermediate and advanced language skills. This finding was consistent with the academic profile of second-year university students, who had already completed several years of English study before participating in the research. The relatively high level of proficiency among respondents suggested that they were capable of using AI tools effectively to support writing activities. Moreover, their linguistic competence may have enabled them to evaluate, revise, and integrate AI-generated content more critically and efficiently.

#### Question 4: How often did you use AI tools?

This question examined the frequency with which students used AI tools in their academic activities. It aimed to determine the extent to which AI technologies had become part of students' learning practices. The results are presented in Figure 3.5.

Figure 3.5. Frequency of AI Tool Use



Source: Student's own work (based on questionnaire data).

The results showed that AI tools were widely used among the respondents. Nearly half of the participants (47%) reported that they frequently used AI tools in their academic work. In addition, 42% indicated that they used these tools occasionally. By contrast, only a small proportion of students reported rare use or constant use.

These findings revealed that the majority of respondents had incorporated AI technologies into their learning routines to varying degrees. The high percentages of frequent and occasional users suggested that AI tools had become a common resource for supporting academic tasks.

## Discussion

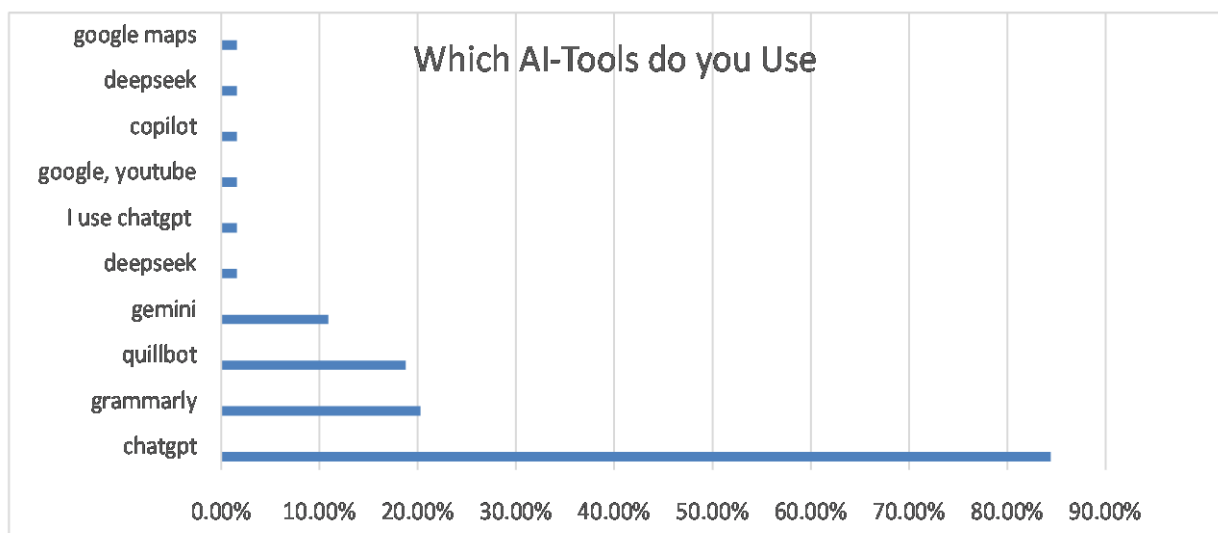
The findings indicated that AI technologies had gained considerable acceptance among second-year EFL students. Most participants reported either frequent or occasional use, suggesting that AI tools had become an important component of their academic practices. However, the relatively low percentage of constant users suggested that students had not relied entirely on AI systems. Instead, they appeared to combine AI-assisted learning with traditional learning strategies and personal effort. This balanced use may reflect students' awareness of both the benefits and limitations of AI technologies in academic contexts.

These results were consistent with the findings of Fitria (2021), who reported that students increasingly used AI-assisted applications to support language learning and writing activities. The growing integration of AI tools into educational settings demonstrated their perceived usefulness in facilitating learning and improving academic performance.

### Question 5: Which AI tools did you use?

This question examined the types of AI tools used by the respondents in their academic writing activities. It aimed to identify the most popular AI applications and the extent to which students relied on them. The results are presented in Figure 3.6.

Figure 3.6. Types of AI Tools Used by Students



**Source: Student's own work (based on questionnaire data).**

The results revealed that ChatGPT was the most widely used AI tool among the respondents, accounting for more than 80% of the responses. Grammarly and QuillBot were the second most frequently used tools, with approximately 18–20% of students reporting their use. Gemini recorded a moderate level of usage, whereas DeepSeek, Copilot, Google, and YouTube were selected by only a small proportion of respondents.

These findings indicated a clear preference for AI tools specifically designed to support writing tasks. While several AI applications were available to students, ChatGPT appeared to dominate their choices, whereas the remaining tools played a supplementary role.

**Discussion**

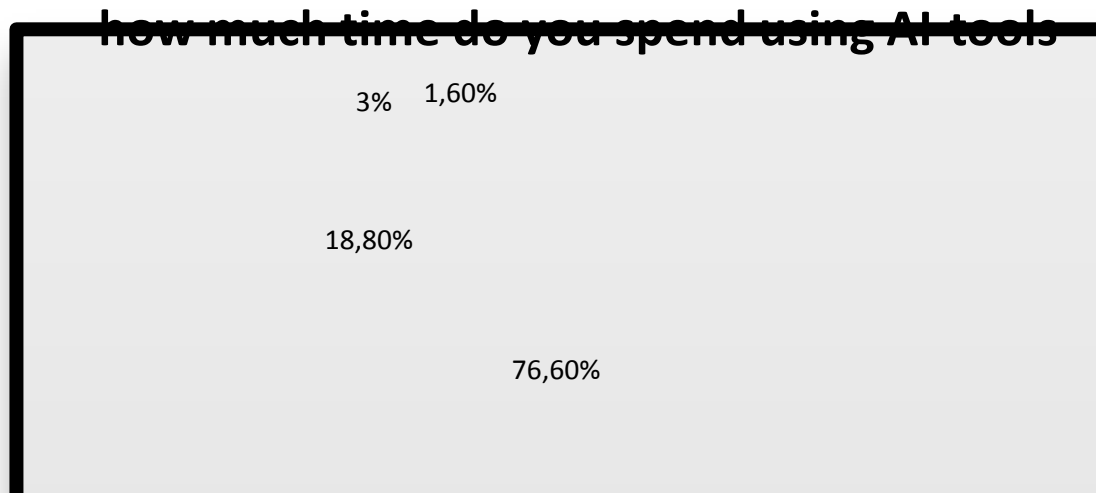
The predominance of ChatGPT suggested that students perceived it as the most useful and accessible AI tool for academic writing. Its popularity may have been linked to its ability to generate ideas, provide explanations, assist with text organization, and offer immediate feedback. The use of Grammarly and QuillBot further indicated that students sought additional support for language accuracy and paraphrasing tasks. In contrast, the limited use of other tools suggested that they were either less familiar to students or less effective in meeting their academic writing needs.

The findings demonstrated that students tended to select AI tools according to their specific functions. ChatGPT served as a comprehensive writing assistant, whereas Grammarly and QuillBot were mainly used for editing and language refinement. This pattern reflected a strategic use of AI technologies, with students relying on different tools to address different aspects of the writing process.

**Question 6: How much time did you spend using AI tools?**

This question examined the amount of time respondents spent using AI tools for academic purposes. It aimed to determine the extent to which AI technologies were integrated into students' study routines. The results are presented in Figure 3.7.

Figure 3.7. Time Spent Using AI Tools



**Source: Student's own work (based on questionnaire data).**

The results showed that the majority of respondents (76.6%) spent between 30 minutes and 1 hour using AI tools. In addition, 18.8% reported spending between 1 and 2 hours. Only a small proportion of students used AI tools for longer periods, with 3% spending between 2 and 3 hours and 1.6% spending more than 3 hours.

These findings indicated that AI tools were regularly used by most students, although their usage remained moderate. The predominance of the 30-minute to 1-hour category suggested that students integrated AI technologies into their academic activities without devoting excessive amounts of time to them.

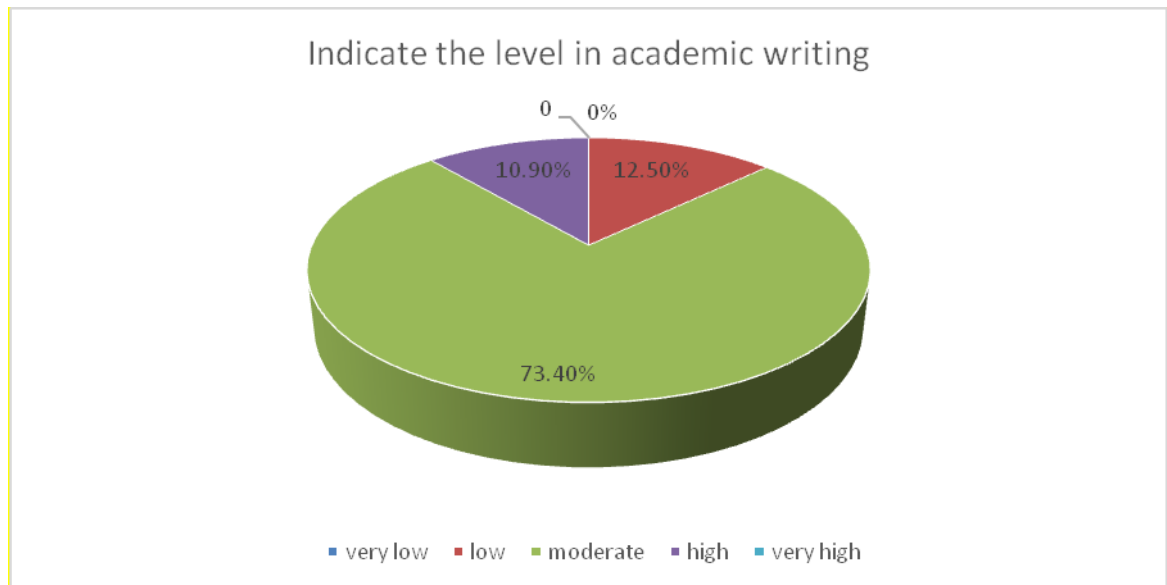
## Discussion

The findings revealed that students used AI tools as supportive resources rather than as primary learning instruments. The moderate duration of use suggested that respondents relied on AI technologies to assist specific academic tasks such as generating ideas, checking grammar, or improving written assignments. The very small percentage of students who reported extended use indicated that excessive dependence on AI tools was uncommon within the sample. Therefore, AI appeared to function mainly as a complementary aid that supported traditional learning practices rather than replacing them.

**Question 7: How would you evaluate your level in academic writing?**

This question examined respondents' self-assessment of their academic writing proficiency. It aimed to identify how students perceived their ability to produce academic texts and complete writing tasks. The results are presented in Figure 3.8.

**Figure 3.8. Students' Level in Academic Writing**



**Source: Student's own work (based on questionnaire data).**

The results indicated that most respondents (73.4%) rated their academic writing level as moderate. A smaller proportion of students (12.5%) considered their level to be low, whereas 10.9% evaluated their writing proficiency as high. No respondent selected the very low category, and only a negligible percentage, if any, reported a very high level.

These findings demonstrated that the majority of participants perceived themselves as possessing an acceptable level of academic writing competence. However, most students did not consider their skills to be highly advanced, suggesting that they still faced challenges in academic writing.

**Discussion**

The predominance of the moderate category suggested that students possessed a reasonable foundation in academic writing but had not yet achieved a high degree of mastery.



This finding was consistent with the educational level of the participants, who were second-year EFL students still developing their academic writing abilities. The relatively low proportion of students who rated themselves as highly proficient indicated that many respondents continued to encounter difficulties related to organization, academic style, vocabulary use, or grammatical accuracy. Consequently, the findings highlighted the need for continued instructional support and writing practice. They also suggested that AI tools could serve as valuable resources in helping students strengthen their writing skills and gradually improve their academic performance.

### **3.2.2. The Impact of AI Tools on Students' Writing**

This section examined students' perceptions of the impact of AI tools on different aspects of academic writing. The statements focused on grammar, vocabulary, punctuation, organization of ideas, cohesion, argument building, feedback effectiveness, and the role of teachers in the writing process. The results are presented in Table 3.1.

**Table 3.1. The Impact of AI Tools on Students' Writing**

| <b>Statements</b>                        | <b>Strongly Agree</b> | <b>Agree</b> | <b>Neutral</b> | <b>Disagree</b> | <b>Strongly Disagree</b> |
|------------------------------------------|-----------------------|--------------|----------------|-----------------|--------------------------|
| <b>AI enhances grammatical structure</b> | 25 (39.1%)            | 22 (34.4%)   | 10 (15.6%)     | 5 (7.8%)        | 2 (3.1%)                 |
| <b>AI improves vocabulary selection</b>  | 24 (37.5%)            | 23 (35.9%)   | 9 (14.1%)      | 6 (9.4%)        | 2 (3.1%)                 |
| <b>AI decreases punctuation errors</b>   | 23 (35.9%)            | 25 (39.1%)   | 8 (12.5%)      | 6 (9.4%)        | 2 (3.1%)                 |
| <b>AI helps organize ideas</b>           | 26 (40.6%)            | 21 (32.8%)   | 9 (14.1%)      | 6 (9.4%)        | 2 (3.1%)                 |
| <b>AI enhances writing cohesion</b>      | 24 (37.5%)            | 24 (37.5%)   | 8 (12.5%)      | 6 (9.4%)        | 2 (3.1%)                 |
| <b>AI improves</b>                       | 22 (34.4%)            | 25           | 9 (14.1%)      | 6 (9.4%)        | 2 (3.1%)                 |

|                                                                   |            |            |            |            |           |
|-------------------------------------------------------------------|------------|------------|------------|------------|-----------|
| <b>argument building</b>                                          |            | (39.1%)    |            |            |           |
| <b>AI feedback improves writing more than traditional methods</b> | 20 (31.3%) | 26 (40.6%) | 10 (15.6%) | 6 (9.4%)   | 2 (3.1%)  |
| <b>AI replaces the role of the teacher in correcting writing</b>  | 5 (7.8%)   | 8 (12.5%)  | 10 (15.6%) | 20 (31.3%) | 21 32.8%) |

**Source: by student's own work (based on questionnaire data).**

The findings revealed overwhelmingly positive attitudes toward the use of AI tools in writing. Regarding grammatical structure, 73.5% of respondents agreed or strongly agreed that AI enhanced grammatical accuracy, while only 10.9% disagreed. Similarly, 73.4% agreed that AI improved vocabulary selection, suggesting that students perceived AI tools as valuable resources for lexical development.

Concerning punctuation, 75% of participants agreed that AI reduced punctuation errors, making this one of the most positively rated aspects. Likewise, 73.4% of respondents agreed that AI helped them organize their ideas more effectively, whereas 75% believed that AI enhanced writing cohesion by improving the logical flow between ideas and paragraphs.

The results also demonstrated positive perceptions regarding higher-order writing skills. Approximately 73.5% of students agreed that AI improved their ability to construct arguments, indicating that these tools supported not only linguistic accuracy but also the development of critical and analytical writing skills.

Furthermore, 71.9% of respondents agreed that AI-generated feedback improved their writing more than traditional feedback methods. This finding suggested that students appreciated the immediacy and accessibility of AI feedback during the writing process.

In contrast, respondents largely rejected the idea that AI could replace teachers in correcting writing. A total of 64.1% disagreed or strongly disagreed with this statement,

whereas only 20.3% expressed agreement. Additionally, 15.6% remained neutral. These results indicated that students continued to value the teacher's role despite recognizing the benefits of AI technologies.

## **Discussion**

The findings demonstrated that students perceived AI tools as effective instruments for improving multiple dimensions of academic writing. The high levels of agreement across most statements suggested that AI technologies contributed positively to both lower-level writing skills, such as grammar, vocabulary, and punctuation, and higher-level skills, including organization, cohesion, and argumentation.

The positive evaluation of grammatical improvement was consistent with the findings of Ghufon and Rosyida (2018), who reported that AI-assisted writing tools significantly enhanced grammatical accuracy in EFL writing contexts. Similarly, the positive perceptions regarding vocabulary development supported the conclusions of Nazari et al. (2021), who found that AI-generated feedback facilitated lexical growth and more appropriate word choice.

The findings also revealed that students considered AI particularly useful for organizing ideas and improving textual cohesion. This result supported the argument of Burrill (2024), who emphasized the role of AI technologies in helping learners structure and organize their written work more effectively. Moreover, students appeared to perceive AI as a valuable aid for developing arguments, suggesting that its contribution extended beyond language correction to more complex cognitive aspects of writing.

The results regarding feedback indicated that students valued the speed and availability of AI-generated responses. However, this preference should not be interpreted as evidence that AI feedback was objectively superior to teacher feedback, as the study did not involve an experimental comparison between the two forms of evaluation.

Perhaps the most significant finding concerned the role of teachers. Although students expressed strong confidence in AI tools, the majority rejected the notion that AI could replace teachers entirely. This finding suggested that respondents distinguished between technological assistance and pedagogical guidance. While AI was viewed as an efficient

support tool, students still recognized the importance of teachers in providing personalized explanations, critical evaluation, and academic guidance.

These results were consistent with the perspective of Blannin (2021), who argued that AI technologies could enhance writing instruction without eliminating the pedagogical role of teachers. Interestingly, the open-ended responses revealed a degree of contradiction. Although most students rejected complete teacher replacement, some acknowledged that AI could partially assume specific functions such as grammar correction or feedback provision. This finding suggested that students viewed AI as a complementary educational resource rather than a substitute for human instruction.

Overall, the findings demonstrated that students held highly positive perceptions of AI-assisted writing. They believed that AI tools improved various aspects of writing performance while simultaneously recognizing the continued importance of teacher support in the learning process.

### **3.2.3. Students' Attitudes Toward AI Tools**

This section examined students' attitudes toward the use of AI tools in writing. The statements focused on participation, engagement, confidence, and motivation in order to determine how AI technologies influenced learners' experiences during the writing process. The results are presented in Table 3.2.

**Table 3.2. Students' Attitudes Toward AI Tools in Writing (N = 64)**

| <b>Statements</b>                                        | <b>SA</b>     | <b>A</b>      | <b>N</b>     | <b>D</b>    | <b>S</b>    |
|----------------------------------------------------------|---------------|---------------|--------------|-------------|-------------|
|                                                          |               |               |              |             | <b>D</b>    |
| <b>AI tools enhance students' participation in class</b> | 27<br>(42.2%) | 22<br>(34.4%) | 8<br>(12.5%) | 5<br>(7.8%) | 2<br>(3.1%) |
| <b>AI tools make students more engaged</b>               | 26<br>(40.6%) | 23<br>(35.9%) | 9<br>(14.1%) | 4<br>(6.3%) | 2<br>(3.1%) |
| <b>AI tools raise students' confidence in writing</b>    | 25<br>(39.1%) | 24<br>(37.5%) | 8<br>(12.5%) | 5<br>(7.8%) | 2<br>(3.1%) |
| <b>AI tools motivate students to write</b>               | 28<br>(43.8%) | 21<br>(32.8%) | 8<br>(12.5%) | 5<br>(7.8%) | 2<br>(3.1%) |

**Source : by student's own work (based on questionnaire data).**

The results revealed highly positive attitudes toward the use of AI tools in writing activities. Regarding classroom participation, 76.6% of respondents agreed or strongly agreed that AI tools enhanced their participation in class, whereas only 10.9% expressed disagreement. Furthermore, 12.5% remained neutral. These findings suggested that students perceived AI technologies as supportive tools that encouraged greater involvement in classroom activities.

Similarly, 76.5% of respondents agreed that AI tools increased their engagement in learning activities. Only 9.4% disagreed, while 14.1% selected the neutral option. This indicated that most students believed AI tools promoted active interaction with writing tasks and learning materials.

Concerning confidence in writing, 76.6% of participants agreed that AI tools raised their confidence levels. In contrast, 10.9% disagreed and 12.5% remained neutral. These results demonstrated that students generally felt more comfortable and secure when using AI technologies during the writing process.

The highest level of agreement was recorded for motivation to write. A total of 76.6% of respondents agreed or strongly agreed that AI tools motivated them to engage in writing activities. Only 10.9% disagreed, while 12.5% expressed neutral opinions. This finding suggested that AI tools positively influenced students' willingness to practice and improve their writing skills.

## **Discussion**

The findings demonstrated that students held favorable attitudes toward AI-assisted writing. The consistently high levels of agreement across all four statements indicated that AI tools positively influenced learners' participation, engagement, confidence, and motivation.

The positive perception of classroom participation suggested that AI technologies encouraged students to become more involved in educational activities. Students may have felt more prepared to contribute to discussions and complete writing tasks when supported by AI-generated assistance. Likewise, the high level of engagement indicated that AI tools stimulated greater interaction with learning materials and writing activities.

The findings also revealed that AI tools contributed significantly to students' confidence in writing. The majority of respondents reported feeling more confident when using AI technologies, possibly because these tools provided immediate support, suggestions, and corrective feedback. This result was consistent with the findings of Ningrum (2023), who

reported that AI-assisted writing applications increased learners' confidence and reduced writing anxiety.

Moreover, the results showed that AI tools served as important motivational factors. The strong agreement regarding motivation suggested that students viewed AI technologies as engaging and useful resources that made writing tasks less demanding and more enjoyable. This finding supported Walter (2024), who argued that AI applications enhanced student engagement and encouraged active participation in learning activities.

The consistency of positive responses across all statements suggested that AI tools influenced not only students' writing performance but also their attitudes toward learning. Increased participation, engagement, confidence, and motivation are important factors that contribute to effective language learning and writing development. Therefore, the findings indicated that AI technologies played a valuable role in creating a more supportive and encouraging learning environment for EFL students.

#### **3.2.4. Open-Ended Questions**

This section analyzed students' responses to the open-ended questions. The questions explored students' perceptions of the advantages, effectiveness, limitations, and overall impact of AI tools on writing skills in comparison with traditional teaching methods.

##### **Q1: What were the positive impacts of AI tools on writing skills?**

The analysis of students' responses revealed that AI tools had a positive impact on writing skills. Most respondents reported improvements in grammatical accuracy, vocabulary use, sentence structure, and writing organization. Several students stated that AI tools provided immediate feedback, enabling them to identify and correct errors more efficiently. Others indicated that AI-assisted applications helped them generate ideas and overcome difficulties encountered during the writing process. These responses suggested that students perceived AI tools as useful learning resources that supported writing development and autonomous learning.

##### **Q2: In which ways were AI tools better at developing writing performance than traditional teaching methods?**

Students' responses indicated that AI tools were valued for their speed, accessibility, and availability. Many participants reported that AI tools provided immediate feedback, whereas teacher correction often required more time. Several respondents also emphasized that AI applications were available at any time, allowing them to practice writing independently outside the classroom. In addition, students noted that AI-generated

suggestions were often personalized and targeted their individual writing difficulties. Nevertheless, some participants acknowledged that traditional teaching remained important because teachers provided explanations and guidance that AI systems could not fully offer.

**Q3: Did overreliance on AI tools substitute the teacher's role? Explain.**

The findings revealed mixed opinions regarding the replacement of teachers by AI tools. A small number of respondents believed that AI could partially perform certain functions such as grammar correction, vocabulary suggestions, and feedback provision. However, the majority of students rejected the idea of complete substitution. They argued that teachers remained essential because they provided detailed explanations, critical feedback, classroom interaction, and emotional support. Several students also expressed concerns that excessive dependence on AI tools could reduce independent thinking and creativity. Overall, students viewed AI as a complementary educational resource rather than a replacement for teachers.

**Q4: Did AI tools enhance students' writing or limit it? Explain.**

The analysis revealed generally positive perceptions of AI-assisted writing. Most respondents reported that AI tools enhanced writing by improving grammatical accuracy, coherence, organization, and vocabulary use. However, some students expressed concerns regarding excessive reliance on AI technologies. They reported that overdependence on AI-generated content could limit creativity, critical thinking, and independent writing practice. The findings therefore suggested that the impact of AI tools depended largely on the manner in which they were used. When used appropriately, AI tools were perceived as effective aids for writing improvement; when overused, they were viewed as potential obstacles to the development of independent writing skills.

### **3.3. Teachers' Interview: Analysis and Interpretation**

This section presents the analysis and interpretation of the data collected through teachers' interviews. The interview aimed to explore teachers' perceptions of the use of AI tools in higher education, particularly their impact on students' writing skills, learning engagement, and classroom practices.

**Q1: How often did you use AI tools in your teaching practice?**

The responses revealed varying levels of AI tool usage among the interviewed teachers. Some participants reported using AI tools regularly for lesson preparation, material development, activity design, and language support. Others indicated that they used these technologies only occasionally and for specific instructional purposes. The most frequently

mentioned tools included ChatGPT, Grammarly, machine translation applications, and AI-powered presentation tools.

The findings suggested that AI technologies had gradually become part of teachers' professional practices. However, the frequency of use differed according to teachers' familiarity with these tools, their teaching objectives, and their attitudes toward educational technology. Overall, the responses indicated a growing integration of AI tools into university teaching, although their use had not yet become fully standardized among all instructors.

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#### **Q1: How often did you use AI tools in your teaching practice?**

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#### **Q2. Which AI tools were you most familiar with or used regularly? (Familiarity with AI Tools)**

The responses indicated that teachers possessed a moderate to high level of familiarity with AI tools. The most frequently mentioned applications included ChatGPT, Grammarly, machine translation tools, and AI-based educational platforms. These tools were



mainly used for lesson preparation, language correction, content generation, and classroom support.

However, some teachers reported that their knowledge of AI technologies remained limited and that they were still exploring more advanced applications. The findings suggested that although AI tools had become increasingly familiar to university teachers, further professional development and training were still required to expand their knowledge and enhance their effective use of these technologies.

**Q3. In your opinion, how did AI tools support students' learning process? (Support for Learning Process)**

All interviewed teachers agreed that AI tools positively supported students' learning. They reported that these technologies helped students access immediate explanations, understand complex concepts, and practice language skills independently. Teachers also noted that AI tools provided learners with opportunities for self-directed learning outside the classroom environment.

The findings indicated that teachers perceived AI technologies as valuable educational resources that extended learning beyond classroom boundaries and enabled students to progress at their own pace.

**Q4. Did AI tools improve students' English language skills? How? (Improvement of English Language Skills)**

The interviewed teachers confirmed that AI tools contributed to the improvement of students' English language skills. According to their responses, the most noticeable improvements appeared in grammar, vocabulary acquisition, sentence construction, and writing accuracy.

Teachers explained that applications such as Grammarly helped students identify and correct language errors, while conversational AI tools assisted them in developing ideas and practicing written communication. These findings suggested that AI technologies provided useful linguistic support that facilitated language development.

**Q5. What impact did AI tools have on students' writing abilities? (Impact on Writing Abilities)**

Teachers reported that AI tools had a generally positive impact on students' writing performance. They observed improvements in text organization, coherence, grammatical accuracy, spelling, and vocabulary use. Several teachers indicated that students

produced more structured and polished written assignments when supported by AI technologies.

Nevertheless, some participants expressed concerns regarding excessive dependence on AI-generated content. They argued that overreliance on these tools could limit students' creativity, reduce independent thinking, and weaken their ability to develop original ideas. Therefore, while teachers acknowledged the benefits of AI-assisted writing, they also emphasized the importance of maintaining a balance between technological support and personal effort.

**Q6. How did students in your classes respond to the use of AI tools? (Students' Response to AI Tools)**

The majority of teachers reported that students responded positively to the use of AI technologies. According to their observations, learners appeared more interested, engaged, and willing to participate when AI tools were integrated into learning activities.

However, teachers also noted differences in students' behavior. While many learners used AI responsibly as a learning aid, others relied excessively on these tools or used them to complete assignments without sufficient personal effort. These findings suggested that students generally welcomed AI technologies, although responsible use remained an important concern.

**Q7. Did AI tools increase students' motivation and engagement? Why or why not? (Motivation and Engagement)**

All interviewed teachers agreed that AI tools increased students' motivation and engagement in learning activities. They explained that these technologies made learning more interactive, accessible, and less stressful. Furthermore, the immediate feedback provided by AI applications appeared to increase students' confidence and encourage active participation.

The findings suggested that AI tools contributed positively to the learning experience by creating a more engaging and supportive educational environment.

**Q8. What challenges did you face when students used AI tools for learning? (Challenges in Using AI Tools)**

Despite recognizing the benefits of AI technologies, teachers identified several challenges associated with their use. The most frequently mentioned concerns included overreliance on AI systems, plagiarism, reduced critical thinking, and diminished learner autonomy.

Some participants also highlighted issues related to unequal access to technology and difficulties in monitoring students' use of AI tools outside the classroom. These findings indicated that the integration of AI into education presented both opportunities and challenges that required careful management.

**Q9. Did you think AI tools could replace traditional teaching methods? Explain. (AI Tools vs. Traditional Teaching)**

Most teachers rejected the idea that AI tools could replace traditional teaching methods. Instead, they considered AI technologies to be complementary educational resources that supported the teaching and learning process.

Teachers emphasized that human instruction remained essential because it involved pedagogical guidance, classroom interaction, emotional support, and critical evaluation, all of which could not be fully replicated by AI systems. The findings therefore suggested that teachers viewed AI as an educational assistant rather than a substitute for human educators.

**Q10. What recommendations did you suggest for the effective use of AI tools in university education?**

Teachers recommended integrating AI tools into higher education in a controlled and responsible manner. They emphasized the importance of providing training for both teachers and students on the ethical and effective use of AI technologies.

In addition, participants recommended combining AI-assisted learning with activities that promote critical thinking, creativity, and independent learning. They argued that balanced integration would maximize the educational benefits of AI while minimizing potential risks associated with overdependence and misuse.

Overall, the interview findings revealed that teachers held positive attitudes toward the use of AI tools in higher education. They acknowledged the significant role of these technologies in supporting language learning, improving writing performance, and increasing student engagement and motivation. However, they also identified challenges related to overreliance, plagiarism, and the potential reduction of independent thinking. Consequently, teachers viewed AI as a valuable educational resource whose effectiveness depended on responsible use, appropriate guidance, and integration with traditional teaching practices rather than replacement of human instruction.

**3.4. Classroom Observation: Analysis and Interpretation**

As described in Chapter Two, classroom observation was conducted to examine the actual integration of AI tools into teaching and learning activities. The observation sessions provided direct evidence regarding the use of AI technologies in classroom practices and their influence on students' participation, engagement, and writing-related tasks.

The observations revealed that teachers occasionally integrated AI-based technologies such as ChatGPT, grammar-checking applications, online dictionaries, translation tools, and presentation software into classroom activities. These tools were mainly used to support lesson delivery, explain vocabulary, assist writing tasks, generate ideas, and facilitate classroom exercises. The findings indicated that AI technologies were generally employed as supplementary educational resources rather than replacements for traditional teaching methods.

Furthermore, the observations showed that students demonstrated higher levels of participation during technology-supported activities. Across the six observed sessions, indicators such as hand-raising, task completion, classroom interaction, and peer collaboration increased when AI tools were incorporated into lessons. Many students appeared more engaged and willing to participate, particularly during writing and brainstorming activities. These observations were consistent with the questionnaire findings, which revealed that most students believed AI tools enhanced their motivation, participation, and engagement in learning activities.

The observations also indicated that AI tools supported students during writing tasks. Several learners used AI applications to generate ideas, check grammar, improve vocabulary, and organize written content. As a result, students completed writing activities more efficiently and appeared more confident when producing written assignments.

Despite these positive outcomes, several challenges were observed. Some students demonstrated a tendency to rely excessively on AI-generated responses, particularly during writing and translation activities. In these situations, students appeared more focused on obtaining immediate answers than on understanding the learning process itself. This behavior occasionally reduced opportunities for critical thinking, independent problem-solving, and creativity. Moreover, differences in students' digital skills and access to technology created slight variations in participation and effective use of AI tools.

Another important observation concerned the role of the teacher. Throughout the observed sessions, teachers monitored students' use of AI technologies and provided guidance on their appropriate application. They encouraged learners to verify AI-generated information

and to use these tools as learning aids rather than as substitutes for personal effort. The findings suggested that teacher supervision played a crucial role in ensuring the educational value of AI-assisted activities.

It is important to acknowledge certain limitations associated with the observation process. The presence of the researcher may have influenced participants' behavior during the observed sessions, a phenomenon commonly known as the Hawthorne effect. To minimize this limitation, observation notes were reviewed systematically and compared across sessions to ensure consistency and reliability in the interpretation of the findings.

Overall, the classroom observation findings indicated that AI tools positively supported students' participation, engagement, and writing performance when integrated appropriately into classroom instruction. However, their effectiveness depended largely on responsible use, active student involvement, and continuous teacher guidance. The observations confirmed that AI technologies functioned most effectively as complementary educational resources that enhanced learning without replacing the essential role of teachers.

### **3.5 Conclusion**

This chapter presented the analysis and interpretation of the data collected through the three research instruments adopted in this study, namely the students' questionnaire, the teachers' interview, and classroom observation. First, the questionnaire data were analyzed to examine students' demographic characteristics, their use of AI tools, their perceptions of the impact of AI technologies on writing skills, and their attitudes toward AI-assisted learning. The chapter also analyzed students' responses to the open-ended questions, which provided further insights into their experiences and opinions regarding the use of AI tools in writing.

Second, the teachers' interview data were analyzed and interpreted to explore teachers' familiarity with AI technologies, their perceptions of the role of AI in language learning and writing development, the challenges associated with its use, and their recommendations for effective integration in higher education. Finally, the classroom observation findings were examined to provide direct evidence regarding the actual use of AI tools during classroom activities and their influence on student participation, engagement, and writing-related tasks.

Through the analysis of these different sources of data, the chapter provided a comprehensive presentation of the study findings and generated the empirical evidence necessary to address the research questions.

Building upon these findings, the next chapter discusses the results in relation to the research questions and hypotheses, highlights the limitations of the study, and proposes recommendations for the effective integration of AI tools in EFL writing instruction.

**Chapter four: Discussion and Recommendations**

4.1. Introduction

4.2. Discussion of Research Questions and Hypotheses

4.3 Limitations of the Study

4.4 Recommendations

4.5. Conclusion

## **Chapter four: Discussion and Recommendations**

### **4.1. Introduction**

This chapter discusses the main findings of the study by linking them directly to the research questions and hypotheses. Therefore, the data collected through the students' questionnaire, teachers' interviews, and classroom observation are synthesized and interpreted in order to provide clear answers. Moreover, each research question is addressed separately, followed by confirmation or rejection of the corresponding hypotheses. The chapter ends with practical recommendations.

### **4.2. Discussion of Research Questions and Hypotheses**

The analysis of the collected data revealed that AI tools had a generally positive impact on students' writing development. The researcher found that these tools supported learners in improving grammatical accuracy, vocabulary range, idea organization, and writing cohesion. This was confirmed through questionnaire responses, interview data, and classroom observation, which consistently indicated that AI-assisted writing contributed to better performance and increased student engagement during writing tasks.

The findings also revealed that AI tools were perceived as more accessible and efficient compared to traditional correction methods. The researcher observed that students benefited from immediate feedback and continuous availability of AI applications, which allowed them to practice writing beyond classroom limitations. At the same time, teachers maintained that traditional instruction remained essential for providing deeper explanations, critical thinking development, and personalized pedagogical support. This indicates that both approaches functioned in a complementary rather than competitive manner.

Furthermore, the data showed that AI tools did not marginalize the role of the teacher in the writing process. Although some surface-level correction tasks were facilitated by AI applications, the researcher found that teachers remained central to guiding learners, explaining complex issues, and supporting communicative and cognitive development. The findings therefore suggested that AI technologies could not replace human instruction but rather supported it.

However, the analysis also revealed certain limitations in AI integration. The researcher noted instances of overreliance on AI-generated content among some students,



which occasionally reduced opportunities for independent thinking and creative writing. In addition, differences in students' digital literacy levels affected the extent to which AI tools were used effectively. These observations indicate that while AI tools are beneficial, their effectiveness depends on guided and responsible use.

Overall, the findings demonstrated that AI tools contributed positively to the development of students' writing skills and learning engagement. Nevertheless, their impact was shaped by the way they were used within the learning environment, highlighting the need for balanced integration with traditional teaching practices.

### **4.3. Limitations of the Study**

Despite the valuable findings obtained in this study, several limitations should be acknowledged.

First, the study was conducted with a relatively small sample consisting of sixty students and ten teachers from one Algerian university. Therefore, the findings cannot be generalized to all EFL learners or educational institutions.

Second, much of the data relied on students' self-reported perceptions collected through questionnaires. As a result, some responses may have been influenced by personal bias or social desirability.

Third, the classroom observation sessions may have been affected by the Hawthorne effect, as students may have modified their behavior due to the awareness of being observed.

Another limitation concerns the relatively short duration of the study. Since the research was conducted over a limited period of time, it did not measure the long-term impact of AI tools on students' writing development or critical thinking abilities.

Finally, the rapid evolution of artificial intelligence technologies may affect the relevance of the findings over time, as students' practices and institutional policies regarding AI use continue to change.

These limitations should be taken into consideration when interpreting the results of the study.

### **4.4. Recommendations**

Based on the discussion of the research results, a set of practical recommendations is proposed to enhance the effective integration of AI tools in the development of students' writing skills. These recommendations address pedagogical, instructional, and institutional aspects of AI use in EFL writing contexts.

- **Balancing AI Tools and Traditional Teacher Feedback**

A blended instructional approach should be adopted in writing courses, where AI tools and teacher feedback are used in a complementary manner. Students should be encouraged to use AI applications during the initial stages of writing for drafting, vocabulary support, and grammar correction. Teacher intervention should then focus on higher-order writing skills such as coherence, argument development, organization, and critical thinking.

Writing tasks should include both AI-assisted drafts and revised versions based on teacher feedback. Reflective activities should also be integrated to help students compare AI-generated suggestions with teacher corrections and develop awareness of writing improvement processes. This approach ensures that AI supports efficiency while teachers maintain pedagogical depth in writing instruction.

- **Redefining the Role of Teachers in the AI Era**

Teachers should assume the role of facilitators and AI literacy guides rather than focusing mainly on surface-level correction. Students should be trained to critically evaluate AI-generated feedback instead of accepting it uncritically. Teacher feedback should prioritize content development, logical reasoning, and argument quality rather than basic grammatical correction.

Clear classroom guidelines should be established to regulate the ethical use of AI tools. Students should also be encouraged to document how AI is used during the writing process in order to promote transparency and reflective learning. This shift strengthens the teacher's role in guiding deeper learning processes while integrating technology meaningfully.

- **Enhancing Writing Skills While Preventing Overdependence**

A controlled writing approach should be implemented to ensure balanced use of AI tools. Students should first produce independent drafts without AI assistance in order to

strengthen critical thinking and writing autonomy. AI tools should then be used during the revision stage to improve language accuracy and refine expression.

Students should also be required to justify or explain AI-generated corrections to develop deeper understanding of writing improvements. In addition, assessment tasks should include both AI-assisted and independent writing components to ensure fair evaluation of students' actual abilities. This approach prevents overdependence while maintaining the educational benefits of AI tools.

- **Institutional and Policy-Level Recommendations**

Educational institutions should establish clear policies regulating the academic use of AI tools in writing courses. These policies should define acceptable and unacceptable uses of AI in student assignments to ensure academic integrity and consistency in assessment practices.

Training programs should be provided for both teachers and students to enhance AI literacy and promote responsible use of technology. Teachers should receive professional development on integrating AI tools into pedagogy effectively, while students should be trained to use these tools critically and ethically.

Moreover, assessment frameworks should be adapted to distinguish between independent writing and AI-assisted work. This ensures transparency in evaluation and maintains academic standards while allowing students to benefit from technological support.

- **Recommendations for Future Research**

The findings of this study indicate that while AI tools have a significant impact on students' writing development, their long-term effects remain insufficiently explored. Although the results show immediate improvements in writing accuracy, vocabulary use, and fluency, there is still uncertainty regarding how sustained exposure to AI tools influences students' critical thinking abilities and independent writing skills over time. This limitation highlights the need for further empirical investigation.

The main issue is that current research provides only a short-term understanding of AI-assisted writing practices. As a result, it is not yet clear whether AI tools contribute to long-term learning development or whether they gradually lead to dependency and reduced

cognitive engagement. This gap in knowledge makes it difficult to fully evaluate the educational value of AI in writing instruction across different learning contexts.

To address this limitation, future research should adopt a longitudinal approach in order to examine the long-term effects of AI-assisted writing on students' academic development. In addition, comparative studies should be conducted between students who regularly use AI tools and those who do not, in order to assess differences in writing performance over extended periods.

It is also important for future studies to investigate the impact of AI tools across different educational levels, such as secondary school, university, and postgraduate education, as well as across various academic disciplines. Furthermore, research should explore how teachers adapt their instructional strategies in AI-integrated classrooms, particularly in relation to feedback methods, assessment practices, and classroom management.

This recommendation is justified by the findings of the present study, which reveal both positive and negative effects of AI tools on students' writing skills. While AI enhances certain aspects of writing performance, it may also limit deeper learning if overused. Therefore, further research is necessary to determine whether AI ultimately promotes sustainable learning outcomes or leads to long-term dependency among learners.

### **4.5. Conclusion**

This chapter discussed the major findings of the study, the findings demonstrated that AI tools play a supportive role in developing students' writing skills by improving grammar, vocabulary, organization, and writing fluency. The results also showed that AI applications provide immediate and accessible feedback compared with traditional correction methods.

However, the study revealed that AI tools cannot fully replace teachers, as educators continue to play an essential role in explanation, guidance, motivation, and critical thinking development. In addition, although AI tools positively influence students' writing performance, excessive dependence on these technologies may negatively affect learners' autonomy and independent learning.

Overall, the findings suggest that the most effective approach is to integrate AI tools within a balanced educational framework that combines technological support with human

## ***General Conclusion***

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interaction and pedagogical guidance. The chapter also highlighted several methodological limitations and proposed practical recommendations for teachers, students, and future researchers concerning the effective and ethical integration of AI technologies in EFL writing instruction.

### **General Conclusion**

The present research investigated the impact of AI-powered tools on developing second-year university students' academic writing skills. The study was conducted in response to the increasing integration of Artificial Intelligence technologies into educational environments. Also, because of the growing dependence of students on digital tools such as ChatGPT, Grammarly, and QuillBot. Consequently, this study aimed to explore whether these tools truly contribute to students' writing development or they create negative effects related to dependency and reduced independent thinking.

The main objective of this research was to examine the impact of AI tools on students' writing performance, motivation, classroom engagement, and learning attitudes. Moreover, the study sought to analyze both students' and teachers' perceptions regarding the effectiveness of AI tools in the educational process. Another important objective was to determine whether AI tools should be considered supportive educational resources or potential substitutes for traditional teaching methods.

To achieve these objectives, the study adopted a mixed-method approach that combined both quantitative and qualitative data collection methods. Questionnaires were administered to sixty-four second-year university students; to gather information about their use, attitudes, and perceptions of the effectiveness of these apps on the writing skills. In addition, interviews were conducted with ten EFL teachers; to obtain deeper insights into the educational value and limitations of AI integration in university learning. Classroom observations were also carried out to examine how AI tools are used in actual teaching and learning situations.

The analysis of the collected data revealed several significant findings. First, the results demonstrated that AI tools are widely used among second-year university students. Most respondents reported frequent use of AI applications, particularly ChatGPT, Grammarly, and QuillBot. This indicates that AI technologies have become an important part of students' academic practices, especially in writing-related tasks. The findings further showed that students generally use these tools moderately, mainly between thirty minutes and one hour per day; which suggests that AI is integrated into their learning routines without completely dominating their study habits.

Another important finding concerns the positive impact of AI tools on writing skills. The majority of students agreed that AI technologies contribute to improving grammar, vocabulary selection, punctuation, idea organization, writing cohesion, and argument development. Students emphasized that AI tools provide immediate feedback, help identify errors quickly, and offer useful suggestions for improving sentence structure. These results confirm that AI tools play an effective supportive role in enhancing students' academic writing performance.

The study also revealed that AI tools positively influence students' motivation and engagement. Most participants reported that AI technologies make writing tasks less difficult and more interactive. Students explained that the immediate responses and personalized assistance provided by AI tools increase their confidence and participation in academic activities. Classroom observations supported these findings by showing that students were generally more engaged and motivated during lessons and writing activities.

Furthermore, teachers' interviews confirmed the educational value of AI tools. Most teachers recognized that AI technologies support students' learning processes. They facilitate access to information, improve language accuracy, and encourage autonomous learning. Teachers particularly emphasized the usefulness of AI tools in grammar correction, vocabulary enhancement, and idea generation. However, they also highlighted several concerns regarding over-reliance on AI, plagiarism, and the reduction of students' independent thinking abilities.

One of the most significant findings of this study is that both students and teachers reject the idea that AI tools can replace teachers completely. Although students appreciate the speed and accessibility of AI-generated feedback, the majority still believe that teachers remain essential in the educational process. Teachers provide human interaction, emotional support, explanation, critical thinking guidance, and pedagogical supervision that AI tools cannot fully offer. Therefore, the findings suggest that AI should be viewed as a complementary educational resource rather than a substitute for traditional teaching.

Based on these findings, the hypotheses of this study can now be evaluated clearly. The first hypothesis stated that AI tools significantly improve students' writing skills, including grammar, vocabulary, and organization. This hypothesis is confirmed because the results showed strong agreement among students and teachers regarding the positive influence

of AI on writing performance. The data analysis demonstrated that AI tools help learners produce more accurate, coherent, and organized written texts.

The second hypothesis proposed that AI tools increase students' motivation and engagement in writing tasks. This hypothesis is also confirmed. Students reported higher levels of confidence, participation, and motivation when using AI technologies. Classroom observations additionally revealed increased student interaction and engagement during AI-supported learning activities.

The third hypothesis suggested that students perceive AI tools as supportive learning assistants rather than replacements for teachers. This hypothesis is likewise confirmed. Although students acknowledged the effectiveness of AI feedback, they strongly rejected the idea that AI could fully replace teachers. Both students and teachers emphasized the continuing importance of human guidance and classroom interaction.

The fourth hypothesis stated that over-reliance on AI tools may negatively affect students' independent thinking and creativity. This hypothesis is partially confirmed. While many students benefit positively from AI assistance, some participants and teachers expressed concerns that excessive dependence on AI-generated content could reduce critical thinking, creativity, and personal effort in learning. Therefore, the negative impact appears mainly when AI tools are misused or excessively relied upon.

The interpretation of these findings demonstrates that AI tools represent benefits and challenges in higher education. On the positive side, AI technologies improve accessibility to learning resources, facilitate writing development, provide immediate feedback, and increase students' motivation. These tools also support autonomous learning by allowing students to practice independently outside the classroom. Such advantages make AI a valuable educational innovation capable of enhancing language learning experiences.

However, the findings also indicate that uncontrolled or excessive use of AI may produce undesirable educational consequences. Dependence on AI-generated answers may reduce students' creativity, weaken critical thinking abilities, and encourage passive learning behaviors. In addition, ethical concerns related to plagiarism and academic dishonesty remain important issues that require careful attention from educational institutions.

Consequently, the study highlights the importance of balanced AI integration in education. AI tools should not replace traditional teaching methods but should instead



complement them. Teachers continue to play a central role in guiding students, encouraging critical thinking, and ensuring ethical use of technology. As a result, The effectiveness of AI in education depends largely on responsible use, pedagogical supervision, and proper educational integration.

Despite the important findings achieved in this study, several limitations should be acknowledged. First, the research was limited to second-year university students, which restricts the generalization of the results to other academic levels or educational contexts. Second, the sample size remained relatively limited, which may affect the representativeness of the findings. Third, the study relied mainly on self-reported data obtained from questionnaires and interviews, which may involve subjective bias or socially desirable responses. Furthermore, the study focused primarily on short-term perceptions and experiences rather than measuring long-term improvements in writing performance resulting from AI use. Finally, differences in students' access to technological resources and digital literacy may have influenced the results.

In light of these limitations and findings, several recommendations can be proposed. First, universities should integrate AI literacy programs into higher education curricula in order to teach students how to use AI tools ethically and effectively. Students need guidance on how to benefit from AI technologies while maintaining independent thinking and academic integrity. Second, teachers should receive professional training regarding the pedagogical use of AI tools in teaching and assessment. Such training would help educators integrate AI technologies in balanced and meaningful ways. Third, educational institutions should establish clear policies regulating the responsible use of AI tools in academic work to prevent plagiarism and misuse. Finally, students should be encouraged to use AI as a supplementary learning aid rather than relying on it completely for academic tasks.

Future research could expand this study in several ways. Researchers may investigate the long-term impact of AI tools on academic writing development, compare AI use across different university levels and disciplines, or explore the influence of AI on creativity and critical thinking more deeply. Future studies may also examine the effectiveness of specific AI applications in language learning and compare AI-assisted learning with traditional instructional methods over extended periods.

## ***General Conclusion***

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In conclusion, this study has demonstrated that AI tools play a significant role in developing second-year university students' academic writing skills and learning engagement. AI technologies provide substantial educational benefits by improving grammar, vocabulary, organization, motivation, and participation. At the same time, the findings reveal the importance of maintaining balanced and responsible use in order to preserve students' independent learning abilities. Ultimately, AI tools should be considered supportive educational resources for traditional methods, rather than replacing teachers' guidance. Through proper support, ethical use, and pedagogical integration, AI technologies can contribute positively to improving the quality of higher education and enhancing students' academic writing development.

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# Appendixes

## **Appendix**

### **Appendix A: students' questionnaire**

#### **Examining the Effectiveness of AI-tools in Developing Students' Writing Skills**

##### **Introduction:**

Dear students,

You are requested to answer this questionnaire honestly.

The purpose of This questionnaire is to examine the effectiveness of Artificial Intelligence (AI) tools in developing students' writing skills.

You will remain anonymous and your responses will be taken only for the aim of the research.

Thank you in advance.

##### **Section A: Background Information**

1\_Age:

2\_Gender:

Male ☐

Female ☐

4\_Your level of English proficiency :

Beginner ☐

Intermediate ☐

Advanced ☐

Proficient ☐

##### **Section B: The Use of AI-TOOLS**

5\_How often do you use AI-tools?

Always ☐

Often ☐

Sometimes ☐

Rarely ☐

Never ☐

6\_Which AI-tools do you use?

ChatGPT ☐

Grammarly ☐

QuillBot ☐

Autre : ☐

7\_How much time do you spend using AI tools?

30min to 1h ☐

1h to 2h ☐

2h to 3h ☐

More than 3h ☐

8\_Indicate your level in academic writing

Very low ☐

Low ☐

Moderate ☐

High ☐

Very high ☐

### Section C: The impacts of AI-tools of students' writing

|                                                                                                                                         | S<br>trongly<br>agree | gree | eutral | N<br>isagree | D<br>S<br>trongly<br>disagree |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|--------|--------------|-------------------------------|
| Using AI tools ( ChatGPT, Grammarly, QuillBot) enhance grammatical structure                                                            |                       |      |        |              |                               |
| AI applications enhance the selection of words (vocabulary)                                                                             |                       |      |        |              |                               |
| AI tools decrease punctuation errors.                                                                                                   |                       |      |        |              |                               |
| Using AI tools helps in organizing ideas                                                                                                |                       |      |        |              |                               |
| AI tools enhance the writing cohesion                                                                                                   |                       |      |        |              |                               |
| Using AI tools improves building strong arguments.                                                                                      |                       |      |        |              |                               |
| Using Ai tool's feedback about (grammar, vocabulary, cohesion) impacted positively the writing skill instead of the traditional methods |                       |      |        |              |                               |
| AI tools replace the role of the teacher in correcting students writing                                                                 |                       |      |        |              |                               |

### Section D: Students' Attitudes

|                                                   | S<br>trongly<br>agree | gree | eutral<br>N | isagree<br>D | S<br>trongly<br>disagree |
|---------------------------------------------------|-----------------------|------|-------------|--------------|--------------------------|
| AI-Tools enhance students' participation in class |                       |      |             |              |                          |
| AI-Tools make students' more engaged              |                       |      |             |              |                          |
| AI-Tools raise students' confidence in writing    |                       |      |             |              |                          |
| AI-Tools motivate students to write               |                       |      |             |              |                          |

### Section E: Open-Ended questions

Please answer the following questions:

- 1) What are the positive impacts of AI tools in writing skills?
- 2) In which ways , AI tools are better at developing the writing performance rather than the traditional way of teaching?
- 3) Did The overreliance on AI tools substitute the teacher's role? Explain
- 4) Do AI tools enhance students writing or limit them? Explain

## **Appendix B: Teachers' interview**

### **Introduction:**

Dear teacher,

You are invited to respond to the following questions. The purpose of this interview is to obtain further information about the role of AI-Tools in Developing second year students writing skills. Your participation is important and will provide a relevant assistance for the research.

**Q1.** How often do you use AI tools in your teaching practice? (Frequency and Use of AI Tools)

**Q2.** Which AI tools are you most familiar with or use regularly?(Familiarity with AI Tools)

**Q3.**In your opinion, how do AI tools support students' learning process? (Support for Learning Process)

**Q4.**Do you think AI tools improve students' English language skills?How? (Improvement of English Language Skills)

**Q5.** What impact do AI tools have on students' writing abilities?(Impact on Writing Abilities)

**Q6.** How do students in your classes respond to the use of AI tools? (Students' Response to AI Tools)

**Q7.** Do AI tools increase students' motivation and engagement? Why or why not? (Motivation and Engagement)

**Q8.** What challenges do you face when students use AI tools for learning? (Challenges in Using AI Tools)

**Q9.** Do you think AI tools can replace traditional teaching methods? Explain. (AI Tools vs Traditional Teaching)

**Q10.** What recommendations do you suggest for the effective use of AI tools in university education?

Thank you for your participation.



## Appendix C: Classroom Observation Scheme

Date:

Time:

Group:

Number of students:

Teacher:

Observer:

|                                                                                     | Observed (Yes<br>or No) | Co<br>mments |
|-------------------------------------------------------------------------------------|-------------------------|--------------|
| Teachers' integration of AI-tools into the teaching and learning process.           |                         |              |
| Students' engagement when using AI-tools for writing activities.                    |                         |              |
| Students' motivation when using AI-tools for writing.                               |                         |              |
| Students' confidence when using AI-tools for writing activities.                    |                         |              |
| Students' interaction and participation when using AI-tools for writing activities. |                         |              |
| Students' attention and collaboration when using AI-tools for writing tasks.        |                         |              |
| Students' over-reliance on these tools.                                             |                         |              |