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**Exploring the Impact of AI-Generated Content on Master One EFL
Students' Critical Thinking Skills: The Case of Saida University**

**A Thesis Submitted in Partial Fulfillment of the Requirements for the
degree of *Master* in Didactics.**

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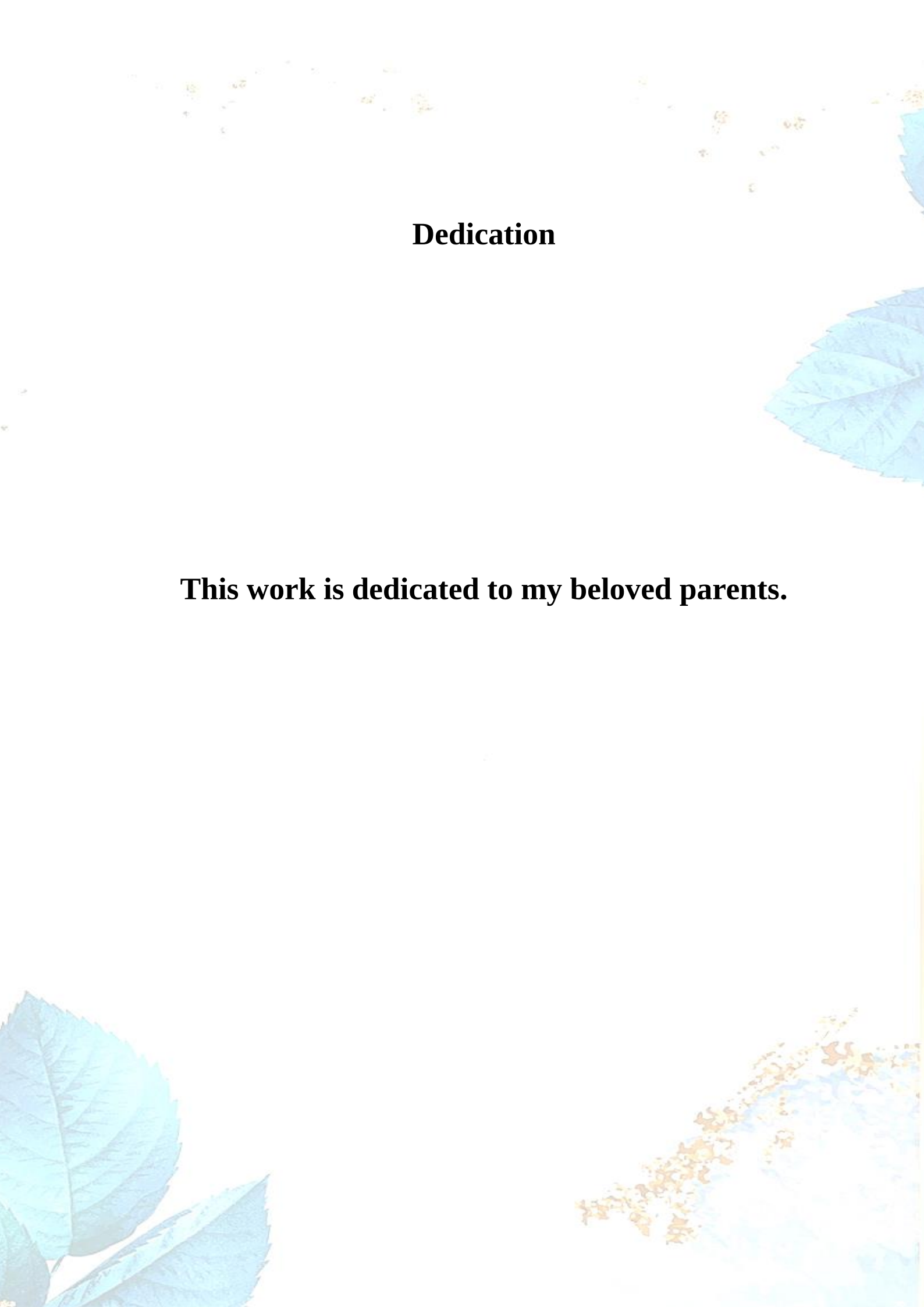
Declaration of Originality

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.

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The page features decorative elements in the corners: a floral pattern in the top-left, a large blue leaf in the top-right, a blue leaf in the bottom-left, and a floral pattern in the bottom-right.

Dedication

This work is dedicated to my beloved parents.

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I have so many special people to thank for supporting and encouraging me throughout this thesis journey.

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ABSTARCT

In recent years, Artificial Intelligence (AI) has increasingly integrated into educational settings, offering multifaceted benefits and challenges, with tools like ChatGPT gaining popularity among EFL learners for its potential to reshape language learning. This study aims to explore the impact of AI-generated content on learners' critical thinking skills among Master One Didactics students, focusing on all six levels of Bloom's Taxonomy. Moreover, it seeks to investigate whether generative AI tools enhance learners' independent thinking or promote overreliance, potentially diminishing the development of higher-order cognitive skills. To achieve these aims, the researcher adopted a mixed methods approach to gather comprehensive data, combining both quantitative and qualitative research instruments. An online semi-structured questionnaire was delivered to 20 Master One students in the Didactics stream of the English Language Department at the University of Saida, Dr. Moulay Tahar. Additionally, a semi-structured interview was conducted with 3 EFL teachers, along with classroom observation. The findings revealed that learners are frequently exposed to AI-generated content for academic purposes, particularly at lower cognitive levels. However, the results also indicated that as tasks become intellectually demanding, students over-rely on AI tools, resulting in a decline in higher-order cognitive thinking. The study recommends that EFL instructors foster learners' awareness by implementing guided activities that promote critical interaction with AI tools. It also underscores the need for institutional policies that promote digital literacy to uphold academic integrity.

Keywords: AI-generated content, artificial intelligence, chatgpt, critical thinking, digital literacy, EFL learners

Table of Contents

Declaration of Originality.....	II
Dedication.....	III
Acknowledgements	IV
Abstract.....	V
Table of Contents.....	VI
List of Tables.....	X
List of Pie Charts	XI
List of Bar-Graphs	XII
List of Abbreviations and Acronyms.....	XIII
List of Appendices.....	XIV
General Introduction.....	1
Chapter One: Literature Review	4
1.1 Overview.....	5
1.2 Introduction to Artificial Intelligence (AI)	5
1.3 The Role of AI in Education and EFL Contexts	6
1.3.1 Natural Language Processing (NLP).....	6
1.3.2 Machine Learning (ML)	7
1.3.3 Deep learning (DL)	7
1.4 AI-Generated Content and ChatGPT in EFL Education.....	7
1.5 Critical Thinking in EFL Education.....	8
1.6 Bloom’s Taxonomy as a Theoretical Framework.....	8
1.6.1 Remembering	9
1.6.2 Understanding	9
1.6.3 Applying.....	9
1.6.4 Analyzing	9
1.6.5 Evaluating.....	9
1.6.6 Creating	9

1.7 Empirical Studies on AI-Generated Content and Critical Thinking	10
Chapter Two: Research Methodology and Design- Data Analysis and Interpretation	24
2.1 Introduction	25
2.2 Research Methods	25
2.3 Participants	25
2.4 Research Instruments	26
2.4.1 Questionnaire	26
2.4.1.1 Description of the Questionnaire	26
2.4.1.2 Questionnaire Analysis	27
2.4.1.2.1 Section One: Gender Distribution and General AI Usage	27
2.4.1.2.2 Section Two: Bloom’s Taxonomy Levels	29
2.4.1.2.2.1 Remembering	29
2.4.1.2.2.2 Understanding	30
2.4.1.2.2.3 Applying	32
2.4.1.2.2.4 Analyzing	33
2.4.1.2.2.5 Evaluating	35
2.4.1.2.2.6 Creating	36
2.4.1.3 Results Interpretation	37
2.4.2 Classroom Observation	38
2.4.2.1 Description of classroom observation	38
2.4.2.2 The purpose of use	38
2.4.3 Interview	39
2.4.3.1 Description of the interview	39
2.4.3.1.1 Section one: AI usage	39
2.4.3.1.2 Section two: AI’s impact on critical thinking	40
2.4.3.2 Results Interpretation	40
2.5 General Interpretation of Results	41
2.6 Conclusion	42

Chapter Three: Suggestions and Recommendations	44
3.1 Introduction.....	45
3.2 Recommendations.....	45
3.3 For Institutional Policies	45
3.4 Implications for Theory and Practice.....	46
3.5 Directions for Future Research	47
3.6 Conclusion	47
General Conclusion	50
References	27
Appendices	56
Appendix A: students' questionnaire.....	57
Appendix B: Teacher's interview	62

List of Tables

Table 01: Students' Confidence in Evaluating the Reliability of AI-Generated Responses	34
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List of Pie Charts

Pie Chart 01: Gender Distribution of Student Participants	27
Pie Chart 02: Frequency of AI-generated Content Usage Among Learners	28
Pie Chart 03: Most Frequently Used AI Tools	
Pie Chart 04: Students’ Perceptions of how AI-Generated Responses Support Comprehension of Complex Topics	31
Pie Chart 05: Students’ Use of AI-Generated Responses in Academic Essays and Reports	32
Pie Chart 06: Students’ Use of AI-Generated Content to Solve Academic Problems	
Pie Chart 07: Students’ Frequency of Verifying the Accuracy of AI-Generated Responses	33
Pie Chart 08: Student Use of AI for Designing Educational Tasks	36

List of Bar-Graphs

Bar-graph 01: Frequency of AI support in Recalling Academic Information	29
Bar graph 02: Students’ Perceptions of the Effectiveness of AI-Generated Summaries Compared to Traditional Study Methods	30
Bar graph 03: Student Comprehension of AI-Generated Content	
Bar graphs 04: Reported Student Reactions to Inaccuracies in AI-Generated Responses	33
Bar graph 06: Learners’ Strategies for Using AI-Generated Responses	36

List of Abbreviations and Acronyms

AI: Artificial Intelligence

AICG: AI-generated Content

AIED: AI in Education

ChatGPT: Chat Generative Pre-Trained Transformer

CT: Critical Thinking

DL: Deep Learning

EFL: English as a Foreign Language

GAI: Generative Artificial Intelligence

HOTS: Higher-Order Thinking Skills

ML: Machine Learning

NLP: Natural Language Processing

List of Appendices

- Appendix A: Students' questionnaire
- Appendix B: Teachers' interview

General Introduction

As an innovative technology in education, artificial intelligence has sparked wide attention among educators and learners due to its transformative potential in reshaping teaching and learning practices. Generative AI tools such as ChatGPT offer numerous benefits and opportunities to support students in their academic journey. These advanced tools assist learners in various academic tasks, particularly in the EFL context, where learners are expected not only to be proficient in the language but also to develop essential cognitive abilities like critical thinking, problem-solving skills, and maintaining creativity.

AI continues to revolutionize the academic paradigm. Many higher education students, especially at the Master's level, often rely on ChatGPT for tasks such as writing essays, brainstorming ideas, and problem-solving. Although these tools enhance productivity and save time. There is a growing concern regarding its influence on learners' analytical abilities and critical thinking. The excessive and irrational use of AI-generated content may result in several negative consequences. Among these are hindering independent thinking, encouraging overdependence on ready-made content, fostering superficial analysis and evaluation of information, and promoting passivity. This raises a significant question concerning whether AI tools help students develop their cognitive capabilities or contribute to a decline in critical engagement.

Critical thinking is a core skill in higher education, particularly in EFL pedagogy. Learners are required to demonstrate higher-order cognitive abilities such as analyzing, evaluating, and creating original content rather than learning through rote memorization. These essential abilities are fundamental for language acquisition and also for personal and academic success. Therefore, gaining insight into the implications of AI tools in such intellectual environments becomes not only a choice but a necessity.

This research explores the impact of AI-generated content, specifically ChatGPT, on the critical thinking skills of Master One EFL didactics learners. It aims to determine how frequently students are exposed to these tools in their academic context and whether their use enhances or inhibits critical engagement across the six levels of Bloom's Taxonomy. The intent of the study is not to disregard the potential advantages of AI but to systematically assess how it is being implemented and to propose pedagogical strategies that ensure the technology serves as a tool to optimize the learning experience, not a substitute for human cognition.

The main objectives of this research are:

- ❖ To examine the extent to which students rely on AI-generated content in their academic activities.

- ❖ To determine whether AI-generated content supports or impedes learners' engagement with critical thinking skills.
- ❖ To explore students' perceptions regarding the influence of AI tools on their independent thinking and academic autonomy.

The study addresses the following research questions:

- How frequently are students exposed to AI-generated content in their academic activities?
- Can AI-generated content contribute to overreliance and diminish learners' critical thinking skills?
- How do students perceive the impact of AI-generated content on their independent thinking and learning autonomy?

To answer these questions, the researcher hypothesizes that:

- Students may be frequently exposed to AI-generated content in their academic activities.
- Excessive reliance on AI-generated content may hinder students' ability to engage in higher-order critical thinking.
- Students who heavily use AI tools such as ChatGPT might demonstrate reduced levels of independent thinking and learning autonomy.

The study adopted a mixed-methods research design, incorporating three major research instruments to collect data from Master One didactics learners at Saida University. These tools include a semi-structured questionnaire for learners, classroom observation, and semi-structured interviews with EFL teachers.

The structure of the thesis will be presented as follows: the first chapter will be devoted to existing literature focusing on the integration of AI in education and its role in EFL learning. The emergence of AI-generated content and its implications for critical thinking within the Bloom's Taxonomy framework. The second chapter will be concerned with methodology, describing the sample population, instruments, and data collection procedures. Furthermore, it will include data analysis and interpretations of the findings from the questionnaire, interviews, and observation. The final chapter will be dedicated to suggestions and practical recommendations for educators, learners, institutions, and policymakers to maintain critical thinking development in EFL classrooms while leveraging AI technology.

Despite the study's contribution, the researcher encountered several limitations. Firstly, AI implementation in education, particularly in Algerian universities, remains in its infancy.

General introduction

This results in a lack of previous studies related to the topic. Secondly. The classroom observation was affected by the limited number of attendees during Ramadan, also the behaviors of some participants may have biased the study and impacted the reliability of the data gathered.

This research provides a significant understanding of the interplay between AI-generated content and critical thinking abilities among EFL learners. It emphasizes the significance of adapting pedagogical strategies to balance AI use, support reflective thinking, and reinforce students' autonomy.

Chapter One:

Literature Review

1.1 Overview

This chapter offers insight into the integration of AI-generated content in education and its impact on critical thinking skills among EFL learners. It begins with a general discussion of artificial intelligence, including its definition, relevant AI technologies with special focus on generative AI tools such as ChatGPT, and their pedagogical implementation.

Additionally, the chapter introduces Bloom's Taxonomy as a guiding theoretical framework for the study, along with the concept of critical thinking, highlighting its importance in the EFL context. Furthermore, the chapter reviews empirical studies to explore the role of AI in enhancing or hindering learners' independent thinking.

Finally, the chapter outlines methodological approaches, research gaps, and limitations in the existing literature that this study aims to investigate.

1.2 Introduction to Artificial Intelligence (AI)

If we aim to understand the integration of artificial intelligence (AI) into educational settings and its impact on the teaching and learning process, we must first explore its nature. What does AI mean, and how does this technology change the educational system? One of the surprising aspects of defining artificial intelligence is the absence of a precise, universally accepted definition due to its complexity (Sheikh et al., 2023).

The field of AI experiences constant transformation in addition to its multidisciplinary nature. Scholars from various disciplines, such as anthropology, biology, computer science, linguistics, philosophy, psychology, and neuroscience, have provided diverse interpretations and terminologies (Luckin et al., 2016).

The term "artificial intelligence" was first introduced by John McCarthy in 1955 during the Dartmouth Conference, where he described AI as the science and engineering of developing advanced machines, particularly smart software systems; it incorporates using computers to understand human reasoning (McCarthy, 2004). Similarly, Xu et al. (2021) defined artificial intelligence (AI) as a system or device that imitates human intelligence. Furthermore, research in AI has predominantly centered on five essential elements: learning, reasoning, problem-solving, perception, and language processing (UNESCO, 2019). These critical aspects are necessary to enable AI to analyze vast amounts of information, generate ideas, and interact with users in a manner akin to human cognition.

1.3 The Role of AI in Education and EFL Contexts

The pervasive implementation of artificial intelligence (AI) has created a new era of innovation, holding significant potential benefits and unprecedented opportunities across various domains of human life. In the context of education, AI has revolutionized traditional teaching methods and enhanced the entire learning process. Liu and Wang (2024) emphasized that the widespread use of AI in education (AIED) has become an evolutionary phenomenon, reshaping the dynamic of teaching and learning. AI-driven technologies, including intelligent tutoring systems, adaptive learning platforms, and interactive educational tools, provide remarkable chances to promote personalized learning experiences and improve students' academic performance. Furthermore, the continuous advancement and integration of these technologies, particularly in the field of English as a Foreign Language (EFL), have gained increasing significance. Traditional learning methods have struggled to address key challenges such as customizing learning instructions, providing immediate feedback, real-time assessment, offering assistance to each learner, and maintaining classroom engagement. In response to these challenges, AI technology has introduced cutting-edge solutions to address these shortcomings and to improve language instruction in EFL settings. As noted by Alhalangy and AbdAlgane (2023), acquiring a new language may require considerable effort; however, AI technology stimulates an interactive teaching and learning atmosphere in EFL classrooms. Thereby reducing time and effort. By utilizing artificial intelligence, instructors can support their EFL students to enhance their analytical abilities, debating, and argumentative skills. Moreover, AI tools can profoundly accelerate students' enthusiasm and performance, particularly in oral communication classes; despite challenges that may appear, AI can assist learners in achieving their goals by highlighting important aspects of oral communication and written production. In addition, to fully comprehend how AI improves EFL learning, it is crucial to mention some extensively applied AI-powered language learning systems in education, comprising Natural Language Processing (NLP), Machine Learning (ML), and Deep Learning (DL) (Schmidt, 2022).

1.3.1 Natural Language Processing (NLP)

It is a branch of artificial intelligence that enables machines to understand, analyze, and interpret human language naturally (Adiguzel et al., 2023). Holmes, Fadel, and Bialik (2019) explain that NLP aims to produce written and spoken human-like language. As a result, AI-driven tools such as ChatGPT, Grammarly, and Gemini leverage NLP to enhance language learning by facilitating grammar-checking, spelling correction, writing style improvement, as well as fluency development.

1.3.2 Machine Learning (ML)

It is a field of computer programs designed to improve their predictive reliability through analyzing and learning from data (Luckin et al., 2016). Furthermore, ML holds immense potential to elevate EFL learning by providing AI-facilitated learning applications, including Duolingo and Lingvist. According to Jagwani (2019), ML enables AI-powered systems to predict student performance by identifying areas of improvement and suggesting practical, customized learning tools to address students' weaknesses. Also, ML helps ensure fairness in grading students and minimizes human bias. Alongside this, it supports content organization, allowing learners to develop their language-learning skills progressively.

1.3.3 Deep learning (DL)

It is a subfield of Machine Learning that utilizes a perception layer to synthesize and process massive data. The filtered input is then transferred through these layers, enabling the AI system to generate and deliver suitable responses (Hamdan et al., 2021). For instance, in the EFL context, deep learning system empowers AI-supported pronunciation training applications such as ELSA Speak to assist English language learners with pronunciation through interactive feedback on sound and intonation (Yamamoto Ravenor, 2024).

1.4 AI-Generated Content and ChatGPT in EFL Education

One of the most groundbreaking applications of AI in pedagogy is the rise of AI-generated content (AIGC), a transformative innovation. Also known as creative AI, AIGC refers to an advanced technological system that can generate authentic and unique content, including text, images, videos, music, and code, through analyzing extensive datasets using machine learning algorithms (Elmourabit, Retbi, & El Faddouli, 2023). This large model presents considerable promise and advantages for enhancing content creation and the overall quality of instructional delivery.

Elmourabit et al. (2023) argue that GAI enables personalized learning by creating learning materials specifically customized to each learner's individual needs, preferences, and learning styles. GAI also streamlines efficient content design by producing new teaching materials such as quizzes, exercises, explanations of concepts, and summaries. In addition, it encourages interactive simulations and virtual environments that improve student participation and the learning experience. It also allows real-time adaptive assessment and feedback, ensuring students are challenged based on their proficiency levels while maintaining ongoing progress. A notable example of AI-generated content in education is ChatGPT, an influential tool that has gained widespread attention among learners. Launched by OpenAI in November 2022,

ChatGPT (Chat Generative Pre-Trained Transformer) is designed to understand human language and produce coherent and informative responses (Lo, 2023). This sophisticated Chatbot has profoundly reshaped the EFL learning experience, offering diverse benefits. It can assist in generating written content, clarifying complex concepts, supporting language translation, and summarizing texts and articles. Along with this, ChatGPT can recommend suitable learning materials, such as textbooks and courses, aiding vocabulary acquisition and grammar correction. Moreover, it engages learners in dialogues and simulates real-life scenarios, creating an interactive learning environment and fostering learners' motivation.

1.5 Critical Thinking in EFL Education

Despite the growing popularity of ChatGPT in education, significant concerns have been raised regarding its impact on students' critical thinking skills. Critical thinking (CT) is defined as the ability to analyze, synthesize, and evaluate information, making rational decisions to solve particular problems. According to Heard et al. (2020), critical thinking refers to cognitive processes that are oriented toward specific goals and driven by purpose. These processes are applied in different intellectual tasks, including problem-solving, supporting a theory or statement, conducting research, formulating arguments, sharing ideas, critiquing viewpoints, or making informed decisions. Additionally, these skills demonstrate that critical thinking is not only reflective thinking, but also applicable and constructive. Aligned with this view, Facione (1990) described critical thinking as “*purposeful, self-regulatory judgment*” that entails interpretation, analysis, evaluation, and inference, along with explaining evidence, concepts, methods, criteria, or context upon which reasoning is based.

Within the realm of EFL, critical thinking plays an important role since language learning surpasses mastering grammar and vocabulary. It encompasses understanding meaning, identifying context, and forming well-structured arguments. Fostering these abilities enables learners to use language effectively for problem-solving, decision-making, and communicating meaningfully in real-life situations (EFL Cafe, 2024). In the same vein, Alnofaie (2013) highlighted that applying critical thinking pedagogy in EFL settings develops the quality of classroom dialogue and engages students in higher-order thinking (HOTS), hence, it improves language proficiency in reading comprehension, writing expression, and oral communication.

1.6 Bloom's Taxonomy as a Theoretical Framework

In light of the pivotal role of critical thinking in the EFL context, especially with the integration of AI-generated tools such as ChatGPT, it is essential to adopt a systematic framework that supports and assesses the development of students' cognitive abilities while

using AI. Bloom's Taxonomy was created by the educational psychologist Benjamin Bloom and his colleagues in 1956. It is a hierarchical model that categorizes learning objectives. It contains six categories of cognitive skills classified from lower-order thinking (knowledge, comprehension, application) to higher-order thinking (analysis, synthesis, evaluation) (Armstrong, 2010).

In 2001, a group of psychologists published a revised version of Bloom's taxonomy. The new taxonomy introduces notable changes. While the original taxonomy used noun forms (e.g., Knowledge, Comprehension, Application, Analysis, Evaluation), the updated framework incorporates verb and gerund forms (e.g., Remember, Understand, Apply, Analyze, Evaluate), highlighting the active application of cognitive processes. The revised taxonomy also replaced Synthesis with Create, which represents the highest level of higher-order thinking. (Hakimi & Lakhal, 2025).

This structured approach allows educators to assess the cognitive abilities of learners and how they interact with the learning materials to develop their critical thinking:

1.6.1 Remembering: Involves retrieving previous information or recalling facts and concepts.

1.6.2 Understanding: At this level, the learner explains and interprets ideas and information in their own words.

1.6.3 Applying: In this phase, the learner is encouraged to apply and transfer knowledge into real-life situations.

1.6.4 Analyzing: In this stage, the learner analyzes and breaks down information into small parts to identify relationships and patterns.

1.6.5 Evaluating: At this level, the learner can make a judgment and construct a well-reasoned argument based on specific criteria and guidelines.

1.6.6 Creating: requires the learner to integrate prior knowledge with new concepts to generate original ideas.

However, with the increasing use of AI in education, particularly ChatGPT, it is important to raise concerns about how such tools may impact the development of learners' critical thinking and analytical abilities, or potentially result in a decline in independent thinking across these cognitive levels.

In the Algerian context, research on the pedagogical implementation of AI remains at an early stage. At the University of Saida, EFL learners, especially within the didactics field, make extensive use of ChatGPT as part of their daily academic routines. Ghounane, Rahmani, and Al-Zubaidi (2024) found that Master's students frequently rely on AI generators such as ChatGPT and Quillbot, mainly for paraphrasing and plagiarism, and also highlighted their poor

awareness of the ethical considerations surrounding these generators. Although the study sheds light on students' attitudes towards AI and its misuse, it does not address how generative AI influences students' cognitive development. More specifically, no research has systematically investigated the relationship between AI-generated content and critical thinking across the six levels of Bloom's Taxonomy, particularly among Master One didactics students at the University of Saida. This thesis, therefore, seeks to fill the gap by providing empirical evidence on the extent to which AI-generated content fosters or hinders critical thinking skills.

1.7 Empirical Studies on AI-Generated Content and Critical Thinking

Since the previous section introduced the key concepts and theoretical foundations of this study, the following section will summarize key findings from existing research on the impact of AI-generated tools and content on students' critical thinking skills.

Hading et al. (2024) investigated EFL students' perceptions regarding the integration of Artificial Intelligence (AI) to enhance critical thinking skills. The research aimed to determine whether AI technologies diminish or boost cognitive abilities. Additionally, the study employed a descriptive qualitative method, conducted direct interviews with 15(fifteen) learners from the English literature study program at the Letter Faculty, Universitas Sawerigading Makassar. The results revealed different perceptions among learners. While AI assisted in retrieving and evaluating information, data analysis, exploring new ideas, enhancing reasoning, and problem-solving, it encouraged overreliance, which could hinder the development of independent thinking. The study highlighted the importance of balancing the use of AI, also implementing AI in ways that support the students to think and evaluate the content generated by AI-powered tools.

Although the study by Hading et al. (2024) provides useful insights into EFL students' perceptions of the integration of AI in fostering critical thinking skills, it is limited in various areas. The researchers emphasize learners' overall attitudes using only a qualitative approach, interviewing a small group of participants. Even though the findings demonstrate advantages, including information retrieval, improved reasoning, and problem-solving, they highlight disadvantages such as over-dependence on AI. Besides, the research does not assess how AI-generated content influences specific cognitive levels. Furthermore, it does not address the strategies that educators must implement to balance the use of AI and promote independent thinking. In contrast, the current study uses a mixed-methods research design comprising classroom observation, teacher interviews, and a questionnaire administered to EFL didactics learners. The study relies on Bloom's Taxonomy as a theoretical framework to gain a comprehensive analysis of AI's impact across all six cognitive levels. By emphasizing the

methodological and theoretical limitations, this work aims to offer a clear and well-structured understanding of the impact of AI-generated content on EFL students' cognitive abilities.

Darwin et al. (2024) explored EFL attitudes toward the benefits and drawbacks of using Artificial Intelligence (AI) in relation to critical thinking. The research followed a qualitative research design employing semi-structured interviews with seven master's degree students from two different Indonesian universities selected purposively. The study demonstrated a multifaceted understanding of the concept of independent thinking that requires questioning norms, contextual analysis, and evaluating evidence. Participants reported the effectiveness of AI in developing critical thinking in various aspects, such as academic research and theoretical analysis. However, several issues were raised regarding AI's limitations, including a lack of personalization, minimizing opinion diversity, and challenges in grasping nuanced understanding. The findings suggested that AI can be a beneficial tool to cultivate analytical abilities, but it should be used carefully. The research limitations emphasized that the overdependence on self-reported data and the diversity of participant backgrounds may cause biases and influence generalizability. Further research is encouraged to use more objective measures, for example, classroom observation, psychometric tests, and investigation of instructional strategies to integrate AI mindfully.

The study provided by Darwin et al. (2024) offers significant perspectives on EFL students' perception of the role of AI in developing critical thinking. Their qualitative research is restricted to a small number of master's students from two Indonesian universities, relying only on semi-structured interviews. Although results indicate a diverse understanding of critical thinking, they remain descriptive and inapplicable. Additionally, the research does not incorporate a clear theoretical framework to measure the students' cognitive development. Moreover, the study underscores key challenges in addressing individual differences. And potential risks to reduce human thought. On the other hand, our work mitigates these methodological constraints by employing a mixed-methods approach supported by triangulation, combining students' questionnaires, classroom observations, and teacher interviews to capture a rich understanding of the research topic. Guided by Bloom's taxonomy, the current study examines how AI-generated content and AI tools like ChatGPT influence the six levels of critical thinking of first-year EFL students.

Galindez et al. (2024) examined the impact of Artificial Intelligence (AI) applications on the development of students' critical thinking skills within various academic settings. The researchers' study involved 200 students from diverse educational backgrounds and revealed a considerable escalation in critical thinking performance following AI incorporation.

Additionally, the study utilized AI tools such as virtual learning platforms, machine learning algorithms, and Natural Language Processing (NLP). As a result, 60% of participants exhibited strong engagement with AI technologies and demonstrated a 10% improvement in their analytical abilities and problem-solving skills. Lastly, the analysis proved that AI has a significant influence in fostering students' independent thinking and sheds light on the potential of AI to enhance classroom instruction to prepare students to thrive in today's modern world.

The empirical efforts of Galindez et al. (2024) have examined the role of AI in developing critical thinking skills. Their extensive investigation, through a large-scale study of 200 participants from diverse academic disciplines, reports a 10% increase in learners' analytical and problem-solving abilities after the implementation of AI-powered tools such as virtual learning platforms, machine learning algorithms, and Natural Language Processing (NLP). Although the research underscores the promise of AI to strengthen independent thinking and students' engagement in the classroom, it relies only on quantitative data and students' perceptions, neglecting the complexity of different cognitive activities. Conversely, the present study employs a mixed-methods approach that combines classroom observation, students' questionnaires, and teachers' interviews to provide a deep understanding of how AI-generated content influences the six levels of critical thinking by establishing Bloom's taxonomy as a theoretical framework to explore the students' reasoning in depth.

Zou et al. (2023) investigated the influence of AI-generated content tools on students' autonomous thinking and their attitudes toward these technologies. The researchers employed a survey with 851 students from a Chinese university to examine digital engagement patterns, motivations, perceived utility, awareness of potential risks, and the significance of independent thinking. The results demonstrated a higher frequency of AI application usage among male and non-binary students and highlighted key motivation factors such as saving time and effort. Participants also exhibited awareness of the disadvantages and limitations of AI tools. Emphasizing the crucial role of critical thinking in navigating AI-generated content. The investigation drew attention to the need for training in artificial intelligence literacy and critical thinking.

Although Zou et al. (2023) offer important perspectives regarding students' engagement with AI-generated content tools, their study primarily focuses on the use patterns, motivations, and perceived risks without addressing how these AI-powered tools influence different levels of critical thinking, despite gathering extensive data from 851 Chinese respondents, which reveals their awareness of AI utilization and the increasing demand for AI literacy. The study does not incorporate a structured framework to systematically analyze the different stages of

independent thinking. In response to these limitations, the current research adopts Bloom's taxonomy to explore in depth the impact of AI-generated content on the students' analytical abilities using a mixed-method approach by integrating students' questionnaires and teachers' interviews, as well as classroom observation. This method provides insight and evaluates how AI applications influence specific cognitive levels in an EFL learning context.

Melisa et al. (2025) conducted a systematic review to investigate the influence of ChatGPT on the development of critical thinking, evaluation, and independent judgment skills among higher education learners across various academic backgrounds. The research employed 19 documents from Scopus and the Education Resources Information Center (ERIC) published between 2023 and 2024. Additionally, it addressed two main questions: the effect of ChatGPT on the development of students' critical thinking skills in higher education, and its impact on students' ability to evaluate information and form independent judgments critically. The findings revealed that AI tools such as ChatGPT can boost learners' independent thinking by supporting effective access to diverse perspectives, promoting analytical thinking, and effective argument construction. However, the overdependence on AI may diminish learners' motivation for self-reflection and critical analysis. The study emphasized ethical use and academic integrity, also suggesting that educators must provide guidance to the students and encourage them to critically analyze information in order to maximize the benefits of AI tools in education.

In contrast to Melisa et al. (2025), synthesize empirical research to examine the growing role of ChatGPT in higher education. Their work persists as general and theoretical. In addition to that, the review depends only on secondary sources, which lack empirical analysis to measure how AI applications influence students in diverse contexts like English as a Foreign Language (EFL); moreover, the absence of a guided cognitive model can lead to ambiguity on which dimension of critical thinking is responsive and affected by AI usage, Unlike previous studies our work presents a narrowed focus on EFL learners, using Bloom's taxonomy as a hierarchical framework to investigate how AI-generated content supports or impedes learners cognitive development though employing a mixed methods approach this current study bridges the gap between the theory and practice.

Rusandi et al. (2023) discussed the application of artificial tools, particularly ChatGPT, in education and research, and its capability to foster critical thinking, enhance research practices, and maintain academic integrity. The authors argued that the ethical and rational use of AI can support learning. Besides, they highlighted the importance of implementing specific teaching strategies to help learners and researchers cultivate analytical abilities and contextual understanding to effectively use AI and assess the accuracy and reliability of information. In

conclusion, the article underscored that the collaboration between AI, researchers, and learners provides significant benefits as long as critical thinking skills and academic honesty remain core priorities.

Rusandi et al. (2023) shed light on the ethical and pedagogical implementation of CharGPT and its impact on academic research and learning, emphasizing the importance of independent thinking and academic integrity. Their research stresses the significance of targeted instructional strategies that support learners in determining the validity of AI-generated content. Nonetheless, the research does not extend to practical implementation, providing solutions without empirical evidence. Consequently, the present study seeks to address these conceptual limitations by applying Bloom's taxonomy and mixed methods design. Using triangulation as a core methodological approach, combining classroom observations, student questionnaires, and teacher interviews to obtain a comprehensive analysis to explore how AI-generated content influences different cognitive processes in EFL learners. This study aims to explore whether AI tools foster the students' ability to think critically or contribute to the overreliance on such technology.

Essien et al. (2024) assessed the role of generative artificial intelligence (GAI), especially AI-powered text generators such as ChatGPT, in the critical thinking skills of postgraduate business school students in the UK. They focused on Bloom's taxonomy as a framework, using a mixed-method approach and a sample of 107 participants to examine these technologies' benefits and challenges in academic settings. The findings revealed that AI tools primarily enhanced the foundational levels of Bloom's taxonomy in terms of remembering and understanding. However, the study also emphasized concerns about their reliability, accuracy, and ethical considerations in education. The research provided important perspectives into the dynamic relationship between AI tools, whose primary focus is enhancing students' critical thinking abilities, guiding educators and policymakers by offering strategies to facilitate the process of integrating these technologies into education while maintaining focus on students' cognition.

Both studies share a common point in their focus on the impact of AI on critical thinking skills, but they have key distinctions in the methodology used. Essien et al. (2024) collected data through a mixed-methods design with 107 participants, and their findings indicate that AI tools primarily enhance lower-level cognitive skills such as remembering and understanding. In contrast, the current research focuses on using questionnaires, interviews, and classroom observation to evaluate and assess the influence of these technologies on students' critical abilities in the EFL context. While both studies examine AI's role in education, Essien et al.

(2024) emphasize reliability, accuracy, and potential ethical implications of AI applications. In higher education. Meanwhile, the present study moves further by analyzing how AI-generated content impacts the development of independent thinking abilities within the framework of Bloom's taxonomy.

Parsakia (2023) shed light on psychological and cognitive aspects in educational settings influenced by chatbots and AI. As these technologies continued to shape the teaching and learning environment, they had a significant impact on various aspects, such as students' confidence, self-worth, problem-solving capacities, and analytical skills. The review highlighted the merits of chatbots in enhancing personalized learning, fostering students' self-efficacy and engagement, as some studies reported increased self-efficacy in controlled settings. However, the results regarding self-esteem remained uncertain. While certain studies highlighted positive outcomes, particularly in body image, others suggested that excessive reliance on chatbots for validation may weaken real-world relationships and self-assurance. The study also examined how chatbots affected critical thinking, concluding that although AI and chatbots can enhance student learning and engagement, their impact remains nuanced. Future innovations should seek to strengthen their cognitive benefits while ensuring they encourage critical thinking and problem-solving.

Unlike Parsakia's (2023) work, which broadly explores the effects of AI and chatbots on psychological factors such as self-esteem and self-efficacy, the present study focuses specifically on the impact of generative AI tools like ChatGPT on students' critical thinking skills. Instead of tackling emotional or motivational aspects, this research examines how AI use influences students' cognitive abilities. Moreover, while Parsakia's study synthesizes existing literature on AI's psychological effects in education, the current study follows a mixed-methods approach, using triangulation, comprising students' questionnaires, classroom observations, and teacher interviews to provide a deeper understanding of how AI tools shape cognitive engagement. Another key distinction is that the present study applies Bloom's Taxonomy as a structured framework to assess the development of critical thinking in the six different cognitive processes, whereas the reviewed article takes a broader approach, examining the benefits and concerns of AI in education without empirical data.

Adiguzel et al. (2023) provided a comprehensive overview of AI technologies and their transformative application in education. The paper addressed Chatbots and related algorithms that simulate human interactions and generate human-like text based on input from natural language processing. Also, the authors delved into the advantages of groundbreaking chatbots like ChatGPT and the ethical and practical concerns regarding AI use in education.

Furthermore, the study aimed to provide a critical reflection on how AI tools can be effectively incorporated into teaching and learning to benefit both educators and learners while promoting responsible and ethical use.

Compared to the work of Adiguzel et al. (2023), which offers an exhaustive and conceptual overview of AI-driven technologies and their capabilities to reshape educational practices. The current research adopts a systematic approach to explore the specific influence of generative AI tools like ChatGPT on students' critical thinking skills. While Adiguzel et al. focus on reviewing existing literature and highlighting ethical and practical concerns, their study provides a limited analysis and exploration of learners and teachers. Conversely, the current study employs a mixed-methods design incorporating student questionnaires, classroom observations, and teacher interviews to shed light on the relationship between AI usage and cognitive development. Moreover, the present research applies Bloom's taxonomy as a guiding framework to evaluate the progression in learners' cognitive competencies. Therefore, while the authors underscore AI's capacity to enhance learning, the present work provides a valuable understanding, strengthening research with empirical data and practical strategies for integrating AI in educational settings to enhance critical thinking.

Yang et al. (2023) investigated the integration of Artificial Intelligence Generated Content (AIGC) large models in higher education. The study used literature review and experimental analysis methods to examine the application of AIGC large models and evaluate their impact on teaching effectiveness, focusing on areas such as personalized learning, teaching resource expansion, and automated assessment. The results demonstrated that AIGC escalated instructional efficiency up to 96%, offering customized lessons, intelligent tutoring assistance, tailored learning resources, and guidance. Also, it contributed to enhancing students' motivation and academic achievement.

Unlike the work of Yang et al. (2023), which highlights the application of AIGC large models in improving instructional delivery. The present research centers on examining how generative tools like ChatGPT influence students' critical thinking skills. Although the authors' study emphasized technological benefits such as personalized learning, intelligent tutoring, and automated assessment, this work predominantly concentrates on the learners' cognitive development. Another significant distinction emerges in terms of the research design used. Yang et al. employed a literature review and experimental data to highlight the effectiveness of AIGC; on the other hand, the present work adopts a mixed methods approach using triangulation through questionnaires, classroom observations, and teacher interviews. To gain valuable insights into how AIGC affects different cognitive stages. In addition, the study applies

Bloom's taxonomy as a theoretical model to analyze and measure how EFL students engage with AI materials critically.

Achili and Zerrouki (2024) explored the implementation of artificial intelligence in Algerian higher education, shedding light on its Potential advantages and ethical challenges. In addition, the study examined the authentic use of AI by teachers from eleven (11) universities, including a purposive sample of forty-one (41) respondents who answered an online semi-structured questionnaire containing twenty (20) items addressing the teachers' AI use practices and perceptions. The results indicated that educators expressed concerns about the unethical use of AI and its influence on teacher-learner trust and rapport. Furthermore, educators exhibited a clear hesitation concerning adopting AI technologies in their classes due to the lack of training and motivation. The researchers suggested that effective integration of AI in Algerian higher education starts by shifting teachers' mindsets and attitudes towards this innovation.

While Achili and Zerrouki (2024) stress the ethical and practical challenges of the use of AI technologies from the perspective of Algerian university teachers, the present study focuses on the impact of generative AI tools on EFL learners' critical thinking growth. Although the authors highlighted educators' reluctance due to insufficient training and unethical issues, the current research centers on Master One EFL students and examines how applications such as ChatGPT impact learners' interaction with AI-generated content at various cognitive levels. Alongside this, the study adopts a mixed-methods approach using triangulation, combining classroom observations, teacher interviews, and questionnaires. Furthermore, this work applies Bloom's Taxonomy as a structured theoretical model to analyze whether EFL learners critically evaluate AI-generated content or exhibit over-reliance on it.

Guo and Lee (2023) analyzed the incorporation of ChatGPT to cultivate critical thinking abilities among higher education students in introductory chemistry courses at Georgia Gwinnett College (GGC). The students interacted with ChatGPT in three stages: account setup and orientation, essay creation, and output revision and validation. The results demonstrated a considerable improvement in students' confidence in asking critical questions, analyzing information, and understanding complex terms. Notably, learners reported that ChatGPT raised their awareness and boosted their analytical abilities; nevertheless, the study reported obstacles such as students' shallow comments and challenges in identifying the validity of information sources. The study emphasized the need for comprehensive teacher training to access reliable resources and ensure privacy and security to support effective implementation. They concluded

that AI technologies like ChatGPT hold strong potential to enhance independent thinking skills in higher education.

Whereas Guo and Lee (2023) emphasize the use of ChatGPT, a large language model, to foster critical thinking in chemistry education, the present study shifts the focus to EFL learners, stressing how AI-generated content influences their cognitive engagement across the six stages of Bloom's taxonomy. The previous research underscores the benefits of AI technologies in terms of learners' confidence and analytical thinking. It also tackled key challenges, including low-quality student responses and struggles related to fact-checking information. The present work employs a mixed research design that integrates classroom observation, teachers' interviews, and students' questionnaires. This methodological approach supports a more critical examination of how generative AI impacts cognitive development in language learning.

Pokkakillath and Suleri (2023) examined the broader implications of ChatGPT in transforming educational practices, highlighting its ability to provide instant feedback, personalized experience, and 24/7 availability. Moreover, the study aimed to analyze various viewpoints regarding the role of ChatGPT in teaching and learning, raising questions about the responsibility for AI-generated content and its use in assessing student outcomes. In addition, the researchers emphasized the necessity for further research to fully comprehend the implementation of ChatGPT and to determine how effectively it can be integrated into pedagogy.

Although Pokkakillath and Suleri (2023) discuss the general educational potential of ChatGPT, shedding light on personalized learning, constant availability, and immediate feedback. The present study centers on how AI-generated content influences EFL learners' critical thinking skills. Their work provides a theoretical framework for considering responsibilities for generated content and further research suggestions. While the current research employs a mixed methods design combining teacher interviews, classroom observations, and student questionnaires to understand how students interact cognitively with AI across different levels of critical thinking of Bloom's taxonomy. Unlike the general overview of Pokkakillath and Suleri, this work provides empirical findings on how AI-generated content shapes the cognitive processes in EFL pedagogy.

Liu and Wang (2024) investigated the impact of AI in foreign language education, particularly within English literature classes. They conducted an eight-week intervention study with a mixed methods approach. The sample consisted of 90 students divided into an experimental and a control group, matched for average age, language proficiency, and gender

ratio. Their critical thinking was assessed before and after the intervention, employing standardized measurement instruments. The experimental group utilized AI technologies such as ChatGPT-3.5, Bodoudou, and SummarizBot to generate and answer text-related questions and engage with interactive quizzes and AI-supported debates. In contrast, the control group followed traditional learning methods without AI assistance. The findings showed a statistically significant enhancement in the critical thinking skills of the experimental group, surpassing the control group, suggesting AI's effectiveness in enhancing critical thinking abilities in English literature classes and providing valuable insights for educators and policymakers to implement AI-driven educational strategies that can be culturally responsive and pedagogically efficient.

Although Liu and Wang's (2024) experimental study illustrates the potential of AI-powered technologies, including, ChatGPT-3.5, Bodoudou, and SummarizBot in cultivating critical thinking skills within the context of English literature classes, it does not provide a detailed analysis of which levels of thinking were developed nor does it align its outcome with a specific theoretical framework. Conversely, the present study is rooted in the field of EFL didactics to explore how AI-generated content impacts learners' critical thinking skills across all the levels of Bloom's taxonomy, from remembering to creating. The study adopts a mixed-methods research design, incorporating student questionnaires, classroom observations, and teacher interviews, to gain a critical analysis and deeper insight into students' cognitive engagement with AI technologies.

Lubbe et al. (2025) discussed the amalgamation of generative artificial intelligence (Gen AI), Bloom's taxonomy, and critical thinking to redefine assessment pedagogy and advance higher-order thinking competencies for independent learning in the field of self-directed learning. The study highlighted the prominent role of AI in diverse domains such as art, music, writing, and design, as well as the incorporation of AI technologies like intelligent tutoring systems, chatbots, robots, learning analytics dashboards, adaptive learning systems, and automated assessment. The researchers emphasized the importance of AI in elevating the higher cognitive levels of Bloom's taxonomy; however, it raised concerns regarding the authenticity and originality of AI-generated content. Ultimately, the authors underscored the importance of developing AI fluency and assessment literacy to enhance critical thinking skills and self-directed learning.

While Lubbe et al. (2025) present an insightful theoretical contribution by advocating the integration of generative AI, Bloom's taxonomy, and critical thinking to improve assessment pedagogy and promote self-directed learning, their study lacks systematic analysis and does not immediately investigate the impact of AI on learners' critical thinking skills.

Moreover, although the paper identifies key concerns about the authenticity of AI-generated content and the necessity for AI fluency and literacy, it does not specifically assess which cognitive levels of Bloom's taxonomy are engaged. In contrast, the current study offers an empirical approach to explore the influence of AI generative technologies on learners' critical thinking abilities across all six cognitive levels of Bloom's taxonomy within the realm of EFL didactics. By adopting a mixed-methods research design, combining student questionnaires, classroom observations, and teacher interviews. This research offers practical and meaningful educational insights into how EFL students process and engage with AI-generated content.

Gonsalves (2025) analyzed the role of generative AI technologies, including ChatGPT, in the development of critical skills in education. The author drew attention to learners' overdependence on AI-generated content, potentially reducing the development of independent thinking abilities. The study also raised concerns about the appropriateness of Bloom's taxonomy in addressing the cognitive demands of AI-assisted learning. To address this, Gonsalves adopted a revised framework that integrated AI-specific competencies to provide a more relevant model for cultivating critical thinking in an AI-driven environment. Moreover, the researcher used a conceptual approach supported by empirical evidence from MSc Marketing students' interactions with AI tools over four weeks. The results revealed that AI could boost and challenge critical thinking across cognitive, affective, and metacognitive domains. Key factors such as melioration and collaboration were identified as effective for enhancing deeper engagement with AI-generated solutions. The study suggested twelve propositions to shape future research on pedagogical adaptations for AI-assisted education.

Although Gonsalves (2025) offers an innovative theoretical framework by revising Bloom's taxonomy to navigate the cognitive demands of AI-assisted learning, it lacks depth in scope because it relies solely on empirical evidence from MSc Marketing students. Moreover, the study does not provide an adequately structured analysis of how AI-generated content impacts specific levels of Bloom's taxonomy within real-world applications. Unlike other studies, this research is based on EFL didactics learners and utilized a mixed-method approach comprising student surveys, in-class observation, and teacher interviews to investigate the effects of AI applications such as ChatGPT on critical thinking at all six levels of the hierarchy. Emphasizing EFL learners, this study fills a gap by providing meaningful contextual pedagogical responses regarding students' cognitive engagement with AI.

Yusuf et al. (2024) explored the influence of generative AI (GenAI) technologies on the critical thinking (CrT) skills of students in higher education in response to the concern regarding its negative effect and ethical implications. While some scholars argue that GenAI tools

enhance academic productivity, Others warned that these applications have the potential to diminish the development of independent thinking. To resolve this issue, the researchers proposed a theoretical model for cultivating critical thinking, aimed at helping students critically evaluate AI-generated responses. The model consisted of five phases: familiarizing, conceptualizing, inquiring, evaluating, and synthesizing. The study involved two separate experiments. The first experiment demonstrated the credibility of the model by delivering critical thinking training to 179 postgraduate learners, whereas the second experiment tested the effectiveness of the framework with 125 learners divided into groups. The findings revealed that both experiments indicated that the framework significantly advanced learners' critical thinking; however, the results varied based on personality traits and extensive learning support. Although the framework proved to be useful in various contexts, it could not enhance students' self-regulated learning compared to alternative frameworks.

Although the experimental design proposed by Yusuf et al. (2024) offers a practical and thoughtful framework for fostering critical thinking, their study remains broad in scope and does not emphasize any specific discipline. Additionally, the model's five phases, including familiarizing, conceptualizing, inquiring, evaluating, and synthesizing, have proven to be impactful in enhancing students' independent thinking, but fail to address tasks involving language-based thinking. Moreover, despite conducting two experiments, the authors acknowledge weaknesses and limitations regarding self-regulated learning and learners' personality traits. In contrast, the current study employs a mixed-methods approach within an EFL context, focusing on how generative AI influences learners' cognitive abilities across all six levels of Bloom's Taxonomy. This study provides a nuanced understanding of how EFL students critically engage and evaluate AI-generated content through triangulating data from student questionnaires, classroom observations, and teacher interviews.

Szmyd and Mitera (2024) analyzed the impact of modern technologies on the development of critical thinking and problem-solving skills in higher education. The study acknowledged both the opportunities and challenges associated with AI integration. Additionally, the researchers administered an online questionnaire survey to gain insights into learners' perspectives on the use of AI and assess their levels of critical thinking and problem-solving competencies. Furthermore, the study examined how AI fostered creative thinking and analytical abilities, adaptation to individuals' needs, and potential risks. The findings revealed that students recognized the effectiveness of AI in supporting information analysis and argument construction; however, 83% noted that overreliance on AI could weaken their ability to think independently and make reasoned decisions. Students also highlighted AI's ability to

evaluate information, but emphasized that it could not replace traditional teaching methods, suggesting strategies to balance the use of AI while supporting autonomous thinking.

While Szmyd and Mitera (2024) address the rising interest in AI's role in enhancing critical thinking and problem-solving skills, their study adopts a broad survey-based approach without implementing any systematic framework. Their focus is on how students perceive the integration of AI technologies and the extent to which these technologies support or hinder creative thinking and analytical skills. Conversely, the present study investigates the impact of AI-generated content on various levels of critical thinking among EFL learners, using Bloom's taxonomy as a structured theoretical model to measure how students critically engage with AI solutions across all six cognitive levels. Unlike Szmyd and Mitera's single-method survey approach, the current research employs a mixed-methods design involving questionnaires, classroom observations, and semi-structured interviews. This methodological combination strengthens the validity of the findings and offers a deeper pedagogical understanding of the EFL context.

Bianchi (2024) explored methods for integrating artificial intelligence (AI) into the educational system to promote critical thinking. The study highlighted both potential benefits and ethical concerns, aiming to enhance traditional teaching methods. Additionally, it discussed AI's capacity to facilitate personalized learning, deliver real-time feedback, and automate administrative tasks, which helped educators determine learners' strengths and constraints and offer targeted educational instructions while encouraging deeper comprehension of complex ideas. However, the researcher drew attention to critical concerns such as data privacy, algorithmic bias, and overdependence on AI applications. To overcome these challenges, Bianchi proposed a balanced approach that combines AI capabilities while preserving human intelligence and creativity. Key strategies discussed included AI-driven educational platforms that tailor lessons to individuals' needs and preferences, and using AI to support collaborative learning. The paper emphasized the necessity for training teachers to use AI proficiently and preparing learners to critically engage with AI technologies and create more engaging, inclusive, and effective learning environments that prepare learners for the demands of the modern world.

Although Bianchi (2024) presents valuable strategies for leveraging AI technologies in educational settings, her exploration focuses mainly on theoretical perspectives. The study highlights the positive implications of AI tools, including personalized learning, automated feedback, and supporting collaborative learning. Along with some ethical concerns, including overreliance on AI technology, the paper does not incorporate any empirical framework to

collect data, limiting the scope to general implications. In contrast, the present research adopts a mixed-methods empirical design to explore how AI-generated content influences EFL learners' critical thinking skills across all levels of Bloom's Taxonomy. The study combines students' questionnaires, in-class observation, and teachers' interviews to offer valuable insight that enriches our understanding of how EFL learners critically interact with AI technologies in authentic learning contexts.

1. Conclusion

This chapter sheds light on relevant literature related to this thesis. First, we have explored the definition of artificial intelligence and its multidisciplinary nature, then we delved into its integration into education, narrowing the scope to the EFL setting, followed by the discussion of relevant AI technologies such as Natural Language Processing, Machine Learning, and generative AI tools like ChatGPT in language learning. Later on, the chapter presented the core concept of critical thinking and its significant role, especially within EFL learning, and established Bloom's Taxonomy as a theoretical foundation for the study. Last but not least, the chapter reviewed literature that investigated the influence of AI-generated content and AI-powered technologies on the development of students' critical thinking skills, pointing out its potential benefits, drawbacks, and ethical concerns. In conclusion, this chapter has reflected how prior studies guided and improved the current investigation

Chapter Two:

Research Methodology and Design- Data Analysis and Interpretation

2.1 Introduction

The present study aims to explore the impact of AI-generated content on the critical thinking skills of M1 didactics learners. The first chapter addresses the increasing dependence on AI tools such as ChatGPT, highlighting potential risks related to their influence on different cognitive skills across all levels of Bloom's taxonomy.

This chapter assesses the extent of learners' cognitive progression and whether the students demonstrate independent thinking when using AI or rely on it passively. It also examines EFL teachers' perceptions concerning the integration of AI into educational settings, highlighting their concern regarding students' analytical abilities.

The analysis starts by outlining the research design, data collection instruments, participants, and analytical procedures that guided the investigation.

2.2 Research Methods

In order to explore the impact of AI-generated content on Master One (M1) EFL learners, a mixed-method approach has been implemented. This approach involves combining both quantitative and qualitative data collection, including an online semi-structured questionnaire administered to a group of the target population, classroom observation with the same sample population, and semi-structured interviews conducted with a sample of teachers selected based on specific criteria. Through the triangulation method, the researcher was able to obtain valuable insights and varied data regarding how M1 EFL students engage and evaluate AI-generated content in their academic studies, as well as how this technology influences their critical thinking abilities.

2.3 Participants

The heart of any research is the participants who bring their theoretical experience and transform it into practice. The study was conducted at the University of Saida, where Master's EFL students are divided into two main specialties: Didactics and Literature/Civilization. The study was on M1 Didactics learners as a target population to test the research hypothesis and answer research questions. The sample population was selected purposively. The M1 didactics learners were chosen because of their familiarity with AI-generated content and their use of generative tools such as ChatGPT in their academic work. Their experience and engagement with such tools make them well-positioned to reflect on how AI impacts their studies, unlike First-, second, and third-year LMD students, who may be familiar with AI tools; however, they are generally not aware of how these tools affect their cognitive skills.

Furthermore, a sample of EFL teachers was also included in the study based on their experience in teaching M1 didactics students and their awareness of the increased use of AI applications in classrooms.

2.4 Research Instruments

Despite the participants' key role in any research, they can do nothing without the support of well-designed research instruments, which are the heart of any study. By applying these tools, researchers can achieve reliable and accurate findings, leading them to draw well-formed conclusions. To guarantee an in-depth exploration of the phenomenon. The researcher employed three methods of data collection: namely, a questionnaire, a classroom observation, and an interview. To provide valuable insights and a comprehensive understanding of how EFL learners critically engage with AI-generated content. The researcher collected data from both teachers and students using triangulation to successfully fulfill the research objectives.

2.4.1 Questionnaire

The researcher relied on a questionnaire as a primary tool for collecting data due to its ability to efficiently gather a large amount of information from the target population.

2.4.1.1 Description of the Questionnaire

The researcher utilized a semi-structured questionnaire, given its potential to provide more comprehensive data. The questionnaire consisted of items, each aligned with a different cognitive domain of Bloom's revised taxonomy: remembering, understanding, applying, analyzing, evaluating, and creating. Additionally, since the questionnaire was administered online, the researcher began with a brief introduction to the topic and explained the main aim of the study to ensure the students understood the questionnaire and to encourage natural and honest responses. The researcher also emphasized anonymity and confidentiality.

Moreover, the first section focused on gender distribution and general AI usage. It included questions about participants' gender, frequency of AI tool use, and the specific tools they commonly engage with (e.g., ChatGPT, Grammarly, QuillBot).

The following section explored cognitive levels using a series of closed-ended Likert scale (e.g., Never, Rarely, Sometimes, Often, Always) to determine how learners interact with AI-generated content. These questions assessed how often AI tools were used to recall facts, understand complex topics, apply knowledge in new contexts, analyze, evaluate information, and support creative thinking.

Furthermore, the questionnaire did not only focus on gathering quantitative data, but also qualitative data through using open-ended questions, which allow students to reflect on their experience, perception, and provide insight into how they perceive the role of AI in their

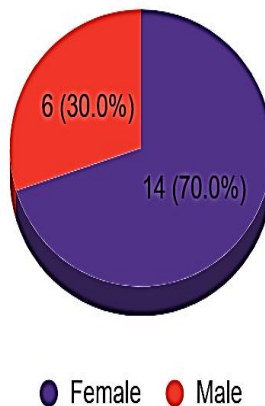
academic thinking and autonomy. This combination enables the researcher to collect a wide range of data while preserving authenticity and flexibility in participant responses.

2.4.1.2 Questionnaire Analysis

The proper analysis of research results is a critical step in bridging the gap between theory and practice, as it allows the researcher to draw meaningful conclusions. In this respect, the analysis section plays a key role in determining whether research hypotheses are supported or rejected. As previously explained, the study employed a series of questions that the researcher analyzed to gain a deeper understanding of the subject under study.

2.4.1.2.1 Section One: Gender Distribution and General AI Usage

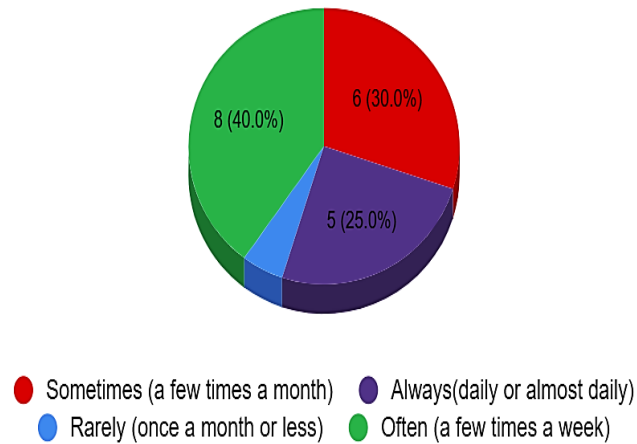
The first section presents an overview of the participants' gender and their general patterns regarding AI usage for academic purposes.



Pie Chart 01: Gender Distribution of Student Participants

According to the pie chart, the sample selected consisted of 20 Master One Didactics learners, of whom 70%, that is, 14, were female, and 30%, the remaining 6, were male students. This gender distribution offers clearer perspectives on how M1 learners engage with AI-generated content in academic contexts.

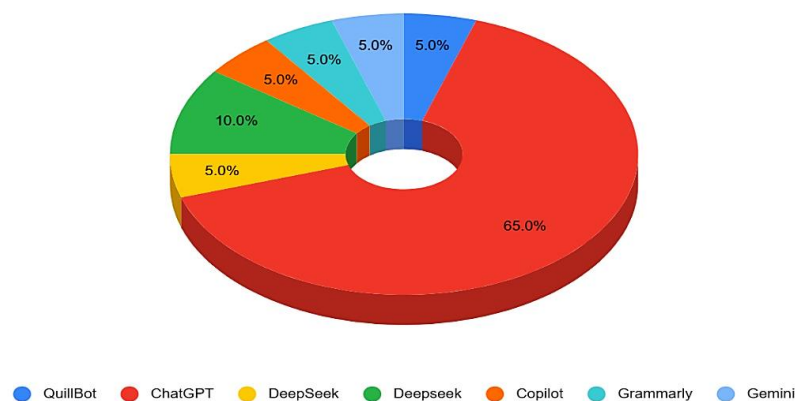
Q1: How often do you use AI-generated content for academic purposes?



Pie Chart 02: Frequency of AI-generated Content Usage Among Learners

The pie chart illustrates that the vast majority of students reported using AI-generated content for academic purposes on a regular basis. A ratio of 8 out of 20 participants indicated that they use generated content sometimes. 6 students, that is, 30% of the sample, answered with daily or almost daily. A percentage of 25% stated that they use AI often, which means a few times a week. While 1 respondent reported rare use, none of the learners indicated that they never use AI-generated content.

Q2: Which AI tools do you use most frequently?



Pie chart 03: Most Frequently Used AI Tools

The researcher presented various AI platforms that the students may employ in their academic practices. As per the data revealed in the pie chart, it was noticed that ChatGPT is the most widely used AI tool among participants. A substantial proportion of 65% of the learners

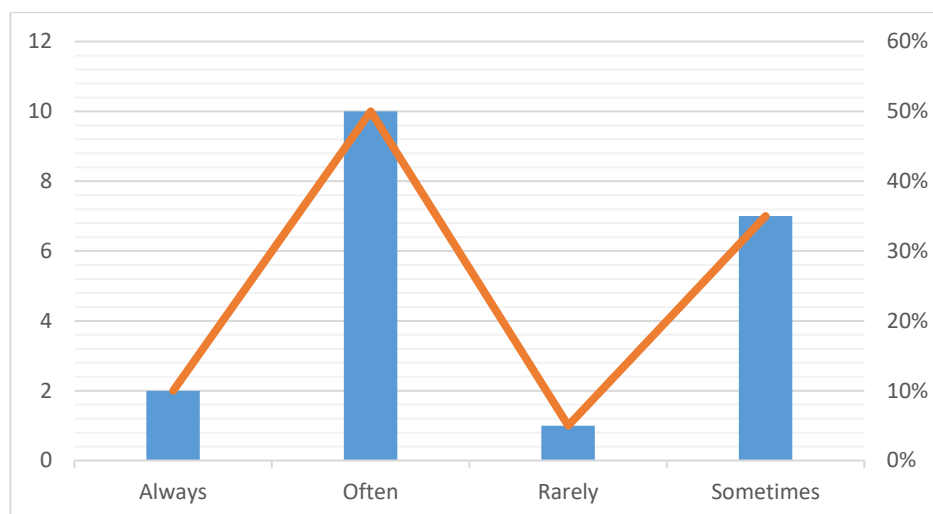
reported relying on ChatGPT for their academic tasks, making it the most preferred tool compared to others. Grammarly followed with 10% of respondents, indicating its use for language purposes. The remaining tools, namely QuillBot, DeepSeek, Copilot, and Gemini, were each used by only 5% of students, demonstrating that these applications are seldom utilized for academic activities.

2.4.1.2.2 Section Two: Bloom's Taxonomy Levels

This section presents the analysis of learners' responses regarding the impact of AI-generated content on their critical thinking skills according to revised Bloom's Taxonomy. The analysis begins with the lower-order cognitive level of Remembering, and progresses to the higher cognitive level of Creating.

2.4.1.2.2.1 Remembering

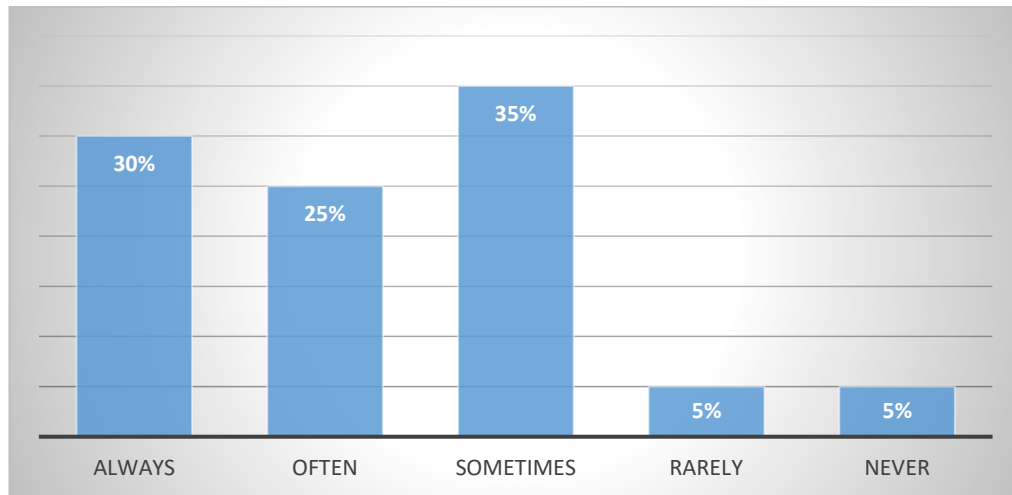
Q1: How often do AI-generated responses help you recall important academic concepts?



Bar graph 01: Frequency of AI support in Recalling Academic Information

According to the bar graph, the majority of learners reported the usefulness of AI-generated content at the remembering level. 10 out of 20 of the participants, that is 50%, stated that AI tools sometimes help them recall academic concepts. Furthermore, 25%, representing a quarter of the sample, indicated that this happened often, whereas only 1 student selected always. Notably, 4 students stated that AI tools rarely assist them with information recall.

Q2: Do AI-generated summaries help you remember complex information better than traditional study methods?

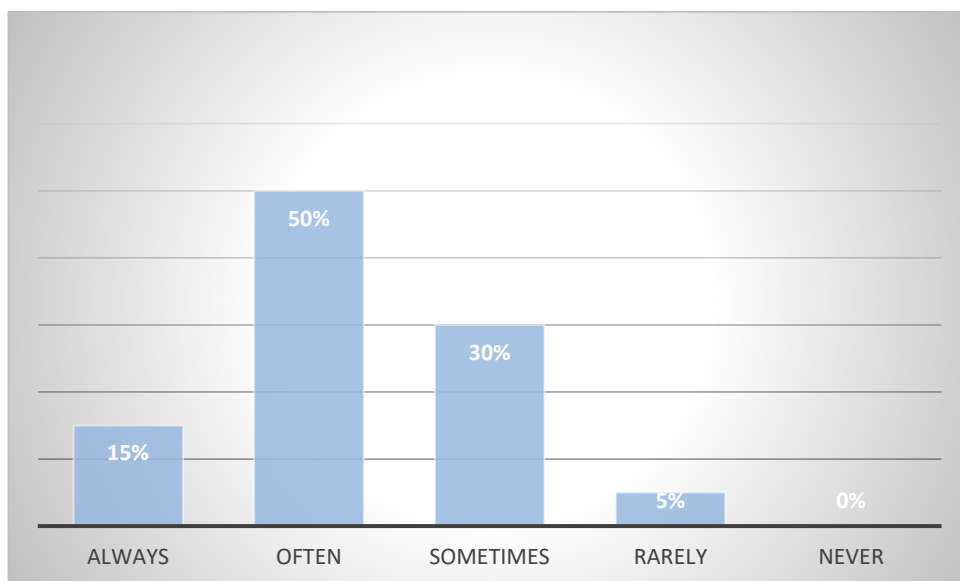


Bar graph 02: Students' Perceptions of the Effectiveness of AI-Generated Summaries Compared to Traditional Study Methods

The bar graph indicates that students exhibited a strong and positive perception toward AI-generated summaries in retaining complex information compared to traditional methods. 7 participants, that is 35%, answered with sometimes. Additionally, 30% of students selected always, while 25% responded with often. Conversely, a minority of learners, 2 participants, that is 10%, expressed limited benefits from AI-generated content, with one selecting rarely and the other selecting never.

2.4.1.2.2 Understanding

Q1: How often can you clearly explain AI-generated content in your own words?

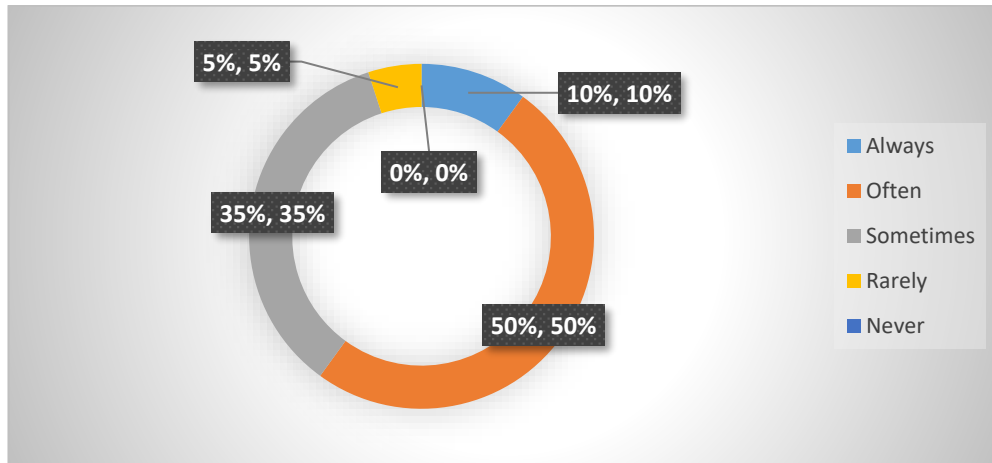


Bar graph 03: Student Comprehension of AI-Generated Content

The results, presented in the figure, indicate that the vast majority of students can understand and explain AI-generated information in their own style. 10 participants, that is, half of the

sample 50% selected often, while 30% responded with sometimes. Furthermore, 3 students, accounting for 15% indicated always demonstrating a high level of confidence in their comprehension. Conversely, it is worth noting that only a single student reported a rare ability to explain AI-generated solutions independently, which suggests that difficulties in understanding such content are limited among participants.

Q2: How often do AI-generated responses help you understand complex topics more easily?

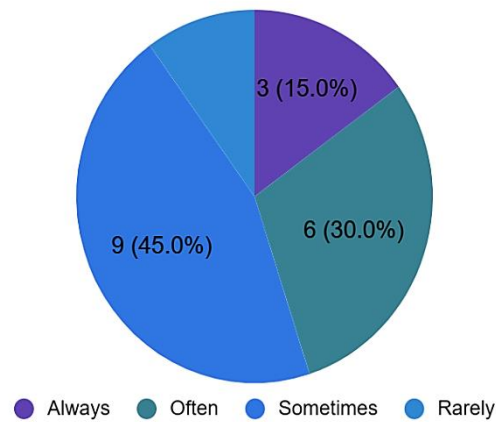


Pie chart 04: Students' Perceptions of how AI-Generated Responses Support Comprehension of Complex Topics

In this question, a significant portion of participants, 10 out of 20, that is 50%, reported that AI tools often assist them in facilitating complex content. However, 35% of the informants responded with sometimes, indicating that AI can be helpful but not always effective. Additionally, very few participants selected always revealing AI-generated content as a reliable source for simplifying challenging topics. On the other hand, only 1 learner responded with rarely demonstrating a low level of reliance on AI support.

2.4.1.2.2.3 Applying

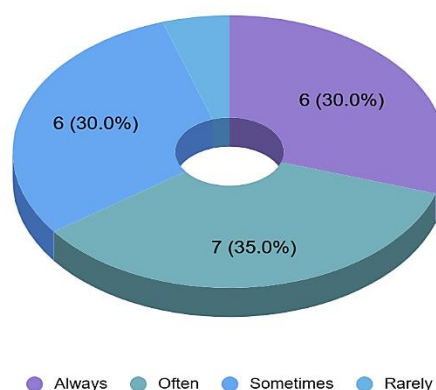
Q1: How often do you use AI-generated responses to help with academic essays and reports?



Pie Chart 05: Students' Use of AI-Generated Responses in Academic Essays and Reports

The pie chart reveals that a significant number of students engage with AI tools to improve their academic writing. Approximately 45%, that is, 9 out of 20 questioned participants, responded with sometimes, indicating consistent use of AI-generated content in their academic tasks. Moreover, 30% selected often, and a percentage of 15% claimed always, reflecting frequent use of AI tools. Notably, just 2 students rarely use AI for academic tasks, and none selected never.

Q2: How often does AI-generated content help you solve academic problems?

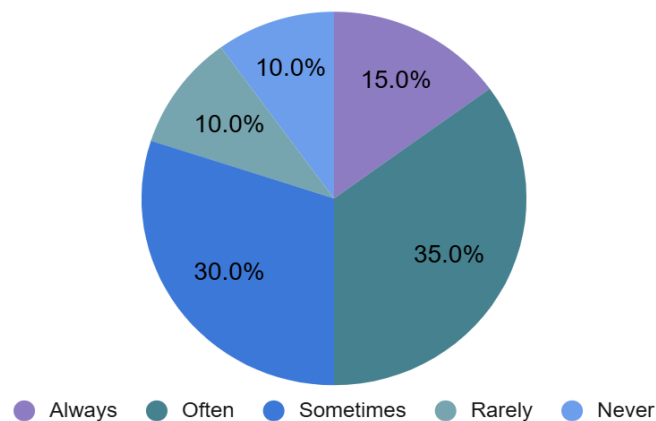


Pie chart 06: Students' Use of AI-Generated Content to Solve Academic Problems

According to the results, most participants view AI-generated content as a practical solution for managing problems and applying knowledge to solve academic tasks. Specifically, 35% selected often. Furthermore, 30% of them responded with always, and an equal number, 30%, chose sometimes. A minimal number of learners reported rare engagement, with only 5%, selected rarely, and no participant selected never, revealing that a large number of the sample use AI tools to address learning challenges.

2.4.1.2.2.4 Analyzing

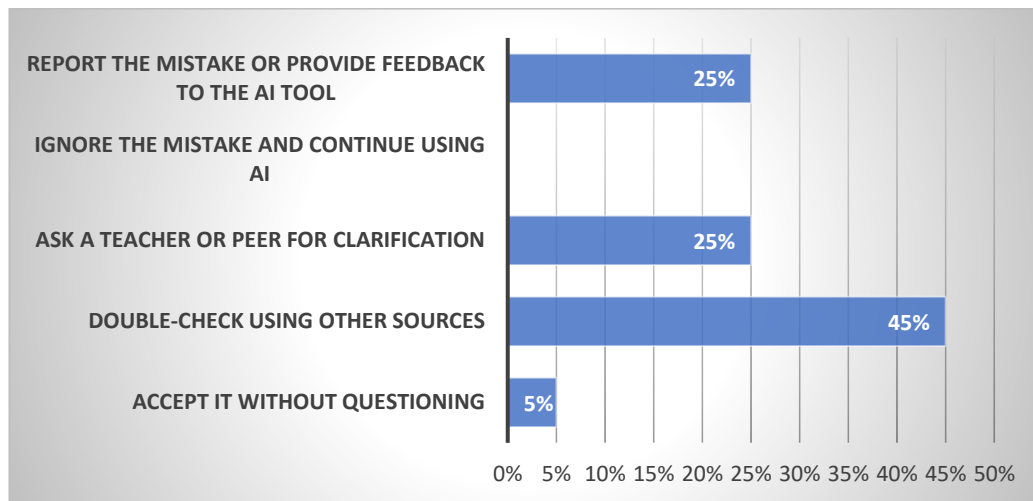
Q1: How often do you verify the accuracy of AI-generated responses?



Pie chart 07: Students' Frequency of Verifying the Accuracy of AI-Generated Responses

This question holds great significance as it aims to determine whether learners use AI-generated content responses and critically analyze and verify the accuracy of the information they obtain. As the pie chart shows, a notable portion of participants, that is, 35 %, reported that they often check the reliability of AI-generated content. In addition, 30% of the informants chose that sometimes they do so. 15% of learners emphasized that they always check generated responses before using them. Conversely, 10% of participants responded with rarely, and another 10% selected never, exhibiting over-reliance on AI solutions without evaluation.

Q2: If you find errors in AI-generated content, how do you typically respond?



Bar graph 04: Reported Student Reactions to Inaccuracies in AI-Generated Responses

To understand learners' analytical abilities, the researcher asked participants how they typically respond when they find errors in AI responses. The figure reveals that 45% of students reported that they double-check using other resources, thus playing an active part in assessing the content accuracy. Additionally, 25% of the informants suggested that they would ask the teacher or peers for clarification or report the mistake, or provide feedback to AI tools reflecting clear efforts and a sense of responsibility to verify misleading information. In contrast, only 01 participant admitted to accepting the information without questioning, while no participant opted to ignore the mistake and continue to use AI.

Q3: What steps do you take to check the credibility of AI-generated responses?

The researcher included open-ended questions to examine learners' analytical engagement and the steps they take to check the credibility of AI-generated responses. The results reveal diverse strategies that learners employ. Many participants demonstrated that they cross-check the information using Google or search for articles to validate the response. Additionally, others suggested that they ask AI to provide the original source of the information to verify its reliability. Furthermore, several students emphasized the importance of trustworthy academic websites. while a minority of respondents adjusted the way they use AI tools. For instance, one student stated: *"I customize AI tools to give me the sources of the responses, then check the source and seek websites to verify credibility."* This reveals students' awareness of the need to critically analyze AI-generated content.

2.4.1.2.2.5 Evaluating

Q1: How confident are you in assessing the reliability of AI-generated responses?

Table 01: Students' Confidence in Evaluating the Reliability of AI-Generated Responses

Confidence Level	Percentage	Number of students
Not confident at all	5%	1
Slightly confident	50%	10
Moderately confident	40%	8
Completely confident	5%	1

In this question, students reported their level of confidence in evaluating the reliability of AI-generated responses. Half of the students, that is 50%, stated they were slightly confident. Additionally, 40% described themselves as moderately confident; notably, only a limited portion of the sample held a strong position, with 5% indicating complete confidence, whereas another 5% reported being not confident at all.

Q2: Compare AI-generated explanations with your teacher's explanations. Which do you find more useful and why?

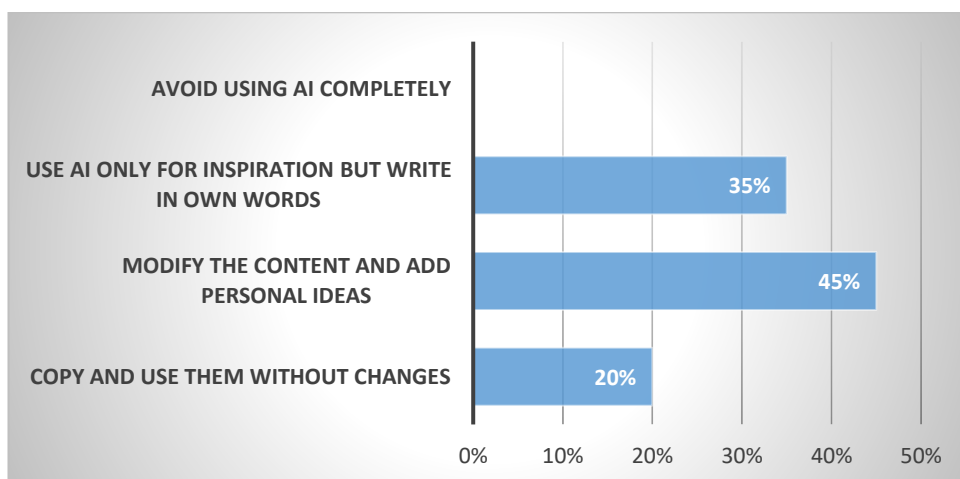
Students were asked to compare the AI-generated explanation with their teacher's explanation. The vast majority of learners preferred instructor explanations due to face-to-face interaction, personalized support, and instant feedback. For example, one student claimed, *"My teacher's explanation is better because he simplifies the lesson using a layout on the board,"* while others stated, *"Teachers because they give more details and understand students best."* In contrast, a few participants expressed their preference for AI-generated explanations, emphasizing its adaptability and flexibility. One informant reported, *"The AI-generated explanations are better and more useful since it can simplify the information for us to acquire new knowledge."* Another argued, *"AI gives easy and summarized explanations."* Several participants adopted a more balanced approach, suggesting that AI and teacher output can complement each other. This diverse perspective demonstrates students' ability to evaluate the strengths and weaknesses of each source.

Q3: Do you believe AI-generated content enhances your critical thinking skills? Why or why not?

This question addresses how AI-generated content influences learners' critical thinking. The responses revealed nuanced viewpoints. Several students emphasized that AI supports independent thinking by providing different perspectives on various topics and promoting deeper understanding. One participant noted, *“It helps me question every detail and improve my ability to argue,”* while another student highlighted, *“AI gives more ideas and new terms.”* Some informants stressed the necessity of being actively engaged when using AI tools. On the other hand, the majority of students expressed concern that AI may hinder critical thinking. These learners reported *becoming “lazy and over-reliant,”* describing AI as a shortcut to avoid their academic tasks. One learner expressed, *“I hate the fact that I rush to AI whenever I have a minimal problem,”* demonstrating the risk of overdependence on such technology.

2.4.1.2.2.6 Creating

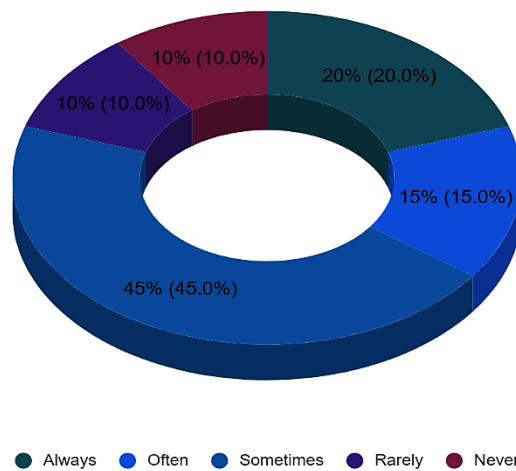
Q1: When AI provides answers, how do you use them?



Bar graph 05: Learners' Strategies for Using AI-Generated Responses

This question assesses learners in terms of creating and generating their own content. As the figure illustrates, nearly half of the informants, that is 45%, reported modifying AI-generated content and adding their personal ideas, demonstrating active engagement when using AI, which reflects a higher level of thinking. Additionally, 35% claimed that they adopt AI only as a source of inspiration and write in their own words. However, only 20% of students were deemed to copy and use AI-generated responses without any changes, and none of the participants reported completely avoiding AI use.

Q1: Have you used AI to generate ideas for classroom activities or lesson plans?



Pie Chart 08: Student Use of AI for Designing Educational Tasks

According to the pie chart, the majority of students indicated occasional to frequent use of AI to generate ideas for classroom activities or lesson plans, specifically, 45% of respondents selected sometimes. Moreover, 15% chose often, while 20% selected always, reflecting that a noticeable number of participants rely on AI when preparing academic activities. This demonstrates potential concerns of overdependence on these tools. In addition, only a small number of the sample, that is, 10%, stated rarely, followed by another 10% of participants who selected never for this purpose.

2.4.1.3 Results Interpretation

The collected data from the questionnaire administered to Master One EFL students provide valuable insights into the frequency of AI usage and its impact on critical thinking development. Although answers vary from one participant to another, the majority of students reported their regular exposure to AI-generated content in their academic work. A notable share of the respondents stated that they use generative AI tools such as ChatGPT for generating ideas for writing assignments and problem-solving. This indicates that AI becomes a significant tool that facilitates the learning process, even though the level of dependence and active engagement differs among students.

Moving on to the main focus of the study, the development of independent thinking, the analysis reveals that the participants engaged with AI-generated content across all six levels of Bloom's taxonomy, yet they varied in their depth of interaction. At a lower level of cognitive thinking, such as remembering and understanding, learners reported AI to be useful in recalling academic facts and facilitating complex topics. In the applying stage, most learners reported

frequent use of AI tools to complete their academic tasks, which suggests a tendency to depend on AI assistance rather than relying solely on their own problem-solving abilities. Moreover, when it comes to the analyzing phase, participants exhibited nuanced perspectives, ranging from playing an active role in checking and verifying the accuracy of information to acting as passive recipients of knowledge. However, as the cognitive demand escalated, particularly at the level of evaluating and creating, students appeared more challenged in applying critical thinking consistently. This challenge may be attributed to the way learners engage with AI-generated content. While some learners expressed their capacity to modify, critique, and personalize AI solutions, others showed signs of overdependence on AI-ready-made responses without critical evaluation. Furthermore, certain learners preferred to adjust or draw inspiration from AI output, yet the analytical depth remains unclear, highlighting an issue regarding the extent to which these modifications reflect critical engagement or simply surface-level thinking.

Lastly, the findings overall reveal that despite the widespread use of AI and learners' positive reception towards this technology. Its impact on critical thinking skills mainly depends on how students choose to engage with it. As a double-edged sword, AI can either serve as a tool to assist, help students reflect and develop their own thinking, or it can become a shortcut that hinders deep cognitive processing and encourages overreliance.

2.4.2 Classroom Observation

Classroom observation plays a significant role in research. Its value as a research tool is widely acknowledged and unquestionable. This method allows researchers to obtain direct data from real-world settings and analyze classroom interactions and behavior in a way that other methods cannot provide.

2.4.2.1 Description of classroom observation

The researcher conducted a non-participant observation with M1 EFL students of didactics, attending seven sessions. Three of which were lectures, and the remaining four sessions were practice. During these sessions, the researcher wrote down every single noteworthy information in a notebook to capture how students engage with AI-generated content in an authentic academic environment.

2.4.2.2 The purpose of use

The main purpose of the observation was to gain a deeper understanding of how M1 EFL learners interact with AI-generated content and to identify how they demonstrate critical thinking through their questions and responses. The observation was guided by Bloom's revised taxonomy and focused on indicators such as interaction, comprehension, application, and basic analysis, as these most observable signs of AI use.

2.4.3 Interview

The researcher employed an interview as the last research instrument to gain valuable insights into the teachers' perspective on the use of AI-generated content and its impacts on EFL learners' cognitive skills.

2.4.3.1 Description of the interview

The researcher conducted a semi-structured interview consisting of open-ended questions to encourage EFL teachers to provide detailed responses rather than just yes or no answers. The main aim of the interview was to explore how AI-generated content, particularly tools like ChatGPT, influences M1 EFL students, also to understand how teachers interpret its integration in relation to academic tasks and cognitive development. As we mentioned earlier, the interview focused more on teachers' perspectives compared to the questionnaire.

The interview included two sections, each containing questions related to a specific aspect of the research focus. The first section examined AI usage and the types of tasks students generally employ AI for. Moreover, the second section concentrated on the perceived impact of AI-generated content on learners' critical thinking skills and whether teachers encourage or discourage the integration of such tools in academic settings.

2.4.3.1.1 Section one: AI usage

Q1: How often do you observe your students using AI tools like ChatGPT?

In response to this question, all the teachers did not hesitate to directly state that students frequently use AI and emphasized that learners rely heavily on ChatGPT without even thinking. All the participants noted that when students are asked questions or given an activity, they automatically check AI answers. One teacher reported, *"Students do not use their brains."*

Q2: What are the main tasks or activities for which they use AI?

Regarding this matter, all the teachers agreed that the majority of students rely on ChatGPT for productive tasks such as writing assignments like essays, participating in oral communication classes, or performing role plays. This reliance stems from their lack of linguistic and cultural background, which leads them to consult ChatGPT to find ready-made content or the right answers.

Q3: Do you encourage or discourage AI use in the classroom? Why?

Answering this question (T1) stated that it depends on the situation and the level of the learners. She/he highlighted that for the first-year license students, AI use is not permitted, as they lack the awareness and the skills on how to use such tools properly. Additionally,

(T2) expressed an extreme position of disagreement, even advocating for banning AI adoption in education. While (T3) claimed that he/she allow students to use AI, with careful attention to promote creativity and independent thinking.

2.4.3.1.2 Section two: AI's impact on critical thinking

Q1: In your opinion, does AI support critical thinking, or does it encourage passive learning?

On this point, (T1) noted that it depends on learners' language level and how they utilize AI tools. Some learners use them tentatively and consciously, while others treat them as a shortcut, because they do not have sufficient knowledge to distinguish between reliable and unreliable content. Conversely, (T2) indicated that AI promotes passivity and laziness, emphasizing that the human brain is designed to think and analyze, relying solely on ready-made content weakens that capacity. Furthermore, (T3) acknowledged that AI has the potential to support critical thinking if used correctly, describing it as “*miracles*”. However, he/ she added that in our context. AI does not foster independent thinking, as many learners are irresponsible and unwilling to make efforts to learn.

Q2: Do students typically analyze and question AI-generated responses, or do they accept them without evaluation?

All participants confirmed that most students do not evaluate AI-generated material. They do not question its validity or accuracy; instead, they tend to copy and paste blindly, simply to avoid the teacher's involvement and ultimately to obtain a grade. One teacher reported, “*They take responses for granted; they do not even analyze them.*”

Q3: Have you noticed signs of students becoming overly dependent on AI? if so, in what ways?

Regarding this question. The three participants confidently stated that the majority of students exclusively rely on AI for nearly everything they undertake. (T2) claimed that he/she no longer assigns presentations or homework because learners consistently submit ready-made work without even reviewing it. Meanwhile, (T3) emphasized that AI can be helpful as a supplementary research tool in preparing the lectures. However, he/she stressed that the problem lies in learners bringing answers without any further analysis or evaluation.

2.4.3.2 Results Interpretation

The data collected from three EFL teachers was significant in addressing the major concerns of the present study, particularly the influence of AI-generated content on learners' critical thinking skills. The results revealed that despite the AI tools becoming more prevalent in academia, their effectiveness mainly depends on how learners engage with such technology.

All three teachers confirmed the frequent use of AI tools among M1 didactics learners, emphasizing their excessive reliance on ChatGPT, especially for productive academic tasks

such as writing assignments and oral communication classes. This aligns with the findings of the questionnaire. Where a considerable number of students reported daily or weekly use of AI tools for related activities. However, the teachers raised concerns that several learners use AI passively, copying content without further reflection or verification. Thereby hindering the development of independent thinking rather than supporting it.

Notably, while (T1) permitted the use of AI cautiously (T2) rejected its integration completely, claiming that it contributes to laziness and diminishes analytical abilities. Conversely, (T3) encouraged its use under proper supervision, as long as students apply critical thinking. These perspectives overlap with students' own reports in the questionnaire, which showed that although some learners indicated deliberate efforts to evaluate AI responses or adjust content, many tended to depend on ready-made output.

Furthermore, all interviewees agreed that students rarely evaluate or question AI-generated responses, prioritizing convenience and ease. This behavior reflects the superficiality and passivity of learners, which undermines independent thinking and critical engagement.

Ultimately, there is no doubt that AI generative tools can facilitate academic success when used appropriately. However, the results from both the teachers' interviews and the students' questionnaire responses indicated that heavy reliance on them without deliberate reflection may hinder the development of essential skills that education aims to promote.

2.5 General Interpretation of Results

In order to explore the impact of AI-generated content on the critical thinking skills of EFL learners, the researcher employed two primary research tools, namely a questionnaire and an interview, to collect data from participants (The purpose of using the observation has already been highlighted). The questionnaire was designed to assess the extent of learners' exposure to AI-generated content and how it influences their cognitive levels across Bloom's Taxonomy.

The findings indicated that the vast majority of students frequently interact with AI generative tools, particularly ChatGPT, for various academic reasons, mainly in productive tasks. The pervasive integration demonstrates learners' familiarity with AI tools; however, it raises concerns about how they engage with them critically. Several students highlighted that AI assists with lower-order thinking, such as remembering, understanding, and applying, but a minority reported engagement when it comes to progressive levels of thinking, analyzing, evaluating, and creating. This reflects challenges and a potential decline in learners' independent thinking.

The interview reinforced this phenomenon. All three teachers confirmed the frequency of AI utilization in academic settings and expressed concern about its excessive use and

overdependence, highlighting that students tend to be passive recipients of information. This aligns with Mehdaoui and Bessaid (2024), who found that many Algerian EFL learners perceive ChatGPT as a shortcut to solve their academic activities, reducing their level of creativity, language development, independent thinking, and academic integrity. While some teachers expressed cautious support, others revealed their skepticism, raising concerns about plagiarism and students' autonomy. Similarly, Drid et al. (2024) stressed that overreliance on Large Language Models (LLMs) can eventually reduce learners' active engagement and critical thinking processes, as students tend to depend on AI-generated content rather than constructing and developing their own ideas. This intensifying reliance on AI-powered tools underscores the need to implement clear policies and guidelines that balance their use to maintain learners' active involvement and independent reasoning.

In light of these insights, the hypothesis that excessive reliance on AI-generated content may hinder students' ability to engage in higher-order critical thinking is confirmed. This outcome directly addresses the research question concerning the extent to which AI-generated content affects the students' ability to think critically. The data obtained from both teachers and students indicate that learners are often unaware of the potential drawbacks of using AI as a substitute for their mental efforts. While AI applications can support lower-order cognitive tasks, their misuse poses a threat to the development of higher-order cognitive processes, including analysis, evaluation, and creation.

2.6 Conclusion

This chapter dealt with the practical aspects of the study, providing detailed information about the research design and methodology employed to explore the impact of AI-generated content on the critical thinking skills of Master One EFL students. It described the research methods, instruments, procedures, and characteristics of the sample population. To obtain a valuable understanding of how learners critically engage with AI tools during their academic work, it has been concluded that M1 didactics learners frequently use AI. However, the pervasive adoption appears to be driven more by convenience rather than a strategic approach to learning. Many students turn to AI as an academic solution when activities become more challenging. This tendency helps them achieve their academic goals with less effort, but it comes at the cost of their intellectual growth.

Chapter Three:

Suggestions and Recommendations

3.1 Introduction

Based on the research findings presented in the previous chapters, it has been established that the integration of AI-generated content in a particular ChatGPT has become a widely used tool among learners. Although such technology can support academic tasks and offer multiple benefits. The findings also indicated that excessive use and overreliance can negatively impact students' ability to engage in higher-order thinking.

This chapter, therefore, is devoted to providing practical suggestions and recommendations to help mitigate the drawbacks of AI and promote more reflective and critical use of AI tools in education.

3.2 Recommendations

The findings of this study demand the need to reconsider pedagogical strategies, assignment design, and evaluation practices in EFL didactics contexts. To address this, we recommend the structured application of Gonsalves' (2025) '20-80 model as a scaffolded approach for responsible AI integration, requiring students to indicate and reflect on AI generated solutions which should not exceed 20% of their work while ensuring 80% production represent their own original content, thereby maintaining a healthy balance between technological assistance and autonomous thinking.

Furthermore, the students should keep a reflective learning journal in which they assess how AI content influenced their understanding, whether they accepted or questioned its suggestions, and how it shaped their final output. Moreover, to directly reduce the potential risks of plagiarism and superficial engagement that AI tools magnify, oral presentations and defenses could be incorporated into AI-assisted assignments. This would allow learners to verbally explain and justify their answers to ensure the depth of their understanding. These strategies aim not to ban AI but promote reflective use that enhances rather than replaces intellectual engagement, while preserving the development of higher-order cognitive thinking.

3.3 For Institutional Policies

At the institutional level, the growing presence of AI in academic settings underscores the need for a structured and transparent AI policy. Universities and departments should consider implementing mandatory AI literacy programs for both learners and faculty. These programs should cover critical knowledge domains such as recognizing bias in generative responses, practicing academically rigorous citation of AI-generated content, and clearly defining ethical boundaries for AI use. Such academic rules should be adapted to the specific needs and values of each field of study.

Along with this, instructors should be provided with professional development opportunities that enable them to design AI-aware assessments, such as incorporating elements like personalized datasets or real-time performance tasks. Additionally, to effectively detect AI-generated content, advanced tools like Turnitin's AI detection features should be used. Teachers also need support to gain a deeper understanding of AI's pedagogical potential so they can adapt their instructional teaching methods to foster meaningful and engaging learning experiences in the AI era.

To guide future policymakers, institutions could consider launching pilot studies that compare learning results between students who use AI and those who rely mainly on traditional learning methods. Such an initiative would offer valuable insight to promote ongoing improvement in AI adoption across the EFL context and other academic disciplines.

3.4 Implications for Theory and Practice

The study highlights three significant implications for theory and practice regarding the integration of AI in the EFL setting. Firstly, it indicates the effectiveness of Bloom's Taxonomy as a systematic and evaluative framework to assess how learners engage critically when using AI-generated content. The findings reinforce that AI tools like ChatGPT are more likely to enhance lower-order cognitive thinking, like remembering and understanding, and to a limited extent, applying; however, their contribution when it comes to higher-order thinking, as tasks that require deeper cognitive efforts, such as analyzing, evaluating, and creating, is limited, revealing imbalance in the impact of AI across the taxonomy.

Secondly, the research identifies what may be described as an emerging “AI-critical thinking gap.” This paradox reflects the tendency of the learners to over-depend on AI when encountering challenging tasks rather than using these tools as a supplementary support. As the difficulty of the task increases. Students' autonomy tends to decrease, creating a gap in which AI usage diminishes crucial aspects of critical thinking. Overcoming these issues requires deliberate pedagogical interventions that guide students and encourage critical engagement. Thirdly, the interview data demonstrated diverse perspectives concerning AI implementation, ranging from cautious approval to complete rejection. This variation emphasizes that teacher attitudes and classroom regulations are significant in either promoting or suppressing AI use.

Taken as a whole, these implications suggest the need for more thoughtful and practical approaches to AI in education. That transcends simply acceptance or rejection. But rather, the focus should be on developing effective strategies to use AI responsibly and ethically, and most importantly, supporting the development of higher-order thinking among EFL learners. These

results offer insight for educators and institutions looking to embed AI in education successfully.

3.5 Directions for Future Research

While the research shed light on significant aspects of AI use and critical thinking in EFL education. It also unveils many areas that require further investigation. Longitudinal research would be valuable to explore how learners' cognitive skills are processed when AI tools are utilized regularly over time. Such studies could determine whether AI assistance turns into reliance or fosters metacognitive awareness. Additionally, cross-cultural studies are also necessary to compare how students from different academic and cultural backgrounds interact with AI, specifically in EFL pedagogy

Lastly, designing standardized tools to assess students' engagement while using AI would enhance the reliability of future research. Addressing these research constraints necessitates collaboration across various disciplines to better understand the role of AI in education.

3.6 Conclusion

This chapter offered practical suggestions to manage the widespread use of AI tools in EFL education. Although AI can be a valuable tool to support learning, the data indicate that extensive and uncritical use may compromise students' cognitive development, particularly at higher levels of cognitive thinking. Such a threat constrains the ability of learners to engage meaningfully with educational tasks and develop essential academic skills. Therefore, the proposed strategies in this chapter are recommended to promote balanced use of AI that encourages learners' autonomy, deeper engagement, and cultivates active participation. They also seek to boost learners' initiative and uphold academic honesty.

General Conclusion

Artificial Intelligence (AI) has increasingly become a transformative force in the education sector, offering unprecedented opportunities in various aspects of teaching and learning. The widespread adoption of AI, especially in the EFL context, raises concerns about how students interact with such technology and demonstrate critical thinking. This study was undertaken to explore the impact of AI-generated content, particularly ChatGPT, on Master One Didactic students' cognitive development across the six levels of Bloom's Taxonomy. The research addressed two primary research questions, which are:

- How frequently are students exposed to AI-generated content in their academic activities?
- Can AI-generated content contribute to overreliance and hinder learners' critical thinking skills?

The main research results demonstrated that the majority of participants frequently depend on AI tools, particularly in productive tasks such as writing essays, oral communication, solving academic problems, and generating ideas. The findings also indicated that AI tools provide assistance in supporting lower-order cognitive tasks, such as remembering facts, understanding different topics, and applying knowledge in different contexts; however, learners' engagement lacks depth. Additionally, the data suggests that as the level of cognitive demands increases, particularly at higher-order cognitive thinking levels like analysis, evaluation, and creation, students become more reliant on AI-generated content. This contributes to a notable decrease in independent thinking.

The teachers' interviews further supported these results. Educators emphasized that learners are exposed to AI-generated content excessively without critical reflection. They highlighted concerns about students' overdependence on ready-made content; some teachers allowed its use with careful consideration, while others were completely against its integration, reporting its drawbacks and negative influence on students' analytical abilities.

A review of related literature by the researcher underscored a dearth of previous studies addressing the influence of AI-generated content on learners' critical thinking skills. This research, therefore, provides a valuable contribution to understanding how AI generative tools such as ChatGPT affect learner cognitive engagement. The study paves the way for further research into how AI tools can be leveraged in EFL education while maintaining independent thinking.

General Conclusion

Undertaking research is a challenging task, yet an enriching experience. The novelty of AI and its specific integration into the EFL context presented distinct challenges. Like many other academic works, the current research is not without limitations. Firstly, as mentioned earlier, the field of AI is still an emerging one, and the lack of previous studies directly related to AI-generated content and critical thinking within EFL pedagogy created difficulties for the researcher. The review of literature is an integral part of the thesis, and having limited resources, especially in the Algerian context, made it challenging for the researcher to build a solid foundation.

Another challenge was that during the observation, the researcher noticed a reduced number of students and was informed that the attendance would be even less during the sacred month of Ramadan, with possibly no students present until the end of the month. This forced the researcher to conduct an online questionnaire to gather data. However, only a limited number of students responded, which narrowed the scope of the analysis.

Lastly, it is important to note that the behavior of certain teachers biased the study. One teacher asked the researcher during the observation about the topic being investigated and informed the learners that they were being observed regarding their use of AI. This intervention made the students change their behavior, influencing the authenticity of the data collected.

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Appendices

Appendix A: students' questionnaire

Exploring the Impact of AI-Generated Content on EFL Students' Critical Thinking Skills

This questionnaire explores your experiences with AI-generated content (e.g., ChatGPT) and its impact on critical thinking in EFL learning, focusing on different levels of Bloom's Taxonomy. Specifically, it examines how AI influences your ability to remember, understand, apply, analyze, evaluate, and create information. Your responses will remain confidential and used solely for academic research, with no personal information shared.

1. Section 1: Gender Distribution and General AI Usage

This section focuses on gender distribution and examines how often students engage with AI for academic purposes.

Gender

- Male
- Female

How often do you use AI-generated content for academic purposes?

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

Which AI tools do you use most frequently?

- ☐ ChatGPT
- ☐ Grammarly
- ☐ QuillBot
- ☐ Bard

Others.....

2. Section Two: Bloom's Taxonomy Levels

Remembering (Recall of Information from AI-Generated Content)

This level evaluates how well students retain and recall information from AI-generated responses.

How often do AI-generated responses help you recall important academic concepts?

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

Do AI-generated summaries help you remember complex information better than traditional study methods?

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

Understanding (Comprehension of AI-Generated Content)

This level assesses students' ability to comprehend and interpret AI-generated responses.

How often can you clearly explain AI-generated content in your own words?

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

How often do AI-generated responses help you understand complex topics more easily?

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

Applying (Using AI Content in New Contexts)

This level measures how students use AI-generated content to apply knowledge to new situations.

How often do you use AI-generated responses to help with academic essays and reports?

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

How often does AI-generated content help you solve academic problems?

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

Analyzing (Understanding and Breaking Down Information)

This level explores how students interpret and process AI-generated content.

How often do you verify the accuracy of AI-generated responses?

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

If you find errors in AI-generated content, how do you typically respond?

- ☐ Accept it without questioning

- Double-check using other sources
- Ask a teacher or peer for clarification
- Ignore the mistake and continue using AI
- Ignore the mistake and continue using AI

What steps do you take to check the credibility of AI-generated responses?

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Evaluating (Judging and Critiquing Information)

How confident are you in assessing the reliability of AI-generated responses?

- Not confident at all
- Slightly confident
- Moderately confident
- Completely confident

Compare AI-generated explanations with your teacher's explanations. Which do you find more useful and why?

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Do you believe AI-generated content enhances your critical thinking skills? Why or why not?

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Creating (Generating Original Ideas & AI Use in Learning)

This level explores students' ability to creatively engage with AI tools.

When AI provides answers, how do you use them?

- Copy and use them without changes

- ☐ Modify the content and add personal ideas
- ☐ Use AI only for inspiration, but write in your own words
- ☐ Avoid using AI completely

Have you used AI to generate ideas for classroom activities or lesson plans?

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

Appendix B: Teacher's interview

Teacher's interview

3. Section one: AI usage

Q1: How often do you observe your students using AI tools like ChatGPT?

Q2: What are the main tasks or activities for which they use AI?

Q3: Do you encourage or discourage AI use in the classroom? Why?

4. Section two: AI's impact on critical thinking

Q1: In your opinion, does AI support critical thinking, or does it encourage passive learning?

Q2: Do students typically analyze and question AI-generated responses, or do they accept them without evaluation?

Q3: Have you noticed signs of students becoming overly dependent on AI? if so, in what ways?