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Promoting EFL learners' Self-regulated Learning through the Use of Artificial Intelligence Applications
A Case Study of First-year Master Students, Department of English, University of 8 Mai 1945- Guelma

A Dissertation Submitted to the Department of Letters and English Language in Partial Fulfilment of the Requirements for the Degree of Master in Language and Culture

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DEDICATION

In the name of Allah, the Gracious, the Merciful.

I dedicate this dissertation to my beloved parents; Shahizlane, my mom, from whom I inherited my beauty and strength and my dear dad, Samir.

To the most supportive humans, my brothers Tadj and Yahya.

To my loving sister and her pretty kids, Chanez.

To my younger sister with whom I always fight about the dishes, Fadwa.

To my pieces of happiness, my dearest friends Rayane and Ikhlas.

To those who could not attend today, yet will always be cheering for me.

To my northern star and my future kids.

To the greatest person that her bloodline has ever seen before, the girl who no longer fears spiders because the world had taught her to rely on herself, Me.

Amira Roumaissa BOUDJEDRA

DEDICATION

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ABSTRACT

Self-regulated Learning constitutes a vital process which makes a distinctive contribution to learners' academic achievements, especially during the digital era in the context of higher education. However, many learners struggle at applying self-regulated learning strategies in order to achieve their learning outcomes. Accordingly, the purpose of this research is to investigate EFL learners' views about the use of Artificial Intelligence applications in order to promote self-regulated learning. It also attempts to examine the effectiveness of using artificial intelligence tools in the learning process in order to enhance students' self-regulated learning. Thus, the study hypothesized that using AI applications for learning will affect learners' self-regulated learning. Hence, a mixed research method which consisted of an online questionnaire for students and a one-group quasi-experiment was adopted. The questionnaire was administered via Google forms to 50 first-year Master students of English at the Department of Letters and English Language, University of 8 Mai 1945, Guelma. Additionally, a quasi-experiment was conducted with 20 first-year Master students of English at the same department. More specifically, a pre-test and post-test were administered to the sample students which were designed to assess their learning strategies and motivational orientations, while the treatment consisted of a classroom intervention when learners were encouraged to use AI tools for preparation before class and for their performance during class. The results of the students' questionnaire and quasi-experiment showed that the majority of learners share a positive attitude about using AI applications for learning, and descriptive statistical analysis proved that using AI applications in the learning process improves learners' self-regulation.

***Keywords*:** Self-regulated Learning; Artificial Intelligence applications; Self-regulation

LIST OF ABBREVIATIONS

AGI: Artificial General Intelligence

AI: Artificial Intelligence

AIED: Artificial Intelligence in Education

ANI: Artificial Narrow Intelligence

ASI: Artificial Super Intelligence

CAI: Computer Assisted Instruction

CALL: Computer-Assisted Language Learning

CBLT: Computer-Based Language Testing

CRI: Computer-Supported Reading Instruction

EFL: English as a Foreign Language

FLT: Foreign Language Teaching

GenAI: Generative Artificial Intelligence

IAI: Internet Assisted Instruction

ICT: Information and Communication Technology

LLM: Large Language Model

LMS: Learning Management System

MASRL: Metacognitive and Affective Model of Self-Regulated Learning

MSLQ: Motivated Strategies for Learning Questionnaire

PC: Personal Computer

RAI: Radio Assisted Information

SRL: Self-Regulated Learning

SRSD: Self-Regulated Strategy Development

TAI: Television Assisted Instruction

TELL: Technology-Enhanced Language Learning

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GENERAL INTRODUCTION

1. Statement of the Problem

Within the recent educational context of the Department of English of Guelma University, learners seem to be passive and reluctant to take charge of their own learning, in other words, learners are overly-reliant on the teacher and are incapable of managing and monitoring their own learning. Learners' failure to self-regulate may be attributed to multiple factors such as a lack of independent learning abilities, low self-efficacy beliefs, lack of intrinsic or extrinsic motivation, individual differences, or environmental context. Additionally, teachers may lack sufficient knowledge about the basic strategies by which self-regulated learning can be promoted. This may lead to a classroom where learners are given limited control and responsibility for their learning outcomes. Regardless, students have become reliant on explicit teacher directions and guidance which, in turn, may cripple the learners' growth and impede the development of vital learning skills such as critical thinking, observational skills, self-evaluation, independent thinking, and self-reflexivity.

2. Aims of the study

The current study aims at investigating learners' views on the use of Artificial Intelligence applications in order to promote Self-regulated Learning. Additionally, the study attempts to examine the usefulness of AI applications in improving learners' self-regulated learning.

3. Research Questions

The current research addresses the following questions:

1- What are EFL learners' attitudes towards the use of AI applications?

2- Do AI applications improve learners' Self-regulated Learning skills?

4. Research Hypotheses

In this study, it is assumed that using AI applications would have an effect on learners' Self-regulated Learning. Thus, it is hypothesized that:

H1: If learners use Artificial Intelligence applications for learning, this would affect their Self-regulated Learning process.

H0: If learners use Artificial Intelligence applications for learning, this would have no effect on their Self-regulated Learning process.

5. Research Methodology and Design

5.1 Research Method

In order to investigate the relationship between the use of AI applications and SRL, this research follows a mixed research method consisting of a questionnaire and a quasi-experiment. The questionnaire is administered to first-year master students in order to analyse learners' attitudes towards the use of AI applications in promoting their SRL strategies. The quasi-experiment is conducted with first-year master students in order to confirm whether or not using AI applications will impact learners' SRL process.

5.2 Population and Sampling of the Study

The sample of the study is randomly selected from the population of first-year master students of English at the Department of Letters and English Language, University of 8 Mai 1945, Guelma. The sample concerning the students' questionnaire consists of fifty (50) first-year master students while the quasi-experimental group consists of twenty (20) participants. The selection of first-year master students is based on the assumption that EFL learners at this stage in their academic career are expected to have sufficient knowledge and experience with the application of numerous self-regulated language learning strategies. Additionally, they are given

generally extensive tasks such as oral presentations, essays, and research projects, which rely on cognitive, metacognitive, and motivational factors in order to complete. These learners are also well versed in the use of AI powered software in order to accommodate their learning needs. Thus, this sample is expected to yield relatively accurate and reliable data.

5.3 Data Gathering Tools

The current study opted for the use of a students' questionnaire as well as a one group quasi-experiment as the main data gathering tools. The former has been administered to fifty (50) first-year master students of English in order to inquire about learners' views concerning the use of AI tools in order to promote self-regulated learning. The latter is a one group quasi-experimental study in which the use of AI applications is integrated into the learning process in the form of an intervention. The Motivated Strategies for Learning Questionnaire (MSLQ), developed by Raul Pintrich and his colleagues, is adopted as a pre-test and post-test in order to measure learners' Self-regulated learning before and after the intervention. The MSLQ is administered to the same group of learners before and after the intervention in order to inspect the effectiveness of using AI applications in increasing learners' self-regulated learning.

6. Structure of the Dissertation

In addition to a general introduction and a general conclusion, this dissertation contains two main parts. The first part is the theoretical part; it includes two chapters which focus on the literature review. The second part is the practical part and similarly to the first part, it includes two chapters. These chapters are devoted to the analysis, interpretation, and discussion of the results concerning the students' questionnaire and quasi-experiment.

The general introduction covers the statement of the problem, aims of the study, research questions, research hypotheses, population and sample of the study, data gathering tools, and the structure of the dissertation.

The first chapter deals with the theoretical background of Information and Communication Technology (ICT) and its integration in education as well as its relevant concepts. It also offers a brief overview about Artificial Intelligence, its definitions, characteristics, types, and its integration in education. It also discusses the concept of Generative AI and its relevant products. The chapter concludes with highlighting the ethical considerations of using AI applications in the learning process.

The second chapter discusses the historical background concerning the theoretical basis of contemporary self-regulated learning models. It offers a brief overview about Self-regulation as a general concept. More specifically, it also discusses self-regulated learning, its components, its phases, and how to develop self-regulatory skills. The chapter concludes with a brief overview about self-regulated learning in the digital era.

The third chapter is devoted to the analysis of the students' questionnaire. It presents an overview of the research design and methodology. It also provides an analysis, interpretation, and description of the extracted data concerning learners' views about the use of AI applications in order to promote self-regulated learning. This chapter also summarizes the research findings in accordance with the extracted data and its respective analysis and interpretation.

The fourth chapter consists of a one group quasi-experimental study. It presents a description of the experiment and its constituent parts. It also includes a descriptive analysis of the findings which was used to compare between the pre-test and post-test results of the quasi-experimental group. Additionally, it includes a summary of the findings and their interpretation

as well as final correlations between the findings of both the questionnaire and the quasi-experiment.

By the end of the dissertation, the general conclusion consists of a summary of the research findings, pedagogical implications and recommendations, limitations of the study, and suggestions for future research.

CHAPTER ONE

ARTIFICIAL INTELLIGENCE

Introduction

Science, especially in the field of education, achieves many accumulations that aim to develop the individual in order to keep up with modern advancements. Artificial Intelligence (AI) constitutes one of the most influential of these advancements. Hence, this technology experienced widespread integration in educational settings. The implementation of AI in education redefines the learning experience for unprecedented advancements; thus, creating a new merging field known as Artificial Intelligence in Education (AIED). In accordance, this chapter highlights the theoretical background of Information and Communication Technology (ICT) in relation to education and the emergence of different concepts such as E-Learning, Computer-Assisted Language Learning (CALL), and Technology-Enhanced Language Learning (TELL). Moreover, it discusses some of the comprehensive definitions of AI, the types of AI, and its applications in the educational sphere. It also discusses the concept of Generative AI as well as the ethical considerations of its integration and utilization.

1.1 The Theoretical Background of Information and Communication Technology in Education.

The educational landscape has been irrevocably altered by the emergence of Information and Communication Technologies (ICTs). The integration of ICT in education throughout history has generated a multitude of terms, often used interchangeably, that represent the diverse applications of technological tools in the learning process. While the interchangeable use of the terms: E-learning, Computer-Assisted Language Learning (CALL) and Technology-Enhanced Language Learning (TELL) often appear synonymous, there are crucial differences and a unifying purpose within the interconnected nature of ICT in Education.

ICT is a broad term which emerged in the 1980s when personal computers became a ubiquity and the internet was developed. UGWU and Nnaekwe (2019) stated that ICT includes all kinds of communication devices such as radios, televisions, and even recent digital technologies like computers and the Internet. In other words, ICT encompasses the use of technological devices for communicating, accessing, sharing, saving, broadcasting and recording data. It aims is to make information more accessible to a sizable stratum of individuals who have access to the internet. Additionally, it enables the conversion of data to many digital formats via mediums and technological applications. Thus, according to Lahera (2021), ICT provides the foundation for all e-learning activities when successfully integrated in education. It enables the use of all forms of tech-enabled learning programs, colloquially recognised as TAI (Television Assisted Instruction), RAI (Radio Assisted Information), CAI (Computer Assisted Instruction), and Mobile Learning and IAI (Internet Assisted Instruction).

In the late 1980s, ICTs as well as personal computers became increasingly accessible. Additionally, the development of early Learning Management Systems (LMS) in the early 1990s made E-learning increasingly popular. The concept of E-learning includes two constituents: the "E" and the "learning." "E" stands for electronic which indicates the use of electronic technologies. "Learning" refers to the process of acquiring knowledge. Sambrook (2003) defined e-learning as the usage of information and communication technologies (ICTs) in different learning activities. Tsai & Machado (2002) stated that e-learning is related to activities using computers and interactive networks concurrently. Bleimann (2004) declared that e learning is a self-directed individual learning process in the presence of advanced technology or the Web. He also highlights that e-learning is a cooperative learning activity which aims to increase the quality of learning via ICTs. Roffe (2002) asserted that e-learning refers to “the way people

communicate and learn electronically" (p.40). According to Harman and Koohang, (2005), e-learning also draws from the principles of constructivism. This learning theory suggests that learners construct knowledge based on their prior experiences. It underlines e-learning since it ensures learning among learners. The constructivist theory of learning was led by Swiss psychologist Jean Piaget who believed that students can generate new ideas and solutions through experiences and interactions from their environments. According to Chaudhary (2018), it gives the learners the opportunity to learn by themselves through deducing new conclusions based on previous experiences and understandings of different meanings. E-learning offers flexibility, scalability and access to diverse learning materials that the students need in order to construct new knowledge.

In the 1960s, Computer-Assisted Language Learning (CALL) emerged in the educational landscape where mainframe computers were only available at universities. However, according to Fotos and Browne (2013), CALL has evolved at an astonishing rate over a limited period of time. In the 1980s, personal computers became widely available for average consumers which lead to the widespread use of CALL. Since then, it was extensively used in the language learning process. Davies (2002) stated that CALL is a method to support language acquisition and learning in which the computers are incorporated as tools to present, produce, practice and evaluate what has been learned using interactive tasks. Levy (1997) defined it as "the search for and study of applications of the computer in language teaching and learning" (p.1). Additionally, Oroujlou and Vahedi (2011) asserted that the term CALL refers to the use of computers for a given purpose, it could be used to enrich educational learning situations, this would allow students to strengthen their language skills, grammar, vocabulary drills, pronunciation activities, listening comprehension, relate things they learned to outside worlds through processing,

presentation, simulation, problem-solving, games, interactive dialogues, and internet applications such as e-mail, chat and the World Wide Web (WWW) for language learning purposes. According to Egbert and Shahrokni (2018), CALL has many other terminologies: "computer-enhanced language learning (CELL), the more general technology enhanced language learning (TELL), and specific applications such as Computer-Based Language Testing (CBLT) and Computer-Supported Reading Instruction (CRI)" (p.10); the commonality between all of these terms is that they focus on acquiring and mastering language skills. This is consistent with both constructivism, where the students actively construct their own knowledge through experiences and interactions. And socio-constructivism, which was posited by the linguist Vygotsky. On this theory Mhlongo et al. (2017) stated that "social constructivism is a learning theory that sheds the light on the importance of social interaction to help students in their learning evolvement" (p.1). It emphasises the importance of social interaction and collaboration in knowledge construction. Moreover, it covers collaborative activities such as role plays and drama in which CALL offers such activities for students. In comparison to E-learning, CALL carves a dedicated niche within the broader concept of E-learning, focusing on technology-driven language acquisition.

However, TELL encompasses a much broader concept than CALL. unlike CALL, TELL refers to the use of various technologies beyond only computers. Shadiev (2020) stressed that the term "technology" refers to any mechanism used to reach particular learning outcomes as well as goals via technological processes, procedures, or data. In this context, the term refers to the application of different technological techniques in education for achieving a particular goal. TELL focuses on using technology to augment existing pedagogical practices like digital mind maps and real-time feedback mechanisms. It does not necessarily prioritise learner autonomy. However, it can still draw from constructivism by providing students with engaging and

interactive ways to explore language concepts and receive feedback that supports their learning journey. Ilgaz (2019) highlighted that students can be responsible for their learning by studying on their own, at their own pace and in a suitable learning environment. Additionally, their mistakes can be rectified by offering detailed feedback in the presence of technology. Therefore, it aids in improving students' motivation for language learning and eagerness for progress and adequate academic performance via technology. According to Laila (2020), technology is a powerful tool in the classroom and its implementation will optimise students' active learning participation, enhance their curiosity and attitudes toward learning, encourage them to communicate orally without fear and encourage engagement among learners. Moreover, it helps learners develop diverse language skills (as cited in Iberahim et al., 2023). Thus, technology-enhanced language learning enables students to effectively learn a new language using different devices and tools. It also provides them access to a variety of language learning resources in a convenient and time efficient manner relative to traditional learning.

The common purpose of E-learning, CALL, and TELL is to leverage technology in order to improve learning outcomes. As a result, these concepts tend to overlap which misleads individuals to use these terms interchangeably. E-learning is broader than CALL and TELL, focusing on electronic delivery of learning content. CALL and TELL have language learning as their core purpose and they represent specific implementations within e-learning. Additionally, CALL, as the name indicates, focuses on the specific use of computers while TELL emphasizes the use of any technological tools in order to achieve favourable learning outcomes. In terms of emergence, TELL is the most recent one. These concepts and the tools which they emphasize have induced major change in the educational system by providing effective language learning

supports. However, in recent years a new type of external support powered by Artificial Intelligence is increasingly becoming more prominent in higher education.

1.2 Artificial Intelligence

AI is arguably considered to be the most viral trend in recent years. It is one of the technologies that monopolised almost all domains. For instance, almost all automated systems and software programs have at least one aspect of them which is powered by AI. Examples of this would be speech recognition, smart suggestions for essay writing, or AI powered statistical analysis. The term alone holds great significance to the extent where consumers see it labelled on almost any digital product. The first level of AI development is gradually appearing in technologies which we use on a daily basis.

Although widely considered as a relatively modern trend, the inception of AI dates back to the mid-1950s. John McCarthy, a Stanford Professor who later became an emeritus, is coined the term “Artificial Intelligence” in 1955. He defined it as the “field of science and engineering endeavour of creating intelligent machines” (as cited in Manning,2020, p.1). Conversely, Chassignol et al. (2018) proposed a two-fold definition of AI. They considered it both as a discipline or a field of study and a theoretical concept. Within computer science, they defined AI as a field which focuses on tackling cognitive challenges akin to human intelligence, including learning, problem solving, and pattern recognition. This focus on cognitive tasks ultimately allows AI systems to adapt. As a theoretical concept, AI revolves around developing and utilising computer systems based on a framework that emulates human intelligence, especially the ability to perform tasks requiring it, such as visual perception, speech recognition, decision-making, and translation between languages. The first definition focuses on practical applications

with the emphasis on adaptation while the second definition focuses on a theoretical concept aimed at achieving human-like intelligence in machines.

The existing body of literature about AI definitions highlights key recurring characteristics and the fundamental properties of AI. Sharma et al. (2019) defined AI as machines that have the ability of replicating human reasoning abilities. Similarly, Pokrivcakova (2019) offers a definition of AI specific to the education sector. He observed that AI is the product of extensive research and development by diverse experts including: system designers, data scientists, product designers, statisticians, linguists, cognitive scientists, psychologists, education experts and many others. These collaborative efforts aim to develop intelligent educational systems that assist teachers and empower learners by fostering knowledge and adaptable skills for a constantly evolving world.

In essence, AI can be broadly understood as the endeavour to develop intelligent machines. These machines have the ability to mirror human intelligence, encompass learning, activate cognitive processes, make decisions, adapt to surrounding environmental changes. Consequently, these definitions highlight specific characteristics shaping the core principals of AI. One of those core characteristics is the ability to exhibit some level of intelligence and perform a wide range of tasks that typically necessitate human intelligence.

1.2.1 Types of AI

In modern times, AI has revolutionized countless industries. Thus, AI functionalities have become heavily requested by average consumers. This spike in demand for different AI skills in order to accommodate different tasks is basis of classifying the three types of AI: Artificial Narrow Intelligence (ANI), Artificial General Intelligence (AGI), Artificial Super Intelligence (ASI). These classifications are based on overall capability and functionality.

Firstly, Machines that limit the scope to only one task are known as Artificial Narrow Intelligence (ANI). This type of AI is also referred to as “Weak AI” due to the fact that it excels at performing a single task. Sharma (2021) declared that ANI “equals or exceeds human intelligence or efficiency at specific task” (p.3), meaning that due its specialization in one task, ANI has the potential to rival or exceed human intelligence, which in natural circumstances, always focuses on multiple tasks simultaneously. This type of AI is frequently used on a daily basis and is limited to solving one problem, it includes using Google search and RankBrain as well as Chatbots such as Siri by Apple, Alexa by Amazon, and Cortana by Microsoft. Khan (2021) highlighted that one of the major advantages of ANI is accuracy. In other words, although it cannot perform multiple tasks simultaneously, specialization in one task means that it can focus all attention and resources on performing that task as optimally as possible. Nevertheless, limitations to one specific task render ANI a type of AI which merely simulates human Behaviour.

Secondly, while Artificial Narrow Intelligence is considered as a shallow simulation of human intelligence, Artificial General Intelligence (AGI) is a type of AI which claims to mimic, replicate, or even rival human intelligence. According to Strelkova (2017), AGI is a machine that possess capabilities of reasoning, planning, and problem-solving that surpasses the intelligence level of a human. Those machines have the ability to think abstractly, comprehend complex ideas, learn quickly, and learn from experience. This type of AI is also known as Strong AI or Deep AI since it is considered to possess human-like capabilities and high cognitive. AGI is the future generation system capable of performing all types of tasks that humans can and cannot perform. However, Khan (2021) stated that AGI is purely theoretical until now and will be

invented within Quantum computing, meaning that practical implementations for AGI are still decades or even centuries away.

Finally, Artificial Super Intelligence (ASI) is the type of AI which would hypothetically surpass human intelligence. Bostrom (1998) defined it as "an intellect that is much smarter than the best human brain in practically every field, including scientific creativity, general wisdom and social skills" (p.1). Meaning that, ASI would hypothetically be exceedingly better at everything humans do. As a result, it sparks concerns of ASI powered systems replacing humans in almost all industries and occupations. It directs efforts towards eliminating any differences between humans and machines by performing extraordinary tasks such as creating art works, decision making, self-awareness, displaying opinions and beliefs, and forging emotional relationships.

The spectrum of AI types provides an insight into the evolving capabilities of intelligent machines. However, some important aspects must be taken into consideration. Firstly, ANI is the only type of AI which has been successfully realized to this date. By contrast, AGI remains theoretical and practical implementations are several decades away. ASI is purely hypothetical and there is little consensus between research on when it will be invented, let alone implemented for practical use. Secondly, some AI theories and speculations regarding the future of AI may impede progress. One of these theories postulates a dystopian future where AI systems dominate the word. Fears about AI reaching equal or even superhuman levels of intelligence are amongst the major concerns of AI evolution. Nevertheless, ANI has experienced numerous breakthroughs in recent years as well as widespread implementation in order to support learners.

1.2.2 AI Applications as Learning Support

The mass production of AI powered products as well as open access to these tools lead to their integration into the educational system. Alneyadi et al. (2023) stated that AI in education refers to the use of smart applications for active learning and improving learning experiences. This incorporation should be encouraged and actively promoted by both teachers and parents. The utilization of AI reshaping the learning and teaching styles; thus, an international conference in Beijing 2019 discussed the future of a new merging field, Artificial Intelligence in Education (AIED). As a result, UNESCO launched the "Beijing Consensus – Artificial Intelligence and Education", proposing that all countries should establish comprehensive guidelines and policies for AI use in education. Huang (2019) stated that this consensus encouraged countries to investigate effective strategies and practices for the deployment of artificial intelligence in educational contexts for the purpose of promoting educational innovations (as cited in Yufei et al., 2020, p.584). Yufei et al. (2020) stated that today, the application of the artificial intelligence tools is highly prominent in all levels of the educational system. This convergence reaffirms the advantages of AI since it can be used in many areas of education such as: automatic grading, personalized learning, and adaptive learning.

The automatic grading system is an artificial intelligence based professional computer system that mimics the teachers' behaviours such as assigning grades to student tasks (Yufei et al., 2020). AI provides teachers with programs and systems to facilitate the grading process of students' tasks and activities, these programs are not limited to teachers. Students can use these systems for self-assessment based on a set of pre-defined criteria. Moreover, it yields feedback, explanations to the mistakes that had been committed, and suggestions for future tasks. Peters 2019 stated that modern technologies such as AI-driven conversation robots, machine learning, and natural language processing offer various chances to bolster the quality of feedback (as cited

in Yufei et al., 2020), meaning that learners can take advantage of multiple sources and types of feedback in order to perform formative self-assessment.

Personalized learning refers to the different learning programs that are driven by the learners' needs (Ahmad et al., 2020). AI offers many methods and strategies for learning to suit the student's individual learning style. Additionally, it helps students discover and discern the different learning styles and choose them based on their capacities, strengths, and limitations. A popular example of such applications would be the widely used language learning app Duolingo. The U.S. Department of Education's Office of Educational Technology (2023) claimed that AI-powered services are used on a daily basis by individuals. These include programs of voice assistance, grammar and punctuation correction, sentence completion, paragraph and essay writing, and automated trip planning. AI offers many tools for students to facilitate their learning and to bridge the gaps in knowledge and skills.

In adaptive learning, Wu (2019) stated that artificial intelligence is used to collect data about students and analyse their learning styles and characteristics. According to that data, teaching methods and course contents are automatically adjusted in order to match their needs (as cited in Yufei et al., 2020). Thus, this system of AI is flexible and relies on analysing students' styles, preferences, gaps, wants, lacks then providing them with content accordingly. Thus, AI has the potential to revolutionize the learning process by making it more attractive, personalized, engaging, and efficient for students (Alneyadi et al.,2023). Needless to say, AI is progressively becoming an inseparable tool from education in order to achieve desired learning outcomes.

When taking into consideration the numerous advantages of AI, its proliferation in education no longer comes as a surprise. For instance, AI can offer suitable learning resources,

detect learners' strengths and weakness, and adjust the level of complexity of the tasks based on their level. It ensures that learners have been provided with adequate scaffolding in order to accommodate their learning needs. Relative to traditional learning, AI attempts to create a more efficient, engaging, and self-sustainable learning experience.

1.2.3 Generative AI

For many years, it has been a common assumption that AI is unable replicate human creativity. Feuerriegel et al (2023) highlighted the prevailing supposition that writing a poem, drawing a landscape, composing a song, or writing a piece of code are tasks that could only be performed by humans. These assumptions were put aside as recent advancements in computational science gave birth to Generative AI (GenAI). This relatively recent type of AI had the ability to generate new and meaningful products which are seemingly indistinguishable from human products. According to Ali et al. (2024), generative AI algorithms are types of machine learning models that are used to create novel data samples that are similar to the examples introduced to in extensive training sessions. UNESCO (2023) defined Generative AI (GenAI) as an artificial intelligence technology that automatically produces new outputs like: images, texts and poems. in response to prompts which guide it.

Generative AI introduces many technologies like ChatGPT, Bard, and others. Sallam (2023) described ChatGPT as "an artificial intelligence (AI)-based conversational large language model (LLM)" (p.1). Meaning that, ChatGPT is a type of artificial intelligence designed for maintaining dialogues and conversations with humans. According to the House of Lords (2024), large-scale Language Models are "a subset of foundation models focused on language (written text)" (p.9). In other words, LLM is a model that has the capabilities to understand natural human language besides creating texts and answers based on provided human inputs.

The recognition of ChatGPT in education is starkly apparent. The tool has been cited in many studies of different fields including education. Sallem (2023) stated that extensive research and examination are required order to examine the benefits of ChatGPT in improving personalized learning, critical thinking, and problem-based learning. ChatGPT can generate text answers from its knowledge acquired via machine learning in engagement with data from large databases on the internet (Pavlik, 2023). In the context of academic writing, ChatGPT can provide learners with essays or improve their writing to achieve the required criterion It can also be used to identify references and dismantle difficult passages into smaller and less complex fragments (Buriak et al., 2023). Additionally, ChatGPT can function as a tool for writing assistance for foreign language learners. Seth et al. (2023) stated that ChatGPT is a tool that could revolutionize the academic setting and increase the quality of academic writing.

Bard is another example of GenAI which relies on LLMs. It can generate different types of content like poems, software code, scripts, and emails. It can also translate, summarise, and paraphrase specific texts. Additionally, Bard can transmit convert a text into speech form and vice versa. This is particularly useful for learners with reading and hearing disabilities (Segovia & Baumgartner,2024).

Students with different styles and personal needs can greatly benefit from GenAI (Cornell University,2023). GenAI provides a self-regulated learning experience as well as accessibility for students with and without learning disabilities. It also grants instructors with effective scaling tools to give constructive critiques promoting iterative learning and writing. Its benefits even extend to aiding in various tasks from different fields like assisting in coding and creative composition. However, there are some drawbacks to the use of GenAI concerning accuracy and misconduct. GenAI can sometimes provide inaccurate or biased data as well as violating

copyright laws and misrepresenting intellectual property. Students can also misuse GenAI through cheating or plagiarism in order to acquire desired grades. Consequently, this threatens the credibility of assessment and overall integrity of academic research. Additionally, over-reliance on AI may cause the progressive degradation of learners' mental abilities and willingness to interact with peers. Thus, there important ethical considerations to uphold when using AI in education.

1.2.4 Ethical Considerations of AI Use in Education

Recently, the educational context has been characterized by a remarkable shift involving the integration of AI. Although advantageous to both teachers and learners, this shift sparked several ethical concerns around the use of AI tools. Consequently, according to Nguyen et al. (2023), UNESCO issued international standards for AI ethics which were agreed and signed by its 193 member countries on November 25, 2021. Miao et al. (2021) reported that UNESCO called for the need to "set up a system-wide organizational structure for policy governance and coordination" (p32). Furthermore, the OECD (2021) contended the need for standards for liable stewardship of trustworthy AI. The principal of governance and stewardship highlights the proper and effective use of AI in education. According to Floridi (2018), it can be understood by "the practice of establishing and implementing policies, procedures and standards for the proper development, use and management of the infosphere." (p.3). These ethical principles are emphasized and reinforced through concepts of transparency, accountability, sustainability, privacy, and security

First, transparency is an important precondition to ensure respect for humans and protection of humans' life and environment. Sveinsdottir et al. (2020) stated that "transparency means that data can be accessed, processed, understood, deleted and presented easily" (, p.38). In

other words, transparency is about having a detailed knowledge about the process of collecting data and what will happen to that data.

Second, Nguyen et al. (2023) defined accountability as "acting with integrity and clearly determining the attribution of responsibility and legal liability with careful consideration of potentially harmful factors" (p.4230). Thus, AI users must have good intentions and uphold principals of fairness toward all parties involved as well as take responsibility for the consequences of their conducts.

Third is the principle of sustainability. AI technologies have two dimensions, they can either benefit sustainability goals or hinder their realization. This depends on its level of utility in a given country. Sustainability is reliant on the design, development, and employment of AIED to optimise energy efficiency and minimise its ecological footprint (European Commission, 2019). Verheyen (2012) stated the European Parliament's regulations of AIED must consider other sustainable sectors, including economic and societal aspects like improving productivity, increasing growth and employability, culture, and politics. This means that the deployment of AIED would not harm or interrupt all the domains. For instance, regulation of AIED should consider ensuring policies supporting equitable resources for innovation and different rights including employment (UNESCO, 2019), meaning that AIED should ensure its effectiveness and contribution to all aspects of life.

Fourth, concerning the principle of privacy, AIED must ensure well-informed consent and preserve the confidentiality of the users' information during the process of providing and collecting data about them (Nguyen et al.,2023). Privacy ensures the protection of humans' dignity, freedom, and autonomy by ensuring confidentiality. Furthermore, privacy ensures data protection in collecting and sharing data.

Lastly is the principal of security. AIED should be specifically designed to protect and safeguard sensitive data from any potential harm or attacks including cybercrimes, corruption, and data breaches (Nguyen et al.,2023). Additionally, contingencies and protocols should be implemented in the event of a security breach. UNESCO (2022) emphasized that security should be taken into consideration and any potential harm or risks related should be avoided as well as informed. Additionally, Safety risks must be prevented and eliminated through the use of AI systems to ensure human, environmental, and ecosystem safety and security.

As AI technology progresses, new and more powerful technologies have become readily accessible to the average consumer, including students. However, with this power comes an equally corresponding degree of responsibility and accountability. AI is an extremely convenient tool; however, the effectiveness of this tool depends entirely on the user. Thus, the ethical principles of AIED must be recognised and taken into consideration throughout the process of using AI in education. This ensures that learners will use these tools effectively to scaffold their learning as well as use these tools as a supplement to traditional learning rather than a substitution for it.

Conclusion

The current chapter discussed a crucial topic in the field of education which is integration of technology in the educational landscape. It indicates a new educational renaissance in which many developments at the level of learning and teaching are expected to support the learner centred approach. It discussed the theoretical background and implication of ICTs in education as well as crucial concepts related to it such as CALL, TELL, and E-learning. It also dealt with AI and its definitions which helped outline some of its core characteristics and principles. It also discussed the different types of AI and their classification based on capability and functionality

as well as the application of AI in education. This chapter also highlighted the emergence of Generative AI and concluded with a strong emphasis on the ethical principles and considerations of using AI tools in education.

CHAPTER TWO

SELF-REGULATED LEARNING

Introduction

Ever since the inception of schooling, educators and researchers were concerned with the substantial differences between individual learners. The ease by which learners grasp some concepts faster than others and learners' motivation are among the main concerns. The emergence of psychology as a science prompted research that would form the theoretical basis for interventions specifically designed to accommodate for learners' individual differences. Research on meta-cognition and social cognition led to new conceptualizations of individual differences and the emergence of self-regulation as a major field of research in educational psychology. Moreover, self-regulated learning is a vital component in forging lifelong learners, which is the ultimate goal of education, especially in the context of higher education. Thus, this chapter attempts to highlight the origin and theoretical basis of contemporary views of self-regulated learning theories, definitions related to self-regulated learning, the different components and phases related to the self-regulated learning process, the different methods used for acquiring and developing self-regulatory skills, and how digital technology is used as a scaffold for self-regulated learning.

2.1 Historical Background

Due to its prominence in the field of language learning, self-regulated learning was explained by various figures who tried to identify its features and subskills. Zimmerman and Schunk (1989) defined self-regulated learning in terms of students' becoming "masters of their own learning" (as cited in Nodoushan, 2012, p.1). Zimmerman (1990) argued that concept of self-regulated learning dates back to the 1860s when post-colonial American leader Benjamin Franklin wrote about the techniques which he used in order to improve his knowledge, self-control, and scholarship. In his autobiographies, Franklin stressed the importance of personal

initiative and provided extensive descriptions of the ways by which he set learning goals, improved his writing through emulating exemplar written models, and monitored his progress in a journal.

Alternatively, John W. Gardner, former United States Secretary of Health, Education, and Welfare, reaffirmed the importance of taking charge of one's own learning and assuming personal responsibility in the pursuit of knowledge. Gardner (1963) suggested that "the ultimate goal of the educational system is shift to the individual the burden of pursuing his own education"(as cited in Zimmerman 1990, p.4). In other words, the essence of educational progress is based on self-initiated responses rather than fixed learning. Furthermore, students can reach their full potential because they are active, observant, and reflective in their problem solving while overcoming learning hurdles in a systematic manner.

These theories have had a profound impact on the way teachers interact with students in the classroom (Zimmerman, 1990). The most influential of these theories are the Metacognitive theory and Social-cognitive theory. Each of these theories theory views self-regulated learning from a different perspective and brings forth critical aspects, components, and conceptual frameworks which later on became the basis of multiple prominent self-regulated learning models.

2.1.1 Metacognitive Theory

In the early 1980s, research on metacognition helped shape a new outlook on students' individual differences. As Zimmerman (2002) defined it, metacognition refers to the "awareness of and knowledge about one's own thinking" (p.65). Accordingly, Students' learning deficiencies were associated with a lack of metacognitive awareness of one's strengths and weaknesses as well as the inability to adapt and compensate for them. Thus, metacognition

constitutes a critical component of self-regulated learning and enables learners to turn mental abilities into academic skills. Evidently, learning becomes a proactive activity driven and guided by the learners' goals and task-related problem-solving strategies; as well as, their awareness of their own limitations and the ability to compensate for them. More specifically, an important distinction must be drawn between the two main components of metacognition: metacognitive knowledge or knowledge of cognition, and metacognitive control process or regulation of cognition.

According to Pintrich (2002), metacognitive knowledge refers to what students know about their own cognitive processes, tasks, learning strategies, the extent of effectiveness of these strategies, the conditions under which these strategies are most effective, and knowledge about themselves and their own abilities. It can be further divided into: Strategic knowledge, cognitive task knowledge, and self-knowledge. Firstly, Pintrich (2002) stated that strategic knowledge "includes knowledge of the various strategies students might use to memorize material, to extract meaning from text, and to comprehend what they hear in classrooms or what they read in books and other course materials" (p.220). Secondly, cognitive task knowledge refers to knowledge about why and when to use learning strategies; not all strategies are appropriately applicable in all situations, thus, learners must have sufficient knowledge about the conditions required for specific strategies to be most effective. Thirdly, self-knowledge refers to learners' self-awareness concerning the depth of their abilities and their limitations.

Conversely, metacognitive control refers to all metacognitive processes that aid in controlling one's thinking and learning, including the processes of monitoring, control, and regulation of cognition (Schraw & Moshman, 1995). Thus, learners' use of these cognitive processes is reflected in activities such as goal setting, planning, asking questions and checking

answers, generating knowledge, self- assessment, and self-evaluation. Regardless, metacognitive knowledge and metacognitive control do not operate independently of one another and learners' deficiencies may be attributed to a lack in either one or both of them.

2.1.2 Social-Cognitive Theory

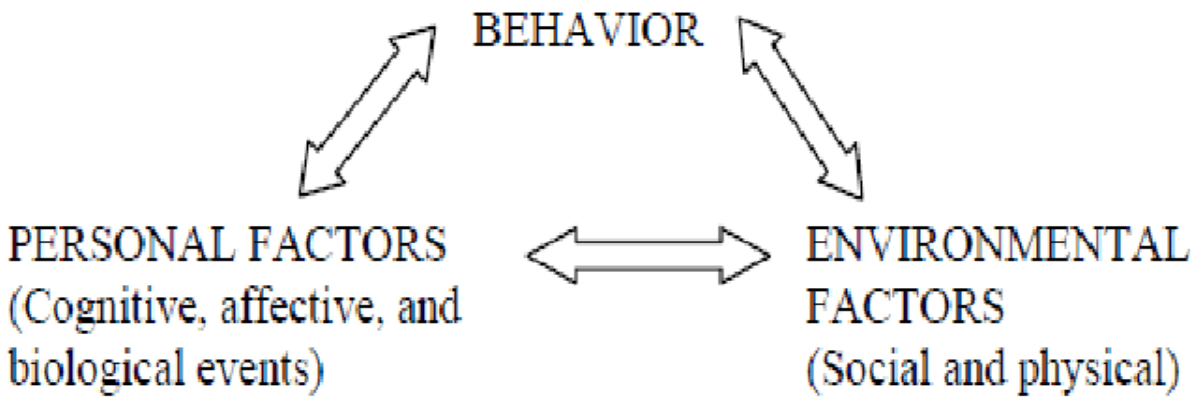
Another crucial theory that contributed to understanding the concept of SRL, and accommodate for students' failure to self-regulate is the social-cognitive theory. Zimmerman (1995) argued that "self-regulation involves more than metacognitive knowledge and skill, it involves an underlying sense of self-efficacy and personal agency and the motivational and behavioural processes to put these self-beliefs into effect" (p.217). This clarified that the use of metacognitive knowledge and components is not sufficient to explain learners' self-regulation failures, thus, scholars expanded their views on self-regulation as a complex process involving motivational, behavioural, and social aspects. This social-cognitive view highlights the complexity of self-regulation as well as the role of the human element within this process.

Bandura's social-cognitive theoretical perspective was initially based on the concept of observational learning, the idea that individuals learn by watching and imitating the actions of others. His views further expanded to include human cognition and social learning theory and became ultimately known as social cognitive theory. Hence, Schunk and DiBenedetto (2020) defined social cognitive theory as a "psychological perspective on human functioning that emphasizes the critical role played by the social environment on motivation, learning, and self-regulation" (p.3). This theory focuses on one key concept that is vital to becoming a self-regulated learner: Reciprocality, also known as Reciprocal Interactions.

According to Nabavi and Bijandi (2023), Triadic Reciprocality defines human functioning as a triadic, dynamic, and reciprocal process based on an interacting set of personal,

behavioural, and environmental factors. Personal influences may include beliefs and perceptions as well as affective and cognitive factors, goals, self-efficacy beliefs, values, and outcome expectations. For instance, highly efficacious learners are more likely to choose challenging tasks as well as setting up and environment that is most suitable for learning. Behavioural influences may include choices of environmental regulation, activities, persistence, effort. For example, learner's engagement in productive behaviour and high effort expenditure may lead to positive learning outcomes and increase or maintain self-efficacy, additionally, these learners are more likely to create effective environments for learning. Environmental influences can be social or physical. For illustration, the manner by which a teacher gives feedback concerning a learner's progress can build or deconstruct self-efficacy, similarly so, teachers providing students with attainable goals and rewards can significantly increase learners' effort expenditure and persistence.

Figure 1: Bandura's Concept of Triadic Reciprocity Behaviour (1986)



(Adapted from Jalaluddin, 2017, p.256).

2.2 Self-Regulation

Between the 1970s and 1980s, efforts to study human self-control as well as contemporary limitations of efforts to improve students' academic achievements resulted in the emergence of Self-regulation as a formal topic. Self-regulatory process research was also influenced by the efforts of social learning researchers such as Zimmerman, Bandura, and Schunk who emphasized processes and notions of self-efficacy, self-assessment, and goal-setting, in an attempt to explain students' efforts of learning on their own and perusing academic achievements. Furthermore, Educational psychologists had grossly neglected the teaching of academic studying skills such as note-taking, planning, and goal-setting, as students were simply expected to develop these competencies by themselves through completion of assigned homework and exams.

Self-regulation has been defined by Zimmerman (2000) as "learners' beliefs about their capability to engage in appropriate actions, thoughts, feelings, and behaviours in order to pursue valuable academic goals, while self-monitoring and self-reflecting on their progress toward goal-completion" (as cited in DiBenedetto, 2021), in other words, self-regulation is not a mental ability, a performance skill, or a character trait which learners either possess or lack. Rather it is a self-initiated, variable, and a directive process which is goal-oriented, context-specific, and is used in order to acquire and enable task-based skills. Zimmerman (2015) postulated that the quality of self-regulatory processes varies drastically depending on individual difference between learners. For instance, novice learners rely on primitive forms of self-regulation such as using non-systematic strategies or methods and setting unspecified goals while expert learners exhibit strong self-regulatory processes using strategic methods as well as specific and accurate goal-setting.

However, despite the stark importance of self-regulation, very little attention is attributed to preparing students to become autonomous and self-regulated. Zimmerman (2010) argued that students are seldomly asked to self-evaluate; rarely given the chance to choose their academic tasks; and barely encouraged to set specific academic goals. This means that running a classroom where students have limited choice and a skewed perception about control and responsibility of learning outcomes impedes the development of self-regulation because learners are not encouraged to use self-regulatory processes.

2.2.1 Self-regulated Learning

Self-regulation is a general term covering a wide range of aspects and situations in which individuals attempt to regulate their emotions, behaviours, and mental processes. Thus, according to Puustinen and Pulkkinen (2001), self-regulated learning describes the plethora of ways by which learners attempt to regulate cognitive processes within an educational context. Research on self-regulated learning is conspicuous in diverse origins ranging from behaviourism to cognitive psychology. Early self-regulation was based on psychological inquiry into the notion of self-control and its development in children. Additionally, it included therapeutic research which aimed to induce behavioural changes in patients in order to rectify dysfunctional behaviours like aggression or addiction. In the mid-1980s, research was limited to isolated self-regulatory processes like goal-setting, self-efficacy, and volition and their impact without emphasis on their implication to student learning. Zimmerman (2015) stated that in the mid-1990s, theoretical research on self-regulated learning in relation to academic achievements prompted the first wave of descriptive and experimental studies.

From the perspective of other researchers such as Winne and Hadwin (2010), self-regulated learning is a process cantered mainly around the learners' ability to strategically and

intentionally adapt to learning activities. This adaptability would enable learners to select and apply specific learning techniques to accommodate particular learning situations, thus allowing them to make necessary adjustments to either the process or the product. For instance, after writing an essay, learners evaluate the product by matching it against a number of chosen standards or criteria. Learners can review and make adjustments to the product according to the extent of which those standards were fulfilled. Similarly, learners can adjust the essay writing process by adopting an outline or a concept map.

Zimmerman (2015) stated that self-regulated learning relies on personally initiated metacognitive, motivational, and behavioural processes in order to acquire skills and knowledge. He also highlighted the role of motivation as the current interest of self-regulated learning research and emphasized that it constitutes a critical component in initiating and sustaining self-regulated learning. Thus, Ahmed (2017) stressed that it is crucial for researchers to investigate how motivational constructs such as self-efficacy, self-attribution, task value, and other motivational variables influence self-regulated learning strategies. Consequently, motivation as an interactive component is included in a variety of self-regulation models such as Pintrich's Self-schema model, Boekaert's Three-layered model, Kuhl's Action–state Control model, and Zimmerman's Cyclical Phases model.

Self-regulated learning has become an essential prerequisite for individuals especially in terms of higher education and employment. In order to achieve academic success, learners are required to be proactive and self-initiated. They are also accountable for their own learning, meaning that they must set-goals, monitor their progress, evaluate their performance, and critically reflect on their learning. In today's occupational environment, employees are required to learn quickly through observation. As workspaces continue to evolve due to technological

advancements, self-regulated learning becomes increasingly important for employees in order to quickly grasp new concepts, be more productive, collaborate with co-workers effectively, and thrive in important managerial positions. Thus, more emphasis is geared towards helping learners develop self-regulatory learning skills as a prerequisite for knowledge acquisition and sustainable lifelong learning (Cassidy, 2011).

2.2.1.1 Components of Self-regulated Learning

Self-regulated learning is a deeply complex and multifaceted process consisting of multiple components in order to achieve optimal effectiveness. In the early 1990's, Pintrich and De Groot (1990) proposed three main components which constitute the working definition of self-regulated learning, these being metacognition, effort management and control, and cognition. However, the focus of self-regulated learning research shifted to the importance of motivation and it became an interactive component in the self-regulated learning process. Pintrich and De Groot (1990) stated that "knowledge of cognitive and metacognitive strategies is usually not enough to promote student achievement; students also must be motivated to use the strategies as well as regulate their cognition and effort" (p.33). Thus, it is generally agreed upon that self-regulated learning consists of four components: metacognition, cognition, behaviour, and motivation.

First, self-regulated learning requires learners to regulate their metacognitive strategies, including both knowledge of cognition and regulation of cognition. Early research on knowledge categories divided metacognitive knowledge into three subtypes: declarative knowledge which is knowledge about ourselves and our performance as learners; procedural knowledge which is knowledge about executing techniques, methods, and strategies; and conditional knowledge which is knowledge about why and when to execute a particular strategy. However, Pintrich,

(2002) stated that in more recent taxonomies, the three subtypes became independent knowledge types while metacognitive knowledge is instead divided into strategic knowledge, cognitive task knowledge, and self-knowledge. Regulation of cognition generally involves planning, monitoring, and evaluation. Planning involves accurate goal-setting, effective time management, and activation of prior content knowledge; expert learners self-regulate successfully because they plan ahead effectively before even beginning the task (Schraw et al., 2006). Monitoring involves time and effort management, monitoring task conditions, monitoring behaviours, and judgements of learning (Schunk, 2005), more specifically, learners' ability to make accurate judgments about their strengths and weaknesses, what they did and what they failed to understand, and their affective state. Monitoring can be particularly difficult because it requires a high level of awareness, attention, and self-reflexivity in order to formulate honest and objective perceptions. Evaluation occurs when learners appraise the products and strategies of their learning by determining how successful they are and adjusting them accordingly (Schraw et al., 2006).

Second, self-regulated learners must be able to regulate various cognitive strategies for learning. Regulation of cognition may include processes such as encoding, elaboration, and inference. Encoding refers to the processing of information in the short-term memory through which it can be stored in the long-term memory. Elaboration refers to the process of memorizing new information by linking it to previous information stored in the long-term memory. Inference is also crucial for self-regulated learners, Schraw et al. (2006) stated that it allows learners to operate at a higher level of comprehension because it enables them to extract new information from already existing information as well as generate knowledge that is not explicitly stated.

Third, self-regulated learning involves regulation of behaviour. According to Pintrich (2002), this component refers to the active control of students' resources including behaviours,

environment, efforts, cognition, time, and others. In this sense, this component is more akin to discipline. According to Pintrich (1995), this component is reflected in learners who can maintain cognitive engagement and focus during tasks, adjust their environment by eliminating distractors, and benefit from peers and other available resources. The most important aspect of regulation of behaviour is to maintain the notion of the "individual student". Behavioural control may emerge in learners but the source which prompted that control is what determines whether it is self-regulation or external-regulation. For instance, learners may regulate their behaviour in response to their parents' instructions and cease to do so once those instructions are removed. Pintrich (2002) stated that "the individual student-not someone else like a parent or teacher-must be in control of his actions, hence the "self" prefix in the term self-regulated learning" (p.5), in other words, the essence of self-regulated learning is self-initiated, directive, and goal-oriented change in behaviour.

Finally, the motivational component is regarded as one of the most crucial elements which can either be facilitative or debilitative to self-regulatory processes. Regulation of motivation refers to the ability to control and alter motivational beliefs such as interests, goals, and self-efficacy. Pintrich (1990) proposed three motivational: expectancy component, value component, and affective component. The expectancy component, which in some works is referred to as self-efficacy or attribution style, refers to learners' perceived competence and beliefs about their ability to perform a task. Self-efficacious learners use more cognitive and metacognitive strategies and are generally more persistent than other learners. The value component is generally concerned with students' goals for a task as well as their interest and beliefs about the importance of the task. Generally, learners will exert more effort and engage in more cognitive and metacognitive strategies if they perceive a task as important or interesting.

The effective component addresses the students' emotional reaction to the task. Some tasks may evoke a variety of emotional reactions ranging from joy, excitement, and happiness to rage, frustration, and anxiety.

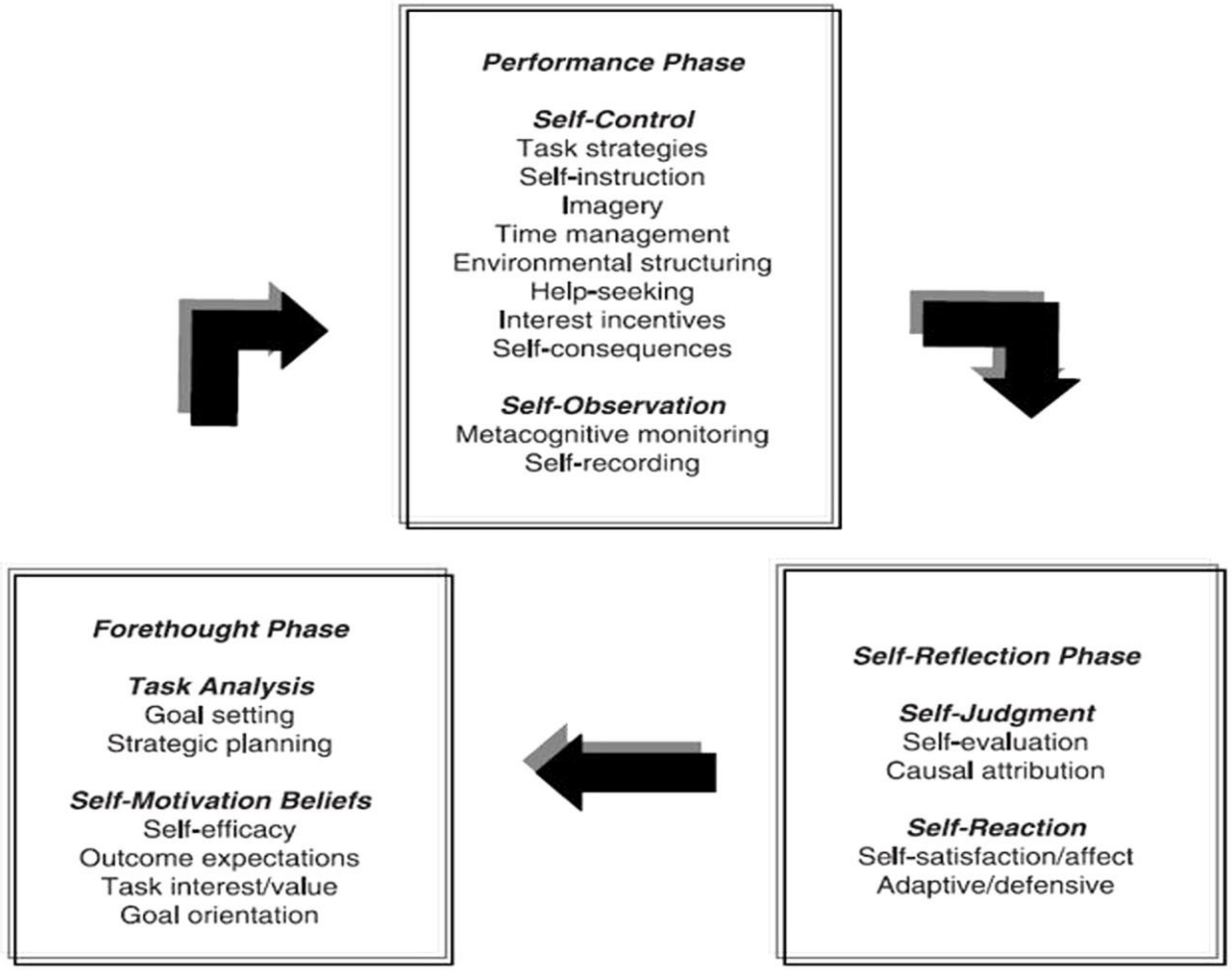
Other motivational components worth mentioning are goal orientations and intrinsic motivation. Goal orientations state that learners adopt varying goals based on beliefs about ability. For instance, Leggett (1998) stated that performance goals, which are short-term goals in order prove skill and competency, are generally adopted by learners who believe that intelligence is a fixed parameter while learners who believe that intelligence is changeable adopt learning goals instead, which are long-term development goals in order to improve skill and competence (as cited in Schraw et al., 2006). Intrinsic motivation refers to the act of engaging in a behaviour for its own sake without extrinsic incentive. Schraw et al. (2006) argued that intrinsically motivated learners expend more effort in learning because of the intrinsic satisfaction and gratification of the learning outcomes such as joy, pride, and challenge; and compared to extrinsically motivated learners, they tend to be more encouraged to continue performing well, making learning perpetually self-motivational.

2.2.1.2 Phases of Self-regulated Learning

Self-regulated learning is considered a complex and multifaceted process containing multiple interactive components. However, experts differ amongst each other in terms of the actual components concerned with the self-regulation process, how they interact, and to what extent they influence each other. As a result, a plethora of self-regulated learning models emerged from different theoretical backgrounds such as Boekaert's Dual Processing Model and Efklides' Metacognitive and Affective Model of Self-Regulated Learning (MASRL). Each of these models emphasizes different processes, components, and phases of self-regulated learning.

Zimmerman and Moylan's Cyclical Phases Model is one of the first and most widely used self-regulated learning models. It proposes three phases: forethought, performance, reflection (Panadero, 2017).

Figure 2: Zimmerman and Moylan's Cyclical Phases Model (2009)



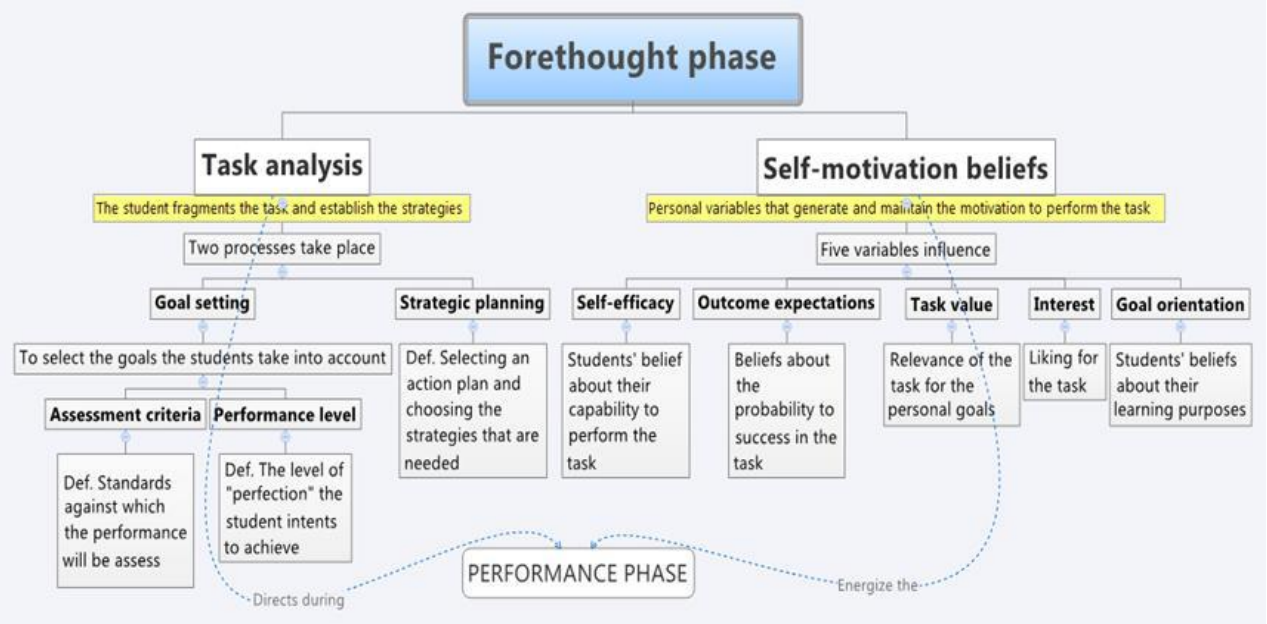
(Adapted from Panadero, 2017, p.5).

The forethought phase includes processes which are divided into two categories: task analysis and self-motivation. Firstly, task analysis requires learners to set proximal goals and strategically plan how to achieve those goals. In order to successfully set goals, two crucial factors must be taken into consideration. First are the assessment criteria used in order to assess

the learner's performance (Panadero, 2014). Many learners fail to set appropriate goals because they either do not know the assessment criteria or it is not explicitly communicated by the teacher. The second factor is the learners' desired level of performance, in other words, the level of performance which the learner deems as "adequate". Even if the assessment criteria are explicitly communicated, the learner will put forth as much as effort as the value he/she sees in the task.

Secondly, self-motivation requires learners to contemplate four key personal variables which generate the motivation to perform a particular task: self-efficacy, outcome expectations for performing the task, goal orientation, and the intrinsic interest in the task or value assigned to the outcome (Winne, 2015). Motivational variables have a significant impact on the way in which learners approach the task analysis. For instance, task value/interest and goal orientation conditions the learner's motivation, and in turn, determine the amount of effort expenditure during analysis and planning (Panadero, 2014).

Figure 2.1: Forethought Phase



(Adapted from Panadero, 2014, p.453).

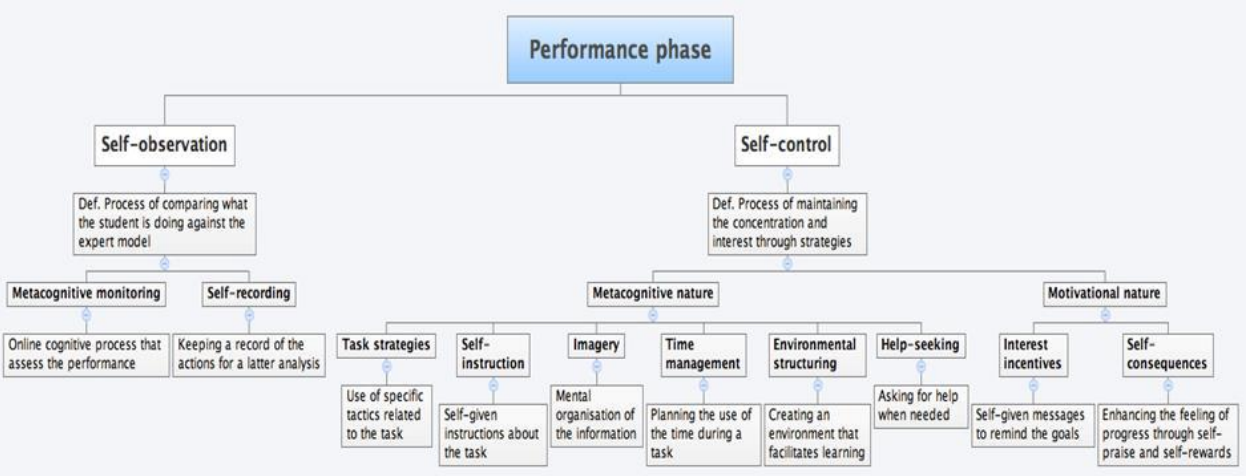
In the performance phase or volitional control phase, learners engage with the task at hand and monitor their progress while also apply a number of cognitive processes and strategies such as imagery, self-talk, focusing attention, and recalling and applying selected strategies (Winne, 2015). The most important part of this phase is to maintain focus and to use appropriate learning strategies in order to monitor progress towards goal completion and to maintain a high level of motivation throughout the task performance (Panadero, 2014). Performance phase processes are divided into two sub-processes: self-control and self-observation.

Firstly, self-control processes are used in order to maintain focus and interest throughout the performance via deploying specific strategies which were planned during the forethought phase (Zimmerman, 2002). Some of the strategies used in order to maintain concentration are cognitive and metacognitive strategies such as learners specific and task related strategies, self-instruction strategies, imagery, time management, and learning environment management strategies. Other strategies are used to maintain motivation such as interest incentives, which are self-directed messages of encouragements to remind the learner about their goal, and self-consequences such as self-appraisal or self-rewards (Panadero, 2014).

Secondly, self-observation processes are used for tracing a particular aspect of one's own performance (Puustinen & Pulkkinen, 2010). This includes mental and material record keeping activities concerning how one performs and the quality of the performance as well as subsequent self-experimentation. Self-observation can be done through various processes such as self-monitoring which is a covert type of self-observation in order to track personal functioning (Zimmerman, 2002), and self-recording, either mentally or materially using a journal. For instance, learners can record the time required to write an essay. Consequently, learners may notice that certain types of essays are more time consuming than others and could conduct a self-

experiment in which they write multiple types of essays, compare the times, and narrow down key factors and aspects which can be improved in order to make the process more time efficient.

Figure 2.2: Performance Phase



(Adapted from Panadero, 2014, p.455).

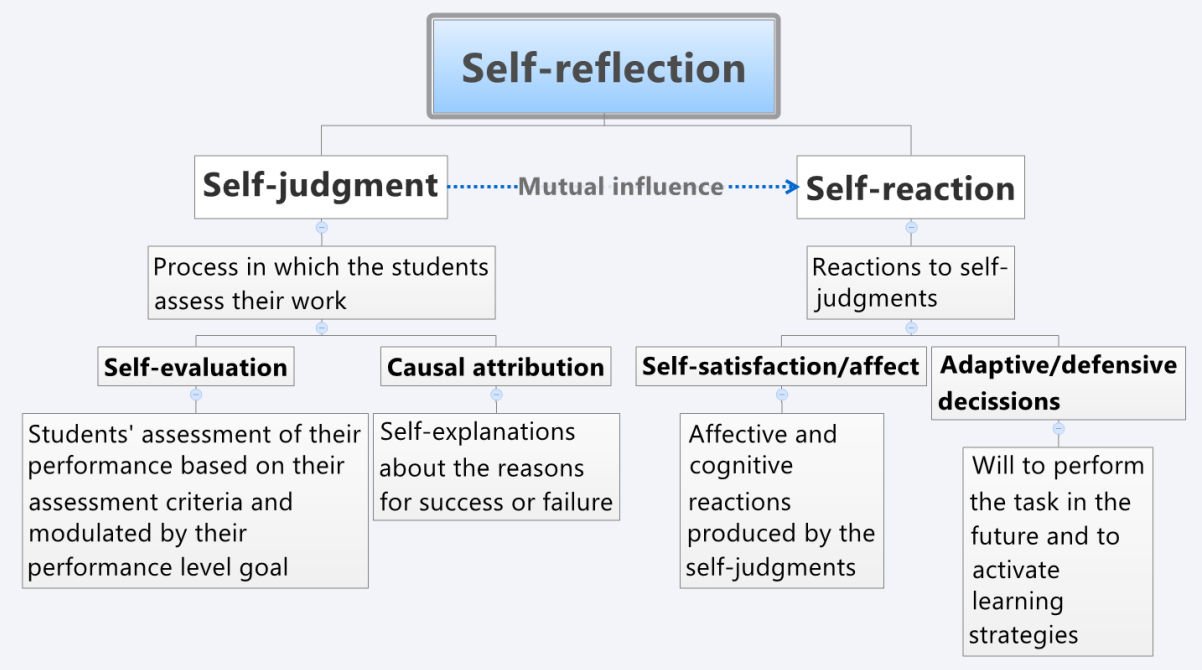
In the self-reflection phase, students assess their performance of the task and generate attributions of success or failure during self-reflection, these attributions lead to either positive or negative self-reactions (Panadero, 2017). Meaning that, as learners attempt to explain the success or failure of their performance, they experience either positive or negative emotions which will affect their motivation and the way by which they approach the task in the future. Self-reflection processes are divided into two sub-processes: self-judgement and self-reaction.

Firstly, Self-judgment is used in order to assess one's own performance, it can be achieved through self-evaluation by matching the results of the performance to the assessment criteria communicated by the teacher or the goals which were set by the student in the beginning based on their own desired performance level (Panadero, 2014). Self-judgement can also be achieved through making causal attributions which are self-generated explanations or beliefs regarding the cause of one's failure or success (Zimmerman, 2002). These beliefs attribute

varying levels of responsibility on different task-related aspects such as luck, effort, or ability. For example, attributing poor test scores to mailable factors such as effort or proficiency has a positive influence on motivation. Mainly because it implies that an increase in effort will lead to better results. Conversely, attributing test scores to fixed abilities is detrimental to a learner's motivation as it implies that efforts to improve are futile (Zimmerman, 2002). Causal attributions are critical because they trigger emotions which can influence future task performances either positively or negatively (Panadero, 2014).

Secondly, self-reaction requires students to affectively and cognitively react to their own attributions which are the results of self-judgments. Self-reactive processes include self-satisfaction or positive affect and adaptive/defensive responses (Zimmerman, 2002). According to Zimmerman and Moylan (2009) "Self-satisfaction is defined as the affective and cognitive reactions that students experience when they are judging themselves" (as cited in Panadero 2014, p.458). Attributions of positive affect increase self-satisfaction and enhance motivation for future performances while attributions which generate negative emotions decrease self-satisfaction and hinder future efforts to learn (Zimmerman, 2002). Concerning adaptive/defensive decisions, learners take defensive decisions such as dropping out of a course or procrastination in order to avoid performing the same task in the future as a measure to avoid recursive emotions of failure or disappointment. Conversely, learners who take adaptive decisions are eager to perform future tasks while also making necessary adjustments according to previous results in order to perform better (Panadero, 2014)

Figure 2.3: Self-reflection Phase



(Adapted from Panadero, 2014, p.457).

2.2.1.3 Developing Self-regulated Learning Skills

During the 1980's, the development of academic self-regulation strategies became a significant field of research in education, mainly due to the growing evidence supporting claims that self-regulatory processes are directly correlated to success in schools. Thus, instructors began to teach study skills in naturalistic settings (Zimmerman, 1998). Over the years, the development of self-regulated learning skills was based on multiple theoretical perspectives of different scholars and researchers which resulted in a variety of intervention models. The most influential of these models is Zimmerman's Multilevel Model of Self-Regulatory Training.

Schunk and Zimmerman (1997) proposed the Multilevel Model of Self-Regulatory Training in order to develop learners' self-regulated learning skills. Based on Socio-cognitive Learning Theory, this model stresses the importance of the social aspects involved in the development of self-regulation (Panadero, 2014). Zimmerman (2013) theorized that "there were

four levels in a social cognitive path to self-regulation— with the first two levels being social and the last two being self in focus" (p.140), the first two being observation and emulation and the last two being self-control and self-regulation.

Figure 3: Zimmerman's Multilevel Model of Self-regulatory Training

	Features of Regulation			
Levels of Regulation	*Sources of Regulation*	*Sources of Motivation*	*Task Conditions*	*Performance Indices*
1. Observation	Modeling	Vicarious reinforcement	Presence of models	Discrimination
2. Emulation	Performance and social feedback	Direct/social reinforcement	Correspond to model's	Stylistic duplication
3. Self-control	Representation of process standards	Self-reinforcement	Structured	Automatization
4. Self-regulation	Performance outcomes	Self-efficacy beliefs	Dynamic	Adaptation

(Zimmerman, 2013, p.140).

At the observational level, Zimmerman stressed the need to observe the performance of a social model which can be a teacher, audience, or peer. At this level, self-regulatory skill acquisition occurs when the learners induce the correct form of that skill as the model performs it. For example, inducing the correct pronunciation of a word from a conversation. Implicit reinforcement from the model can enhance the learners' motivation. Skill attainment depends on whether learners are able to discern the different levels of quality in the model's performance (Zimmerman, 2013).

The emulation level requires learners to imitate and duplicate the models' responses and actions. The aim here is to duplicate the model's general style or pattern instead of a carbon copy of it. For instance, learners observing a teacher use of subordinate conjunctions will adopt a similar style in structuring the sentences instead of the exact same wording. Motivation is greatly enhanced through explicit reinforcement from the model via feedback or guidance. Skill

attainment depends on the extent of which the learners' emulations approximate the models in terms of form and style. Furthermore, performance of the emulated skill is crucial in order to properly integrate it into the learners' behavioural inventory.

At the self-control level of self-regulation skills, emphasis is put on intentionally practicing new tasks. Usually, practice is an activity structured by the model which typically comes in the form of homework. Historically, homework is assigned in order to provide students with systematic practice and enhance performance (Zimmerman, 1998). At this level, learners master a skill in a structured context in the absence of the model. To do so, learners recreate a mental representation of the model's performance and attempt to match their performance against these standards. Self-reinforcement influences motivation and is determinant by how well the learners succeed. Skill is attained when the execution becomes automatic (Zimmerman, 2013).

At the self-regulation level, emphasis is put on performance outcomes and making adjustments according to them. Learners are prompted to use a variety of strategies based on contextual factors and make adjustments when necessary. Attainment of self-regulated learning skills and the motivation to sustain it is highly dependent on the learner's self-efficacy beliefs and mastery of this skill is determined by how well they can adapt to new learning tasks and challenges.

Schunk and Zimmerman's multilevel model starts with social guidance at the first level however social support is gradually reduced as learners become more self-regulated. Nonetheless, social aspects can never be dismissed entirely because even at the highest level, self-regulated learning very much depends on social resources, the only difference is that the process is more self-initiated. More importantly, it should not be assumed that learners must go

through these levels in a constant and unvarying sequence, nor that once the highest skill level is attained learners will remain on that level. Self-regulated learning is heavily context based and it is likely that even highly self-regulated learners will come across new performance tasks that will uncover gaps in their existing skill and require them to start again from level one.

The importance of acquiring and developing self-regulatory skills has gained significant attention over the years which lead to multiple interventions under different formats such as study skill classes, strategy training classes, and systematic efforts following models such as Haris and Graham's Self-Regulated Strategy Development model (SRSD) and Zimmerman's Multilevel Model (Zimmerman, 2015). In these models, the teacher plays a critical role in learners' acquisition of self-regulatory skills. Thus, teacher training in order to become instructors able to promote self-regulated learning in students has become a major field of study. Zimmerman (2015) stated that teachers who were trained to convey self-regulatory skills to learners produced remarkable results, further solidifying the importance of the teachers' role in developing learners' self-regulatory skills.

2.2.1.4 Self-regulated Learning in the Digital Era

In the last three decades, self-regulated learning emerged as an extensively researched construct in the field of educational psychology. However, most of the self-regulatory models, processes, and theoretical frameworks did not take into consideration the element of technology. Advancements in Information Communication Technologies (ICT), Learning Management Systems (LMS), and Artificial Intelligence tools have become the corner stone of higher education. Thus, it is no longer sufficient for modern EFL learners to master reading, writing, speaking, and listening alone. Contemporary learners must enhance their self-regulated learning skills, digital literacy, and critical thinking. Additionally, Anggraeni et al. (2023) stated that "in

today's digital era, students are expected not only to have the responsibility of learning, but to be able to explore values intelligently and independently in obtaining new information" (p.86), meaning that, as modern learners are not constraint by the limitations and inconveniences of traditional learning, they are expected to be more autonomous, responsible, and independent. The proliferation of technology within higher education gave rise to new tools and approaches used to promote self-regulated learning such as Blended Learning and AI.

Blended learning is a widely implemented hybrid educational approach. It has the pedagogical potential to cater to language learners' needs and scaffold self-regulated learning skills. According to Jin et al. (2023) hybrid courses which include traditional classroom lectures blended with online courses (E-learning) have become increasingly prevalent in higher education. This approach relies on three key components: Traditional face-to-face classroom interaction, e-learning through the internet and online platforms, and m-learning which refers to the different types of media used for online learning such as PCs, laptops, tablets and others. In a recent study using the online platform Easyclass, Chelghoum (2017) reported that "students have developed their skills and started using cognitive strategies in learning a subject. This positively affects the learners' overall performance in the course and the taken tests" (p.128), meaning that online classes improved learners self-regulated learning skills. More specifically, their use of cognitive learning strategies as well as their motivation to perform well and acquire good grades in class. Blended learning introduces the learners to an online environment where instructor interaction is relatively limited. Hence, there are more opportunities for learners to assume control of their own learning.

Although a progressive step to improving learners' self-regulated learning, blended learning alone is not sufficient to support learners' self-regulatory skills. Jin et al. (2023) claimed

that “many learners struggle to self-regulate effectively in online learning, resulting in a deficiency in utilizing their SRL during online learning” (p.2). This may be due to the fact that modern learners are forced to function in an environment that necessitates high levels of learning autonomy. Thus, AI became regarded as an additional measure of external support for learners’ self-regulation. Some of the reasons that warrant the use of AI tools is to cover the areas which blended learning failed to do. According to Wong and Viberg (2024), self-regulated learning supports such as online learning lacked personalization and failed to cater to learners’ individual needs. However, Generative AI applications such as ChatGPT, Google Bard, and Gemini have the potential to enable students to personalize their self-regulated learning, and in turn, meet their individual needs. For instance, AI plan organizers can help students set goals, devise plans, and improve overall time management. AI question generators can help students prepare for exams, lessons, and overall activation of prior knowledge. AI virtual companions can increase motivation and provide emotional support by reminding learners of their progress and goals. However, the use of AI to scaffold self-regulated learning is a relatively recent development. Thus, it requires rigorous research and examination in order to implement effective AI applications within higher education.

Despite the apparent advantages and positive influence technology has had on self-regulated learning and education as a whole, there are still some points which need to be considered. First, teaching modern learners using AI or online platforms is considerably challenging, especially for veteran teachers. The continuously evolving nature of modern technology renders teaching a difficult endeavour where teachers must be constantly up to date with the latest changes. Thus, teachers require constant professional development in order to develop and improve their digital literacy skills, in addition to subject matter knowledge in order

to function effectively. Second, Jin et al. (2023) reported that some learners "perceived that AI applications were not useful in supporting motivational regulation . . . Online learning environments face challenges related to a decline in students' motivation, particularly for those who have not developed SRL skills" (p.16). Meaning that AI applications fail to account for some learners' motivational factors. This is because learners usually rely on human support and relationships to increase their motivation. Thus, the absence of the human factor is one of the core deficiencies of AI in general. Finally, Wong and Viberg (2024) argued that the open accessibility of AI applications raises concerns about their misuse and potential disregard of ethical considerations. Many learners will commit to using AI chatbots without questioning the validity of the information or the reliability of the source. These issues must be taken into consideration in order to maximize the effectiveness of digital technologies in the academic learning process.

Conclusion

This chapter discussed the concept of self-regulated learning which, in the past three decades, became a vital construct in EFL and educational psychology. It highlighted the origins as well as the theoretical backgrounds which underline some of the most influential self-regulated learning theories. It also discussed self-regulation as a broad term and self-regulated learning in a more specific and detailed manner. The focus in this chapter was on the components of self-regulated learning and how they interact with each other in different phases of Zimmerman and Moylan's model. It also focused on the different methods used to acquire and develop self-regulatory skills. Additionally, it highlighted how advancements in digital technology are used to support self-regulated learning. More specifically, through the use of Blended Learning and Artificial Intelligence applications.

CHAPTER THREE

LEARNERS' ATTITUDES TOWARDS THE USE OF ARTIFICIAL INTELLIGENCE APPLICATIONS IN ORDER TO PROMOTE SELF-REGULATED LEARNING

Introduction

Throughout the years, self-regulated learning as a construct emerged as one of the major concerns of educational psychology. Self-regulatory processes underlying aspects of cognition, metacognition, motivation, and behavioural control became the focal point of academic performance. At the same time, technology became increasingly prevalent in education, spawning new teaching methods and tools such as Blended Teaching and AI applications. These technologies hold the potential of scaffolding learners' ability to successfully self-regulate in the modern educational environment. Therefore, this chapter presents the research methodology and design of this study as well as the data gathering tools and research sample. This chapter also aims to analyse, interpret, and describe learners' views about using AI applications in order to support Self-regulated learning. By the end, this chapter summarizes the research findings in accordance with the extracted data and its respective analysis and interpretation.

3.1 Research Methodology and Design

3.1.1 Research Method

For this chapter, a descriptive method is adopted throughout the processes of data acquisition, analysis, and interpretation. The descriptive method allows for collecting qualitative and quantitative data from a large number of respondents in order to describe specific characteristics in relation to our hypothesis. It enables the acquisition of relevant data that is statistically easy to analyse as well as qualitative data which aids in providing a more accurate description and a better understanding of the participants' views and attitudes.

3.1.2 Research Population and Sample

The research sample consists of fifty (50) students which are randomly selected from a population of one hundred seventy-seven (177) first-year Master students at the Department of

Letters and English Language, University of Guelma, during the academic year of 2023/2024. The decision of selecting first-year Master students is based on the assumption that students that at this stage, learners would have already developed numerous self-regulated learning strategies and aspects (goals, motivations, self-efficacy beliefs…). They also rely on those strategies more often since they receive more extensive assignments such as research projects, oral presentations, and writing essays. Additionally, first-year master students are more familiar with the use of AI tools for learning.

3.1.3 Data Gathering Tools

A students' questionnaire has been designed for the sample students in order to gather the required research data. It aims to investigate learners' attitudes towards the use of AI applications in order to promote Self-regulated learning. The questionnaire is segmented into different sections, each of which consisting of a set of various questions.

3.2 Description of the Questionnaire

The design of this questionnaire is largely based on the concepts discussed in the theoretical chapters. It consists of twenty-three (23) questions which are ordered logically (APPENDIX 1). Questions range from close-ended multiple-choice questions as well as five point and seven-point Likert scale questions designed to yield quantitative data to open-ended questions in order to gather qualitative data and give respondents the chance to clearly express their views and attitudes towards the use of AI applications to promote Self-regulated learning. The questionnaire is divided into three sections.

Section One: General Information (Q1, Q2)

In this section, students were asked how many years they have studied English including their master one year (Q1). Students were also asked about their own perception regarding their level of English language mastery (Q2).

Section Two: Self-regulated Learning (Q3-Q13)

This section consists of eleven (11) questions and aims to investigate the dependent variable of the research: Self-regulated learning. (Q3) aims to find out whether or not learners have encountered the concept of self-regulated learning previously. In (Q4), learners were asked to specify the extent to which they rely on the teacher to provide them with information on a scale of 1 to 7, 1 being not reliant at all and 7 being very reliant. In (Q5), learners were asked about the importance of goal-setting on a scale of 1 to 7, 1 being not important and 7 being very important. (Q6) attempts to find out whether or not student activate previous knowledge when dealing with new learning situations. (Q7) attempts to find out which motivational variables affect students the most. In (Q8), learners were asked about the necessity of strategic planning before attempting to solve a task. (Q9) requires students to specify which strategy is most useful for maintaining concentration and interest during tasks. (Q10) examines learners' frequency of self-evaluation after tasks or exams. (Q11) attempts to find out whether students seek improved methods of learning after self-evaluation. (Q12) investigates the extent to which learners agree with the following statement: "Self-regulated learning is a strong indicator of academic success". (Q13) aims to investigate learners' perceptions in regards to being self-regulated learners.

Section Three: Artificial Intelligence Applications in the Learning Process (Q14-Q23)

The last section of the questionnaire contains ten (10) questions and it aims to investigate the independent variable of the research: AI Applications in the Learning Process. (Q14) asks how frequently learners use technological tools while learning. In (Q15) learners are asked

whether they previously encountered the concept of Artificial Intelligence. (Q16) attempts to find out which Artificial Intelligence application/site is most beneficial for learners. (Q17) investigates the extent to which learners agree with the idea that all students should use artificial intelligence tools. (Q18) requires students to specify how frequently they use Artificial Intelligence tools to prepare for lessons. (Q19) attempts to find out whether the use of Artificial Intelligence tools affects learner motivation. (Q20) ask students to rate the usefulness of Artificial Intelligence applications on a scale of 1 to 7, 1 being not useful and 7 being very useful. In (Q21) students are asked to state whether self-regulated learning can be facilitated through Artificial Intelligence tools or not. (Q22) investigates learners' consideration towards the ethical risks of using Artificial Intelligence applications for learning. Finally, (Q23) aims to give learners to opportunity to provide additional information concerning the topic under investigation.

3.3 Administration of the Questionnaire

The questionnaire was administered online to first-year Master students at the Department of Letters and English Language, University of Guelma, via google forms. The selection of an online questionnaire is based on factors concerning time efficiency, convenience, cost efficiency, and ease of statistical analysis of data. The questionnaire was sent on Friday, April 26th, 2024 and remained accessible until the required sample number of fifty (50) responses has been reached. The respondents' emails were not collected in order to guarantee anonymity and privacy of personal information. This would also encourage learners to provide sincere responses. Based on the respondents' comments, the questions were clearly understood and the research topic was generally well received.

3.4 Students' Questionnaire Data Analysis

3.4.1. Analysis and Interpretation of the Findings

3.4.1.1 Section One: General Information

Q1- how many years have you been learning English (including this year)

Table 3.1

Learners' EFL Study Background

Options	Number of responses	Percentages (%)
10 years	2	4.3
11 years	37	78.8
12 years	5	10.6
13 years	1	2.1
15 years	2	4.3
Total	47	100

As indicated in table 3.1, the vast majority of students (78.8 %) claimed that they have been studying English for eleven (11) years. Additionally, a total of 8 students (17%) stated that they have been studying English for more than eleven years. This indicates that the majority of students have substantial knowledge base in the English language. The results from Q1 imply that learners have an adequate amount of experience and knowledge in EFL classrooms which, in turn, means that they are relatively well equipped with self-regulated language learning strategies and techniques. Additionally, it implies that they possess well developed cognitive, metacognitive, and motivational self-regulatory processes.

Q2- How would you describe your level of English language mastery.

Table 3.2

Learners' Perceptions about their Level of English Language Mastery

Options	Number of responses	Percentage (%)
Beginner	2	4
Intermediate	29	58
Advanced	19	38
Total	50	100

According to the results displayed in table 3.2, the majority of students (58%) claimed that they have an intermediate level while (38%) of students assumed that they have an advanced level of English language mastery. These results indicate that the majority of learners have positive self-perceptions about their level of English. This also indicates that learners possess crucial motivational variables such as high self-esteem, confidence, and self-efficacy beliefs about overall learning ability.

3.4.1.2 Section Two: Self-regulated Learning

Q3- Have you encountered the concept of Self-regulated learning in one of your modules?

Table 3.3

Learners' Familiarity with the Concept of Self-regulated Learning

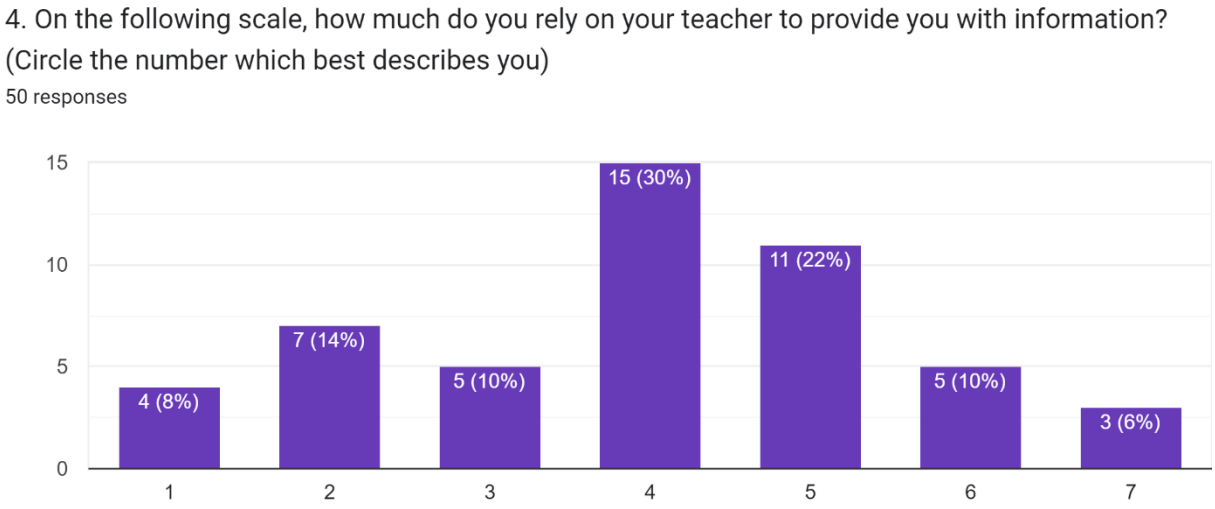
Options	Number of responses	Percentage (%)
Yes	28	56
No	22	44
Total	50	100

As demonstrated in table 3.3, 56% of students reported that they have previously encountered the concept of SRL. This suggests that this concept has been discussed at a particular point in time, in a given module. This also indicates that learners are, to some extent, familiar with the general idea of self-regulated learning as well as some of its underlying components. Conversely, 44% of students claimed that they have not encountered the concept of SRL and are thus unfamiliar with the general idea of the concept.

Q4- On the following scale, how much do you rely on your teacher to provide you with information? (Circle the number which best describes you

Chart 3.1

Learners' Reliance on the Teacher for Information



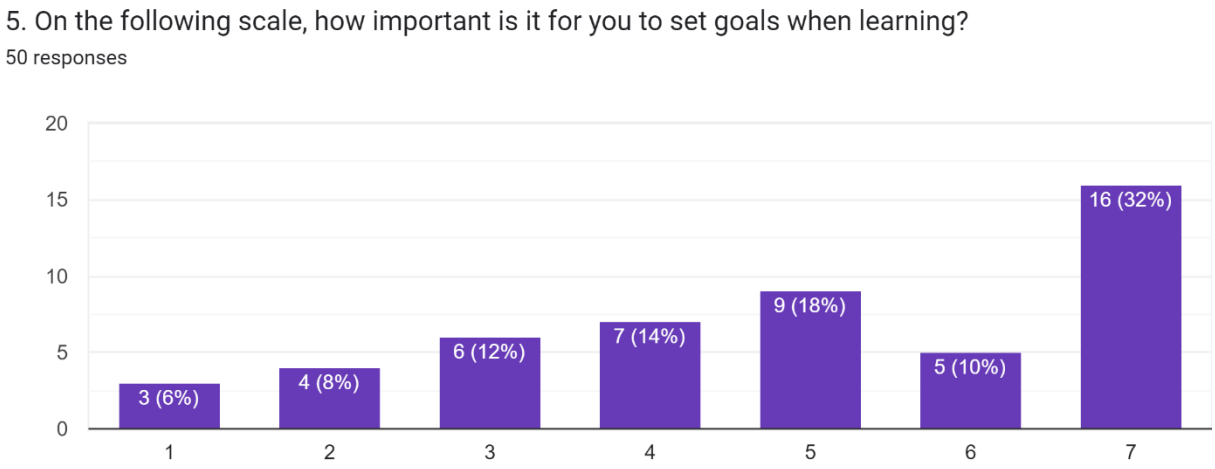
The information displayed in chart 3.1 shows that on the proposed scale of 1-7, the sample students' scores averaged at around four (n=3.98). Meaning that the majority of learners reported that they are relatively reliant on their teachers. This indicates that the majority of learners rely on both the instructor and themselves for information retrieval. This also indicates

that learners are aware of the fact that the teacher is not the only source of information. The data extracted from Q4 implies that learners, to some extent, possess some aspects of self-regulated learning where they rely on the teacher for information in the classroom, but also search for information by themselves outside of the classroom.

Q5-On the following scale, how important is it for you to set goals when learning?

Chart 3.2

Learners' Views on the Importance of Goal-setting



The information illustrated in chart 3.2 demonstrates that on the proposed scale of 1-7, respondents' scores averaged at around five (n=4.88). This suggest that most learners are aware of the importance of goal-setting and goal-oriented learning. The data retrieved from Q5 confirms that the majority of learners set-goals as a cognitive self-regulatory control process in order to organize, guide, and direct their learning. This also helps them maintain focus, perseverance, and increases their motivation.

Q6- Do you use previous knowledge in order to deal with new learning situations?

Table 3.6

Learners' Use of Previous Knowledge

Options	Number of responses	Percentage (%)
Yes	48	96
No	2	4
Total	50	100

As displayed in table 3.6, the overwhelming majority of students (96%) reported that they use prior knowledge for new learning situations while only (4%) of students claimed that they do not. This suggests strong consensus on the importance of activating prior knowledge in the learning process. According to the extracted results, learners seem to be aware of the importance of cognitive strategies such as activation of prior knowledge as a pre-requisite for coping with new learning situations. Additionally, learners rely on prior knowledge for further knowledge acquisition and making connections between previous information and new situations.

Q7- Which of these factors do you believe motivates you the most when learning?

Table 3.7

Learners' Motivational Factors

Options	Number of responses	Percentage (%)
Self-efficacy Beliefs	8	16
Task Interest	20	40
Goals	4	8
All of the above	18	36
Total	50	100

According to the retrieved data displayed in table 3.7, 40% of students chose task interest as their primary motivational process for learning. This suggests that learners are much more likely to engage with a task if it is related to their general interests. 36% of respondents opted for the option of "All of the above". This implies that learners are aware that motivation is a multifaceted variable consisting of multiple components which can influence learners' overall learning motivation. 16% of students chose self-efficacy as their main source of motivation. This suggests that some students support the idea that high levels of self-efficacy can help learners overcome the numerous challenges and obstacles they encounter. 8% of students stated their goals are what motivates them the most. This implies that few students are aware of the importance of goal setting as well as the supporting role goals have in guiding and directing the academic trajectory of learners. The obtained results from Q7 indicate that most learners value task interest over other motivational factors. Meaning that learners will exhibit low levels of motivation and engagement if the task is not interesting enough. Additionally, a significant number of learners are aware of the complex nature of motivation and thus, they associate learning motivation with all three factors mentioned above.

Q8- Do you think that strategic planning is necessary before attempting to solve a task?

Table 3.8

Learners' Attitudes towards Planning

Options	Number of responses	Percentage (%)
Yes	30	60
No	20	40
Total	50	100

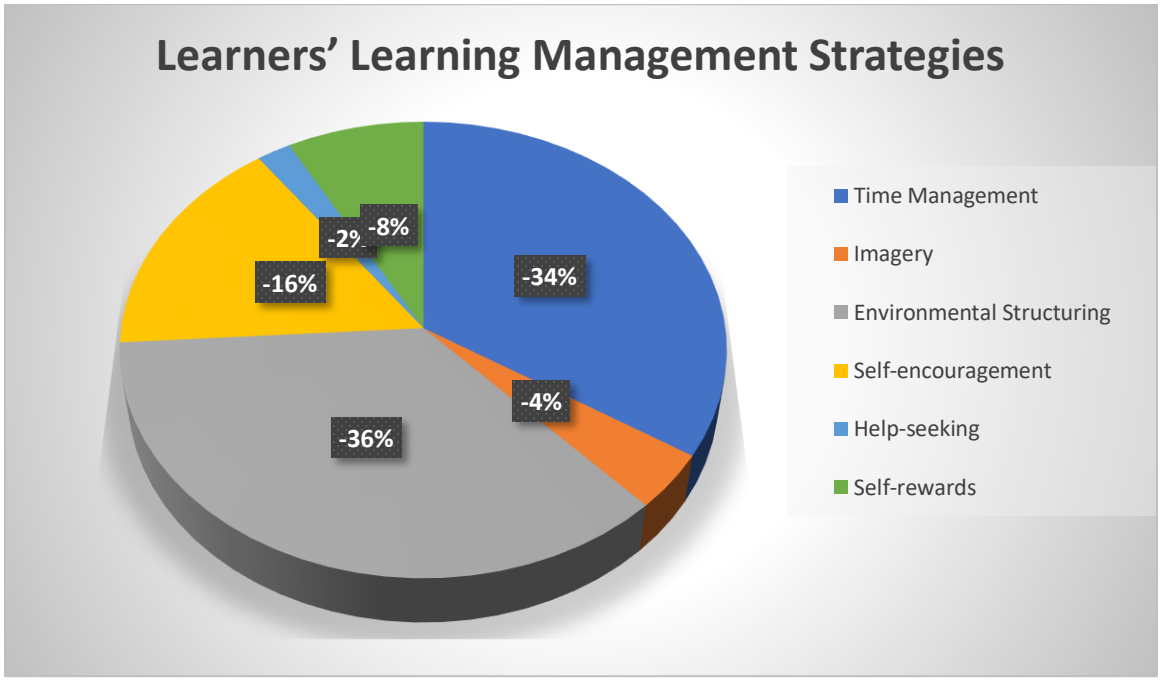
Table 3.8 shows that the majority of students (60%) believed strategic planning is necessary before engaging in learning tasks while 40% of students stated that they refrain from planning before taking action.

In this question, students who chose “yes” were asked to justify their answers. However, only 27 students out of 30 justified their answers. The majority of respondents showed a general preference for planning before taking action in order to improve efficiency, effectiveness, and organization in completing tasks. learners reported that planning helps them in finding solutions quicker, keeping them focused and organized, breaking down complex tasks into smaller constituents, and managing time and resources. By contrast, other learners might prefer a more spontaneous approach, tackling problems as they arise, which can be effective in some circumstances for straightforward and simple tasks. The retrieved data indicates that most learners are aware of the benefits of metacognitive learning strategies such as planning and heavily rely on it before engaging in tasks. Conversely, some learners feel that planning is an unnecessary step due their preferred learning styles and strategies as well as learners’ perception about task difficulty. Learners who perceive most tasks as relatively easy see very little benefit from strategic planning.

Q9- Which of these strategies do you think is most useful in order to maintain concentration and interest during the task?

Chart 3.3

Learners' Learning Management Strategies



The data displayed in chart 3.3 shows a clear distribution across the six strategies, with Environmental Structuring (36%) and Time Management (34%) being the most frequent choices. This indicates that a majority of students believe that proper time management reduces stress, increases efficiency, and maintains interest during the task. Additionally, learners are aware of the importance of creating a dedicated workspace which is optimal for learning. Such environments help learners maximize focus, minimize distraction, and streamline their learning. 16% of students chose self-encouragement. This implies that some learners rely on positive, self-directed messages of encouragement in order to maintain a growth mindset as well as boost their motivation and perseverance during challenging tasks. 8% of respondents opted for Self-rewards. This Signifies that they recognize the value of setting achievable objectives, self-care, and creating a reward system. This makes learning a more fulfilling experience. Imagery (4%) and Help-seeking (2%) are the least opted choices, which may suggest that students are not aware of

the helpfulness of visualization techniques or do not rely on these techniques as often as others. Additionally, some students demonstrated a reluctance to ask other students for help and would rather depend on themselves. The retrieved data from Q9 implies that learners rely on cognitive and metacognitive strategies such as Time Management and Environmental Structuring far more than motivational strategies such Self-appraisal and Self-encouragement. This suggests that most learners focus on cognitive and metacognitive control processes for self-regulated learning during tasks. Additionally, the importance of motivation gradually diminishes as task progression advances.

Q10- How frequently do you evaluate yourself after a task or exam?

Table 3.9

Learners' Use of Self-evaluation

Options	Number of responses	Percentage (%)
Always	2	4
Often	18	36
Sometimes	20	40
Rarely	6	12
Never	4	8
Total	50	100

As table 3.9 displays, respondents expressed a favourable disposition towards "sometimes" and "often" (40% and 36% respectively). This suggests that a majority of students (76%) do some level of self-evaluation after tasks or exams. This indicates that students likely see the value of reflection in identifying strengths, weaknesses, and areas for improvement. 12%

of students stated that they rarely evaluate themselves while 8% of students stated that they never evaluate their performance. This may be due to the fact that some learners lack the self-reflection skills necessary to properly self-evaluate. Some learners may not fully understand the assessment criteria while other learners, such as high-achievers, may not see the value of self-evaluation since they are likely to be satisfied with their performances. A small proportion of students (4%) always evaluate themselves after exams. These students might be highly self-aware learners who prioritize constant reflection and seek improvement. They might have a strong internal focus of control and actively seek feedback for their performance. The results above indicate that most learners deploy self-reflective strategies in order to assess their own learning. Furthermore, learners seem to use these self-reflections in order to generate causal attributions for their success or failure.

Q11- Do you attempt to find better methods and strategies of learning after you evaluate your performance?

Table 3.10

Learners' Attitudes towards Improving their Learning Strategies

Options	Number of responses	Percentage (%)
Yes	38	76
No	12	24
Total	50	100

According to the demonstrated results in table 3.10, the overwhelming majority of students (76%) stated they actively seek better learning methods after self-evaluation. This hints at a strong emphasis on self-improvement and a growth mindset. Conversely, 24% of students do

not make any effort to find better strategies of learning after self-evaluation. This may suggest that the students are satisfied with their current methods or simply lack the motivation to improve their performance through better strategies. The data extracted from Q11 implies that learners use self-evaluation as a formative assessment measure. Learners produce reflective data which they later use to make adjustments, resulting in learners approaching similar tasks in different ways in order to improve performance.

Q12- To which extent do you agree with the following statement: "Self-regulated learning is a strong indicator of academic success"

Table 3.11

Learners' Views Concerning Self-Regulated Learning as an Indicator of Academic Success

Options	Number of responses	Percentage (%)
Strongly Agree	16	32
Agree	23	46
Neither Agree nor Disagree	10	20
Disagree	1	2
Strongly Disagree	0	0
Total	50	100

Table 3.11 shows that 32% of students strongly agreed that self-regulated learning is a crucial factor in predicting academic success. Similarly, 46% of students agreed that self-regulated learning plays a significant role in achieving academic success. 20% of the students showed a neutral disposition towards the statement. Only 1 student (2%) disagreed with the statement that self-regulated learning indicates academic success. This shows that most students

strongly believe in the significance of self-regulated learning as a predictor of academic success and exhibit a positive disposition towards self-regulation. The data retrieved from Q12 affirms the belief that learners who successfully plan ahead, set-goals, are intrinsically and/or extrinsically motivated, and successfully monitor and evaluate their performance are more likely to succeed than learners who rarely or poorly self-regulate their learning. This is consistent with educational research that emphasizes the critical role of self-regulation in managing learning processes and fostering cognitive, metacognitive, and motivational factors which, in turn, improve academic performance.

Q13- Do you consider yourself a self-regulated learner?

Table 3.12

Learners' Self-perceptions of being Self-regulated

Options	Number of responses	Percentage (%)
Yes	11	22
No	39	78
Total	50	100

According to the data illustrated in table 3.12, 78% of students considered themselves to be self-regulated learners while 22% stated that they do not. In this question, learners were asked to justify their choices. However, only 30 students out of 50 justified their answers. The majority of learners claimed to perceive themselves as self-aware, recognizing their strengths and weakness, and highly self-efficacious. These learners also reported that they are intrinsically motivated, receive the best marks, set goals, plan strategies, search for information, and monitor their own performance. More importantly, the majority of students perceive themselves as self-

regulated learners because they rely on themselves for learning rather than on peers or teachers. By contrast, some learners claimed that they struggle to manage their time and environment. Additionally, these learners reported a lack of learning motivation and failure to set appropriate learning goals. Data extracted from Q13 confirms that most learners have a false perception of the concept of self-regulated learning, believing that self-regulation constitutes relying on yourself and refusing to ask peers for help, which is not the core principle of self-regulated learning. Most learners seem confuse self-regulated learning with self-learning.

3.4.1.3 Section Three: Artificial Intelligence Applications in the Learning Process

Q14- How often do you use technology while learning?

Table 3.13

Learners' Use of Technology

Options	Number of responses	Percentage (%)
Always	27	54
Often	15	30
Sometimes	6	12
Rarely	2	4
Never	0	0
Total	50	100

Table 3.13 displays the frequency of using technological tools in learning. Over half of the sample students (54%) stated that they depend on technological tools all the time. 30 % of students stated that they often make use of technology. 12% of students admitted that they use it sometimes while only two students (4%) pointed out that they rarely utilize technological tools

during the learning process. This suggests that most learners acknowledge the widespread advantages of using technology for learning. The data extracted from Q14 implies that modern learners are highly dependent on technological tools in order to accommodate their learning needs. Additionally, the fact that no respondents opted for the choice of "never" suggests that technology constitutes an inseparable part of the modern educational context.

Q15- Have you ever encountered the concept of AI?

Table 3.14

Learners' Familiarity with Artificial Intelligence

Options	Number of responses	Percentage (%)
Yes	47	94
No	3	6
Total	50	100

As shown in table 3.14, the vast majority of students (94%) stated that they are familiar with AI, which in turn indicates that they possess background knowledge and experience in terms of AI use. The data extracted from Q15 indicates that AI is a well-known and trendy concept for most students. This may be mainly due to their use of it, increased media coverage, and everyday interactions.

Q16- Which application/ site do you think is most beneficial?

Table 3.15

Learners' Preferred AI Applications

Options	Number of responses	Percentage (%)
ChatGPT	26	52
Gemini	10	20
Aithor	3	6
Others	11	22
Total	50	100

Concerning the data displayed in table 3.15, the majority of learners (52 %) chose ChatGPT as their preferred AI application. 26 % opted for Gemini while 6% opted for Aithor. Many students also mentioned other AI application, namely: Snapchat (8%), Grammarly (2%), Chat AI (2%), Perplexity (2%), Bing (2%), You.com (2%), Quill Bot (2%), and Claude AI (2%). This preference for ChatGPT suggests that students receive suitable answers that serve their needs. This also indicates that learners are more comfortable using ChatGPT than alternative AI powered software due to its usefulness, high accessibility, and social presence. This indicates that AI applications are extensively used and each student has a specific preference based on its advantages. The different choices of AI applications suggest that the students are already aware of these tools and have used them before.

Q17- What do you think about the idea that all students should use artificial intelligence tools?

Table 3.16

Learners' Views Concerning the Use of Artificial Intelligence Tools

Options	Number of responses	Percentage (%)
Strongly Agree	13	26
Agree	18	36
Neither Agree nor Disagree	15	30
Disagree	3	6
Strongly Disagree	1	2
Total	50	100

Regarding the data displayed in table 3.16, 26% of students strongly agree with the statement that all learners should use AI tools. Similarly, 36% of respondents expressed that they agree with the aforementioned statement. A significant proportion of students (30%) showed a neutral disposition towards the statement. A miniscule proportion of respondents chose the option of disagree and strongly disagree (6% and 2% respectively).

In this question, students were asked to justify their opinion on the use of AI tools. The majority of students who displayed a positive disposition towards AI use stated that AI tools should be used because they support the learning process, save time and energy, help acquire new knowledge and updated data, and can be used for self-assessment and assignment correction. The respondents who chose to remain neutral justified their position by citing concerns of becoming over-reliant on AI, leading to learners becoming passive and lazy. Additionally, learners expressed that AI is not reliable all the time and should only be used superficially. Respondents who expressed negative attitudes towards the use of AI justified their

opinion by stating that AI does not encourage the creativity of the learner nor their willingness and ability to use other resources. It also hinders the learners critical thinking skills. They also expressed that AI threatens the ethical principles of academic learning and research. The retrieved data from Q17 suggests that the majority of learners favour the use of AI applications in their learning. Additionally, these learners recognize the benefits as well as the numerous applications of AI in learning. Conversely, a significant portion of learners seem to recognise AI as a double-edged sword, coming with its own set of advantages and disadvantages. Thus, emphasizing that this tool should be used in appropriate ways and specific times. Additionally, AI is not a replacement for studying but a supplement to it.

Q18- How frequently do you use artificial intelligence tools (ChatGPT for example) to prepare for lessons?

Table 3.17

Learners' Use of Artificial Intelligence Tools for Learning.

Options	Number of responses	Percentage (%)
Always	20	40
Often	11	22
Sometimes	14	28
Rarely	2	4
Never	3	6
Total	50	100

As illustrated in table 3.17, a significant portion of students (40%) stated that they always use AI for lesson preparation while 22% stated they often use it. However, some students (28%)

reported that they sometimes use AI while others (4%) stated that they rarely use these tools. 6% of students claimed that they never used AI applications before. This suggests that modern learners are heavily reliant on AI applications in the learning process. The extracted data from Q18 indicates that AI tools can potentially save time and efforts in lesson planning, help personalise learning experiences for students, and provide access to a vast amount of information and resources.

Q19- Does the use of Artificial Intelligence tools affect your motivation to learn?

Table 3.18

Artificial Intelligence Tools' Influence on Learner Motivation

Options	Number of responses	Percentage (%)
Yes	37	74
No	13	26
Total	50	100

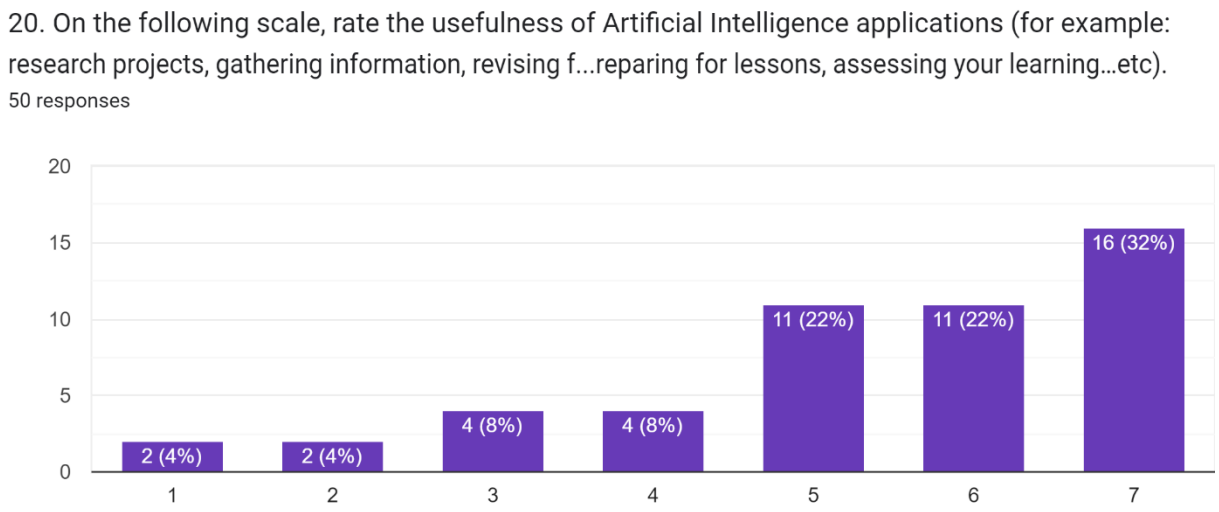
According to the displayed information in table 3.18, the majority of the sample students (74%) reported that using AI tools influences their motivation to learn. By contrast, 26% of students stated that using AI does not motivate them. Based on the respondents' justifications, nearly all students are motivated due to accessibility, ease of acquiring new information, availability of sources without wasting time and effort, experiencing modern technologies, and providing creative ideas. Conversely, students who stated that their motivation remains uninfluenced by AI justified their stance by mentioning their lack of trust in AI, learning styles and preferences, technical difficulties when using AI, and privacy concerns. The data gathered from Q19 indicates that students' motivation toward using AI tools reflects their strong interest

in this type of learning experience. The results also confirm that AI as a modern technology raises learners' engagement and interest in learning, confidence, and self-efficacy beliefs, thus making goals feel more attainable and raising overall learning motivation.

Q20- On the following scale, rate the usefulness of Artificial Intelligence applications.

Chart 3.4

Usefulness of Artificial Intelligence Applications in Learning



The data illustrated in chart 3.4 shows that on the proposed scale of 1-7, the sample students' score averaged at around 6 (n=5.94). This means that the majority of learners believe that AI tools are useful for learning. This suggests that learners recognize the benefits of using AI applications for learning. The data extracted from Q20 confirms that learners exhibit a favourable disposition towards using AI tools for learning considering the wide range of applications and advantages this technology offers.

Q21- Do you believe that becoming a self-regulated learner can be facilitated using artificial intelligence tools?

Table 3.19

Learners' Views about Artificial Intelligence Tools as Facilitators for Self-regulated Learning

Options	Number of responses	Percentage
Yes	44	88
No	6	12
Total	50	100

Table 3.19 shows that 88% of students suggested that AI tools can effectively support SRL. By contrast, 12% of students believed that AI tools cannot be used to facilitate the SRL process. Students were requested to justify their answers. Learners who chose "yes" reported that AI tools help them in various aspects of SRL including metacognition, motivation, time management, and guidance. Those who chose "no" justified by citing technical issues as the reason for their belief. The provided justifications prove that AI tools have the potential to be valuable assets in promoting self-regulated learning; however, it is crucial to use them thoughtfully and strategically.

Q22- Do you consider the ethical risks of using artificial intelligence applications for learning?

Table 3.20

Learners' Consideration about the Ethical Risks of Using Artificial Intelligence Applications

Options	Number of responses	Percentage (%)
Yes	28	56
No	22	44
Total	50	100

The data in table 3.20 reflects a divided perspective on the ethical risks associated with AI. 55,1% considered ethical risks. The remaining 46% did not seem worried about ethical principles. In this question the students were asked to uphold their choice of considering ethical risks, they express concerns about bias, discrimination, privacy issues, job displacement, lack of transparency, and weaponisation of AI. Few students believed that potential benefits outweigh the risks. This indicates an increasing awareness of potential problems.

Q23- Please feel free to add any information concerning this topic

We concluded the questionnaire by asking students to share any additional insights on the topic. Only Eighteen (18) students (36%) took this opportunity to offer suggestions, which are summarized below:

-AI tools can assist students in setting realistic learning goals, tracking progress, and identifying areas where they may need to adjust their approach. Thereby promoting metacognitive skills.

-Personalized recommendations powered by AI can keep students engaged and motivated throughout the learning process.

-AI has the potential to identify students' strengths, weaknesses, and learning styles. Allowing for the creation of personalized learning paths with targeted resources and activities that promote SRL skills.

- Artificial Intelligence is a double-edged sword and its utility heavily depends on the learner rather than the technology itself. Guidelines and protocols of utilization are necessary in order to ensure that learners use these tools appropriately without misuse or misconduct.

3.5 Summary of the Results and Findings from the Students' Questionnaire

Based on the collected and analysed data from the students' questionnaire, some perspectives have been detected concerning the usefulness of using Artificial Intelligence

applications in order to promote Self-regulated Learning. Results revealed some of the learners' perspectives about various aspects of self-regulated learning and self-regulated strategy use. It also illustrated learners' disposition towards AI and its utilization in the learning process.

Firstly, in the general information section. The two questions aimed to gather background information about the learners as well as inquire about their perceptions of their English level. The gathered results demonstrated that most learners have studied English for at least 11 years. Thus, they should have developed sufficient knowledge, experience, and self-regulated language learning strategies. Additionally, results showed that the majority of learners perceive themselves as intermediate or advanced English language learners, indicating positive self-perception views and high confidence levels.

Secondly, the self-regulated learning section covers questions related to learners' perception about self-regulated learning, its phases, components, and some self-regulated learning strategies. The majority of learners reported that they have encountered the concept of self-regulated learning in previous modules. The majority of learners also exhibited a favourable disposition towards the belief that self-regulated learning constitutes a strong predictor of academic success. This is consistent with Zimmerman's claim that self-regulated learning highly correlates with academic achievement.

In this section, questions 4, 5, 6, 7, and 8 were devoted to inquire about learners' self-regulatory processes and strategies throughout the forethought phase as described in Moylan and Zimmerman's cyclical phases model. Results showed that most learners are somewhat reliant on the instructor for information retrieval, mostly during class. Additionally, learners also engage in information retrieval by themselves outside the classroom. Results also showed that learners deploy task analysis strategies through processes of goal setting, activation of prior knowledge,

and strategic planning. The gathered data also demonstrates learners' self-motivation beliefs. The majority of learners emphasized the value of task interest in promoting learner motivation. Additionally, learners also believed that goal orientation and self-efficacy beliefs play a crucial role in increasing and maintaining learner motivation.

Question 9 aimed to investigate learners' self-regulation strategies during the performance phase. The data gathered illustrates that the majority of learners engage in cognitive and metacognitive self-control processes rather than self-motivation strategies. This indicates that as task progression advances, strategies such as imagery and environmental structuring, which are deployed in order to complete the tasks more efficiently, are favoured over self-motivation strategies such self-encouragement, which are used in order to persevere through a task. In other words, students use motivation as a process to help them initiate engagement in the task, not maintain that engagement through the task.

Questions 10 and 11 were devoted to investigate learners' self-regulatory processes during the reflection phase. The results demonstrate that most learners frequently self-evaluate their own performance after tasks or exams. Learners also reported that this self-evaluation is for the purpose of finding better methods and learning strategies. They use self-evaluation as a means of collecting data and adjusting their learning strategies accordingly. Additionally, learners use self-evaluation in order to generate causal attributions, in other words, explain the failure or success of their performance.

The final question in this section was aimed to gather information about learners' self-perceptions about being self-regulated learners. The data demonstrates that most learners perceive themselves as self-regulated learners. Respondents justified this opinion by stating that they set-goals, are intrinsically motivated, manage their study time efficiently, and always seek

to improve their learning abilities and strategies. However, a common trend among these learners is the assumption that they are self-regulated learners mainly because they study by themselves and do not request help from teachers and peers. This is consistent with Pintrich's view that many learners have a misconception about self-regulated learning. This confirms Pintrich's claim since learners cannot distinguish between self-learning, and self-regulated learning.

Finally, the third section attempted to investigate learners' familiarity with the concept of AI and its applications in learning. Additionally, this section attempted to establish a connection between using AI tools and their impact on the learners' self-regulation. Findings indicate that the majority of learners endorse an educational context where the use of AI applications is prominent. Learners further commented by stating the numerous advantages that AI applications offer; however, some learners also raised concerns about the dangers of using AI applications, namely ethical risks, loss of creativity, laziness, and over-reliance. The majority of students affirmed that when they use AI tools, they are highly motivated in that they can perform better and achieve high grades. Findings show that learners are more confident using AI tools. Additionally, learners reported that AI facilitates the learning process to great extent, thus boosting their overall motivation to learn. Results also indicate that AI tools help learners define their goals, reflect on their learning process, offer feedback for improvement and targeted interventions, and recommend relevant sources; all of these reflect the various relevant aspects of SRL.

These findings also demonstrate learners' strong support for incorporating AI tools into the learning process since the majority of learners recognized their benefits and are well versed in the use and maintenance of AI applications. Most importantly, many students displayed awareness towards the ethical considerations of using AI applications such as unreliable sources,

threats to copyright laws and intellectual property theft, plagiarism, and loss of integrity. This leads to the conclusion that AI applications help learners to be self-regulated learners. Just as important, results show that most learners share the belief that AI applications can support complex self-regulated learning strategies. Thus, it is imperative to give learners the opportunity to use these tools in order to support their learning. Additionally, it is equally as important to design AI applications for specific educational purposes and to guide and train learners in their proper use.

Conclusion

The current chapter discussed the analysis, interpretation, and description of the findings of the students' questionnaire. The retrieved results clearly indicate the relationship between the use of Artificial Intelligence applications and self-regulated learning. Furthermore, it illustrates learners' positive disposition towards using AI tools in learning in order to improve their self-regulatory skills. Thus, carefully designed and properly used AI tools can be applied as an external support in order to help learners self-regulate successfully in the modern educational context. However, a one group quasi-experimental study is needed in order to confirm these results.

CHAPTER FOUR

QUASI-EXPERIMENTAL STUDY

Introduction

The current study is a based on a one group pretest post-test quasi-experiment which took place at the Department of Letters and English Language, University of 8 Mai 1945, Guelma. It aims at investigating the relationship between the use of Artificial Intelligence applications for learning and learners' self-regulated learning. The quasi-experiment was conducted with twenty (20) first-year master students. Therefore, this chapter presents the methodology and the design of the study including the relevant research methods, data gathering tools, as well as sampling and population. This chapter also details the procedure of the quasi-experimental study including a description of the pretest, post-test, and the treatment. Additionally, this chapter presents the results of descriptive analysis of the pretest and post-test scores as well as their analysis, description, and interpretation. This chapter concludes with a summary of the findings according to their respective analysis and interpretation.

4.1 Research Methodology

4.1.1 Research Method and Tools

The current study attempts to investigate the usefulness of using Artificial Intelligence applications and their role in promoting self-regulated learning. For this end, a quasi-experimental method has been adopted in order to examine the relationship between the two variables. The study consists of a one group pretest/post-test quasi-experiment which has been conducted on first-year master students of English. The aim is to confirm whether or not using Artificial Intelligence applications increases the learner's self-regulated learning.

4.1.2 Research Population and Sample

The population under investigation consists of students at the Department of English, University 8 Mai 1945, Guelma. The sample consists of twenty (20) first-year master students of

English who all study in the same group (Group One). The choice of first-year master students was based under the assumption that most learners at this stage exhibit, to some extent, different aspects and strategies of self-regulated learning which vary depending on their individual differences. Additionally, most first-year master students are well versed in the use and maintenance of AI powered software and have sufficient knowledge and experience using them for learning purposes. Group One was specifically selected for this quasi-experiment based on multiple teachers' recommendations, academic performance, and scores. Thus, this sample is expected to yield accurate and reliable data.

4.2 The Quasi-experimental Procedure

The quasi-experimental study consists of three main parts: the pretest, the treatment, and the post-test. The pretest and post-test are identical and based on Raul Pintrich's Motivated Strategies for Learning Questionnaire (MSLQ), a well-established and widely used instrument for measuring learners' self-regulated learning. The treatment consists of an intervention which aims to integrate the use of Artificial Intelligence applications in the learning process. It is based on Zimmerman and Moylan's Cyclical Phases model of the self-regulated learning process.

4.2.1 Description of the Pretest/Post-test Questionnaire

The pretest and post-test used in this study are identical and adopted from Pintrich's MSLQ, a SRL instrument designed to assess university student's use of different learning strategies and their motivational orientations. The MSLQ originally consists of 81items distributed as follows: 31 items for the motivation scale and 50 items for the learning strategies scale. However, in order to fit the needs of the study, the number of items has been reduced to 27 items. These items are distributed as follows: 12 items for the motivation scale, and 15 items for the learning strategies section. Each item consists of a 7-point Likert scale (APPENDIX 2).

Each scale is divided into different sections which assess particular aspects related to that scale. The motivation scale consists of three sections: value components, expectancy components, and affective components. First, Value components include intrinsic goal motivation (Items 1 and 2), and extrinsic goal motivation (Items 3-5). Second, Expectancy components include control of learning beliefs (Items 6 and 7) and self-efficacy for learning and performance (Items 8 and 9). Third, affective components include test anxiety (Items 10-12).

The learning strategies scale is divided into two sections: cognitive and metacognitive strategies, and resource management strategies. Firstly, cognitive and metacognitive strategies include critical thinking (Items 13 and 14), and metacognitive self-regulation (Items 15-18). Secondly, resource management strategies include effort regulation (Items 19 and 20), time and environment regulation (Items 21-23), peer learning (Items 24 and 25), and help seeking (Items 26 and 27).

4.2.1.1 The Pretest

At the beginning of the study, a pretest was administered to the quasi-experimental group in order to assess their learning strategies and motivational orientations. The test consists of 27 statements concerning learning strategies and motivation. Each statement is attached to a 7-point Likert scale. Learners were prompted to read the items presented in the test and to choose the number which best describes them on the aforementioned scale. The learners under investigation took approximately 15 minutes to complete the questionnaire.

4.2.1.2 The Treatment

The treatment in this quasi-experimental study comes in the form of a classroom intervention that is based on Zimmerman and Moylan's Cyclical Phases model. Accordingly, the

treatment consists of three key phases: the forethought phase, the performance phase, and the self-reflection phase.

The forethought phase begins immediately after the pretest. Learners were asked to prepare a topic of discussion which will be implemented in the performance phase. Learners were instructed to use their preferred Artificial Intelligence tools to prepare for a lesson about Mesoamerican Civilizations. The quasi-experimental group was encouraged to use their imagination when using AI in order to inquire about different aspects such as religion, social structure, politics, geography, economy, and others. Learners were also advised to take notes of their findings and bring them to class the next day for the next phase. The selection of the topic of Mesoamerican Civilizations is based on the assumption that learners' have relatively limited knowledge about it since they do not study Mesoamerican civilizations in any of their modules. This was in order to incentivize learners to engage in a deep search for new information and see how well they can use AI powered tools in order to fit their learning needs.

The performance phase took place the next day at the beginning of the session. In this phase, learners engage with each other and the instructor in a discussion of their findings. The discussions included multiple aspects of Mesoamerican civilizations such as geographical location, timelines, technology, social structure, political organization, economy, religion, division of labour, architecture, and culture. Learners also took part in tasks such as writing paragraphs and answering specific questions concerning the topic. Learners were asked beforehand to make sure that they bring their cell phones. Learners were also provided with free internet access and were actively encouraged to rely on their preferred Artificial Intelligence software in class. For writing tasks, learners were specifically instructed to summarize and paraphrase as much as possible and to take into consideration plagiarism. Concerning

discussions and answering questions, learners were also instructed to limit reading directly from their notes or their phones and to use their own words instead. The performance phase took approximately 65 minutes to complete.

The self-reflection phase begins immediately after the performance phase. In it, learners are given 5-10 minutes in order to reflect and self-assess their performance. Learners were instructed to ponder questions such as: did I learn something new today? How did I learn it? Which strategies did I apply in order to learn it? Where those strategies effective? Did exert my best effort on this assignment? Which strategies or skills do I need in order to do better at this assignment? Did I achieve the goals I set for myself at the beginning of the session? Why yes and why not? and other questions which provoke self-judgement and self-evaluation in preparation for the post-test.

4.2.1.3 The Post-test

The post-test is administered immediately after the treatment. It is identical to the pretest and aims to assess the students' learning strategies and motivation after the intervention. It follows the same procedure as the pretest and helps investigate whether the treatment had an apparent effect on students' self-regulated learning. The learners under inquiry took approximately 10 minutes to complete the post-test.

4.3 Analysis and Interpretation of the Results

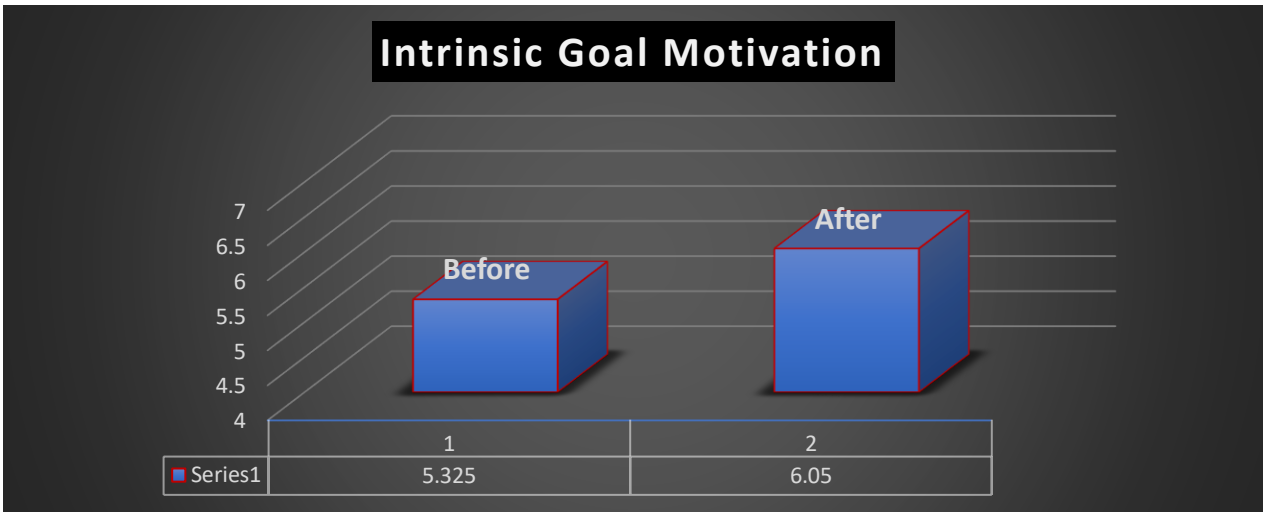
4.3.1 Descriptive Statistics

For this study, the statistical analysis software SPSS is used to run descriptive analysis. The generated results are summarized in the following graphs which provide a comparison between the learners' average scores before and after the treatment. Each section is analysed separately.

4.3.1.1 Pretest and Post-test Results Concerning Value Components

Graph 4.1

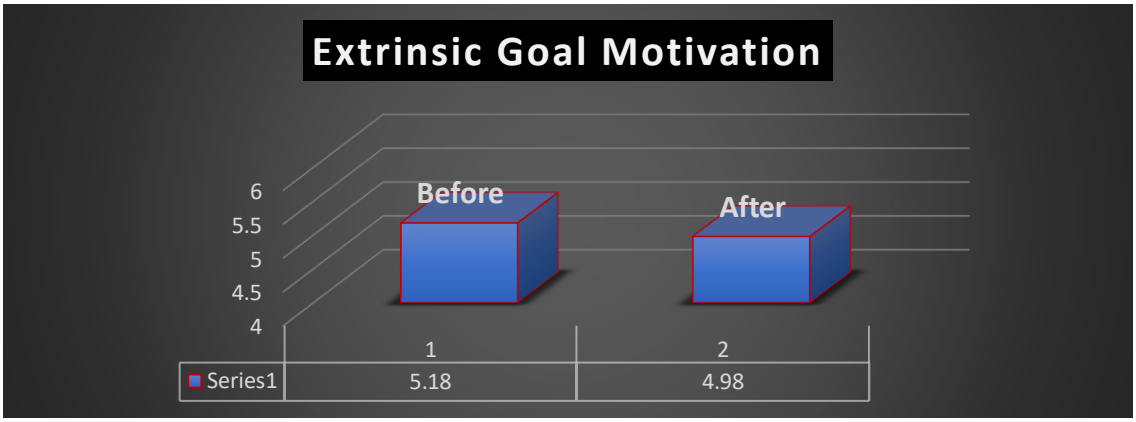
Comparison Between Learners' Intrinsic Goal Motivation Before and After the Treatment



The scores displayed in the graph above show that there is a significant difference in learners' intrinsic goal motivation scores. Before the treatment, the sample students' average score concerning intrinsic goal motivation is 5.325. After the treatment, the students' average score is 6.05. This constitutes a 13.61% proportional increase in learners' intrinsic motivation score. The results reveal that using Artificial Intelligence applications noticeably increases task interest and learner engagement. It also increases the learners' drive for personal development; thus, learners are more self-initiated. Learners reported that they are more open to challenging tasks and focus more on understanding the course content more thoroughly. This is consistent with the results gathered from the students' questionnaire in which students reported that using AI increases their interest and engagement in the task.

Graph 4.2

Comparison Between Learners' Extrinsic Goal Motivation Before and After the Treatment

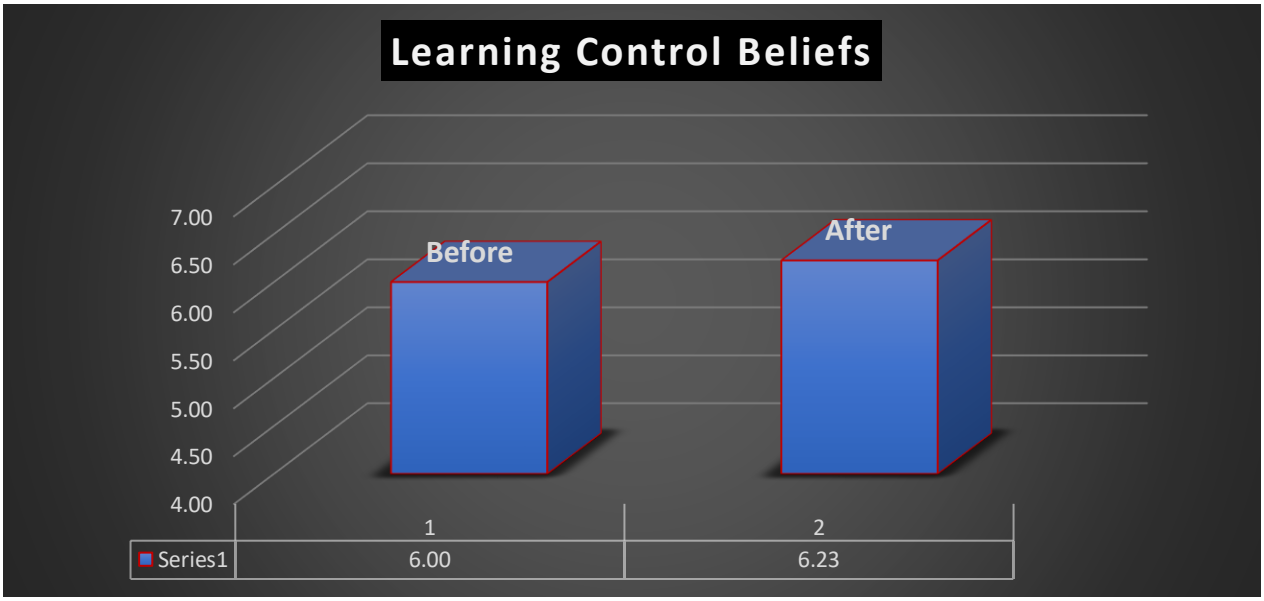


The data presented in graph 02 shows that there is a slight decrease in learners' extrinsic goal motivation scores. The learners' average score before the treatment is 5.18 compare to an average score of 4.98 after the treatment. This constitutes slight drop of 3.86% concerning learners' extrinsic motivation score. The results extracted indicate that learners are less motivated by external rewards when using AI tools in the learning process. Learners expressed that it is less likely that getting good grades or better grades than anyone else will be their main objective of learning. A potential explanation is that as learners' intrinsic motivation increases, they focus more on learning the course material thoroughly rather than scoring high on exams. In other words, learners may begin to value learning goals over performance goals.

4.3.1.2 Pretest and Post-test Results Concerning Expectancy Components

Graph 4.3

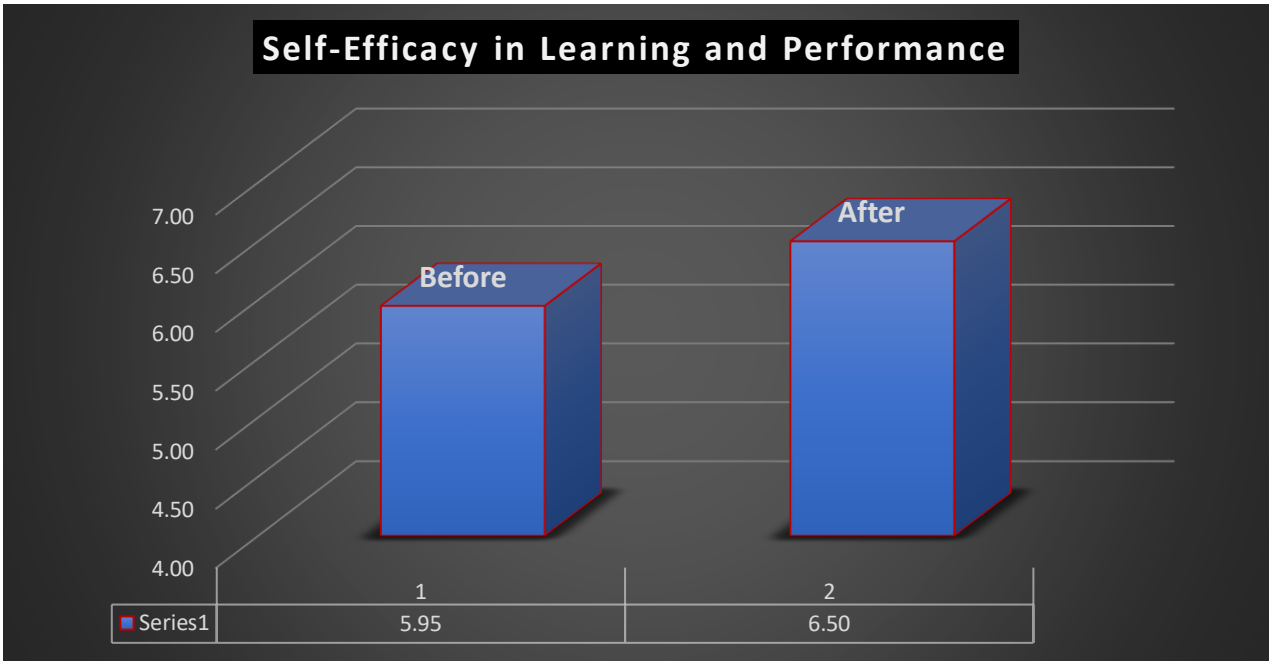
Comparison Between Learners' Control Beliefs Before and After the Treatment



According to the data displayed in the above graph, analysis shows a slight difference in learners' scores related to their learning control beliefs. The learners' average score before the treatment is 6.00 compared to an average score of 6.23 after the intervention. Hence, results show a slight proportional increase of 3.83% related to learners' average score concerning control beliefs. The retrieved results indicate that using Artificial Intelligence applications slightly improves learners' belief that effort exertion on a specific task will lead to positive learning outcomes. Learners expressed that failure to learn the material in a given course is attributed to them. Thus, learners seem to take slightly more control and responsibility for their learning.

Graph 4.4

Comparison Between Learners' Self-Efficacy Before and After the Treatment

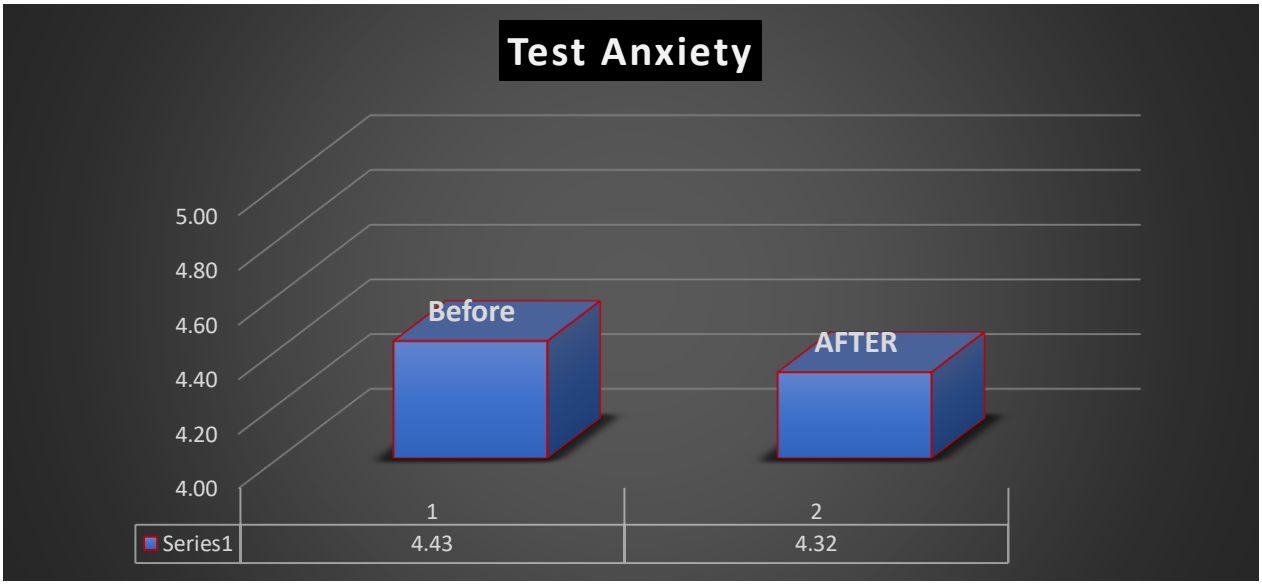


The data displayed in graph 04 shows noticeable change in learners' self-efficacy beliefs in learning and performance. The learners' average score before the treatment has been calculated at 5.95 while their average score after the treatment has been calculated at 6.50. The results indicate a 9.24% relative increase in learners' average score related to self-efficacy beliefs. The extracted data reveals that using Artificial Intelligence tools improves learners' confidence in achieving positive learning outcomes. Learners stated that they feel more confident in their ability to complete tasks and master the skills taught in class.

4.3.1.3 Pretest and Post-test Results Concerning Affective Components

Graph 4.5

Comparison Between Learners' Test Anxiety Before and After the Treatment

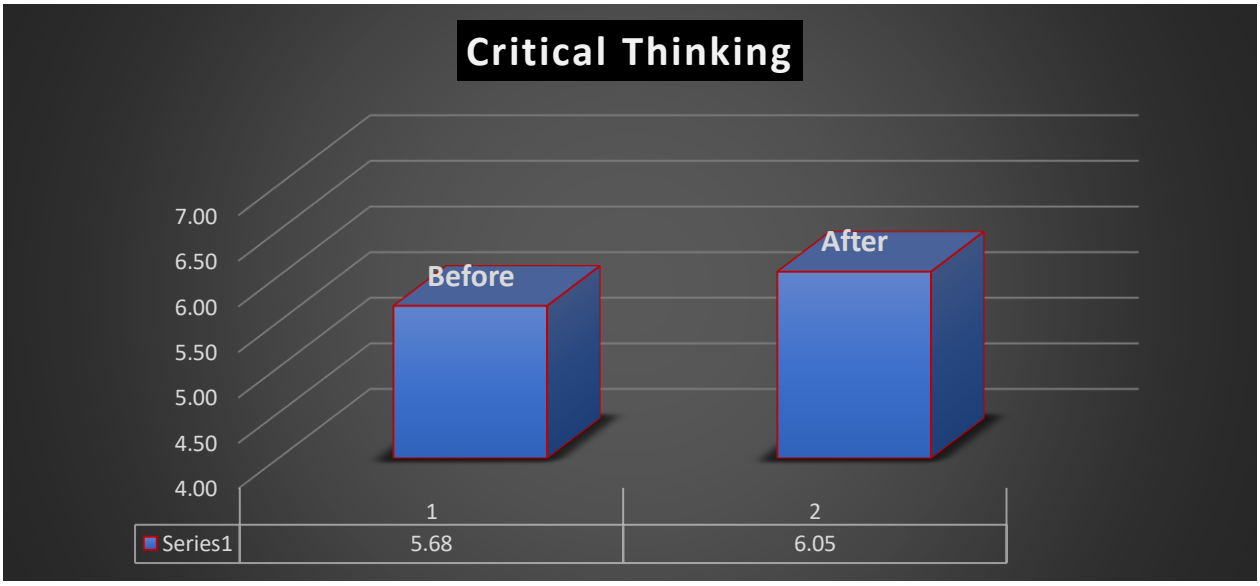


As illustrated in the graph above, the results show a marginal difference between learners' test anxiety scores. The learners' average score before the treatment is 4.43 compared to a score of 4.32 in the post-test. This indicates a marginal decrease (2.48%) in learners' test anxiety. The obtained results indicate that Artificial Intelligence tools are relatively ineffective in decreasing learners' test anxiety. Learners showed that despite the use of AI tools, they still consider the consequences of failing in a test. Additionally, they reported suffering from some symptoms such as stress and sensations of uneasiness or worry. This may be due to the fact that AI tools and applications are mostly used to prepare for exams and not during them. Additionally, learners are aware that the direct use these tools during exams is prohibited. These results may also be explained by the possibility that the sample students' anxiety may be trait anxiety rather than state anxiety.

4.3.1.4 Pretest and Post-test Results Concerning Cognitive and Metacognitive Strategies

Graph 4.6

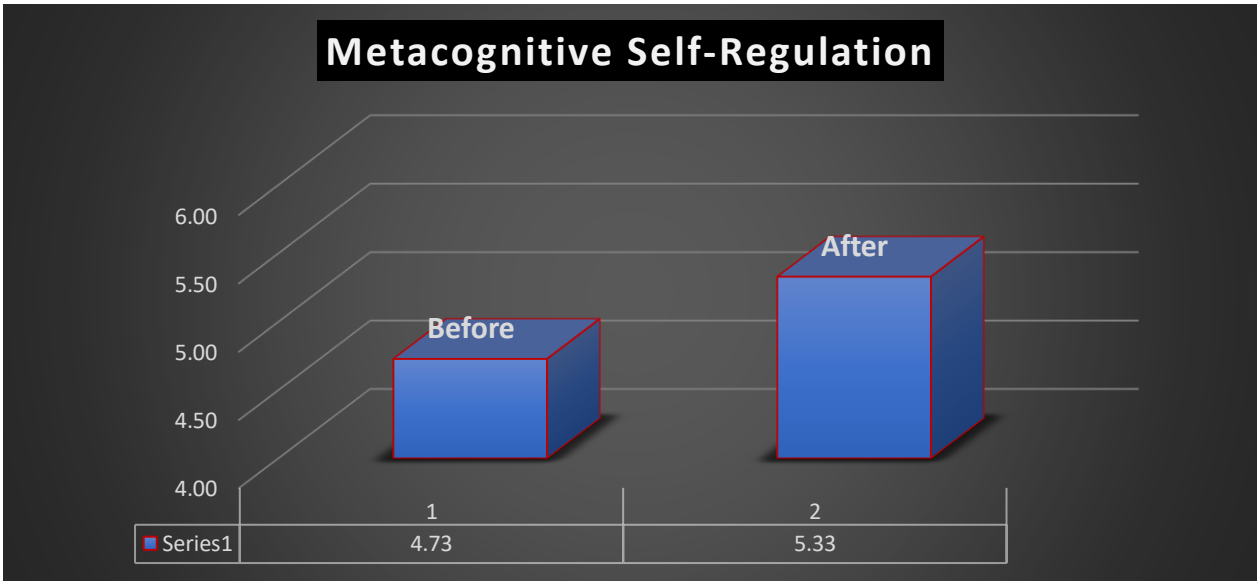
Comparison Between Learners' Critical Thinking Before and After the Treatment



According to the results displayed in graph 06, there is a slight difference between learners' scores concerning critical thinking strategies before and after the intervention. The learners' average pretest score concerning critical thinking strategies has been calculated at 5.68 compared to an average post-test score of 6.05. The results show a slight relative increase (6.51%) between the pretest and post-test scores. The extracted data suggests that using Artificial Intelligence tools increase learners' use of critical thinking strategies. Learners reported that with AI, they find themselves questioning the things they read as well as looking for possible alternatives to the conclusions that they find. This is because learners tend to treat the information presented by the teacher as infallible. However, they question the validity and reliability of information presented by AI software. Additionally, since the majority of learners use Generative AI tools such as ChatGPT, they are required deploy critical thinking skills in order to question, analyse, and evaluate the information found online.

Graph 4.7

Comparison Between Learners' Metacognitive Self-Regulation Before and After the Treatment

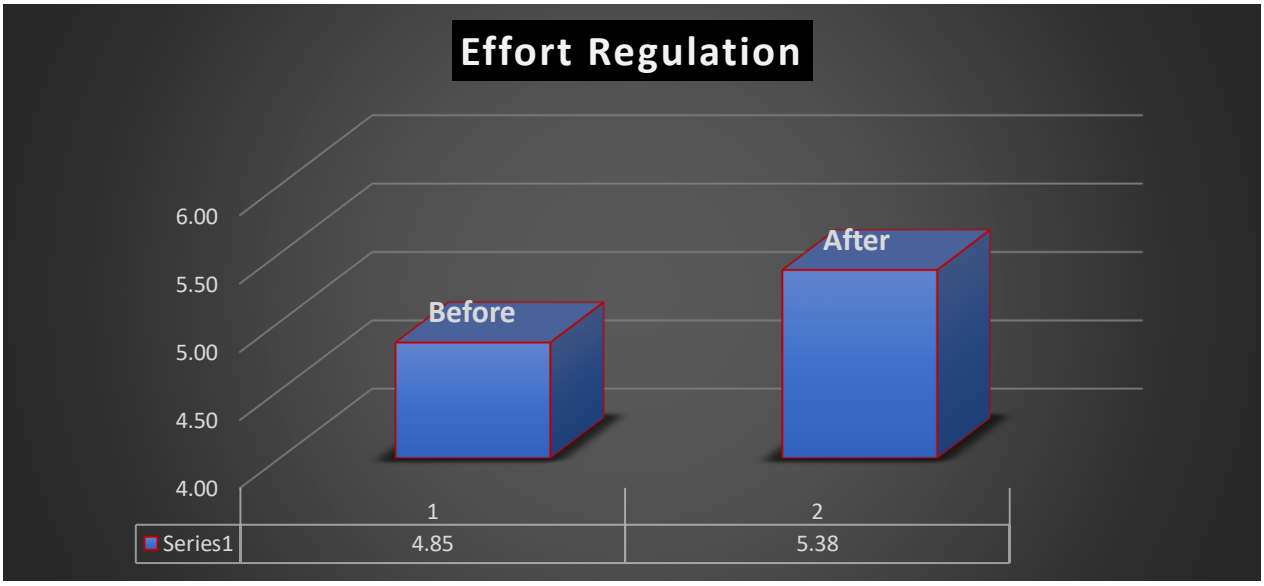


The data demonstrated in the graph above shows that there is a noticeable difference between learners' metacognitive self-regulation score before and after the treatment. The learners' average score before the treatment is 4.73 compared to an average score of 5.33 after the treatment. The statistics show a noticeable relative increase of 12.68% in learners average scores concerning metacognitive self-regulation. These results indicate that using Artificial Intelligence tools in the learning process prompts learners to monitor and control their thinking in order to facilitate learning. Consequently, learners reported that they are more likely to select or change their learning strategies according to certain factors such as course requirement or instructor teaching style. A number of learners also exhibited that they concentrate better in class when using AI tools.

4.3.1.5 Pretest and Post-test Results Concerning Time and Resource Management

Graph 4.8

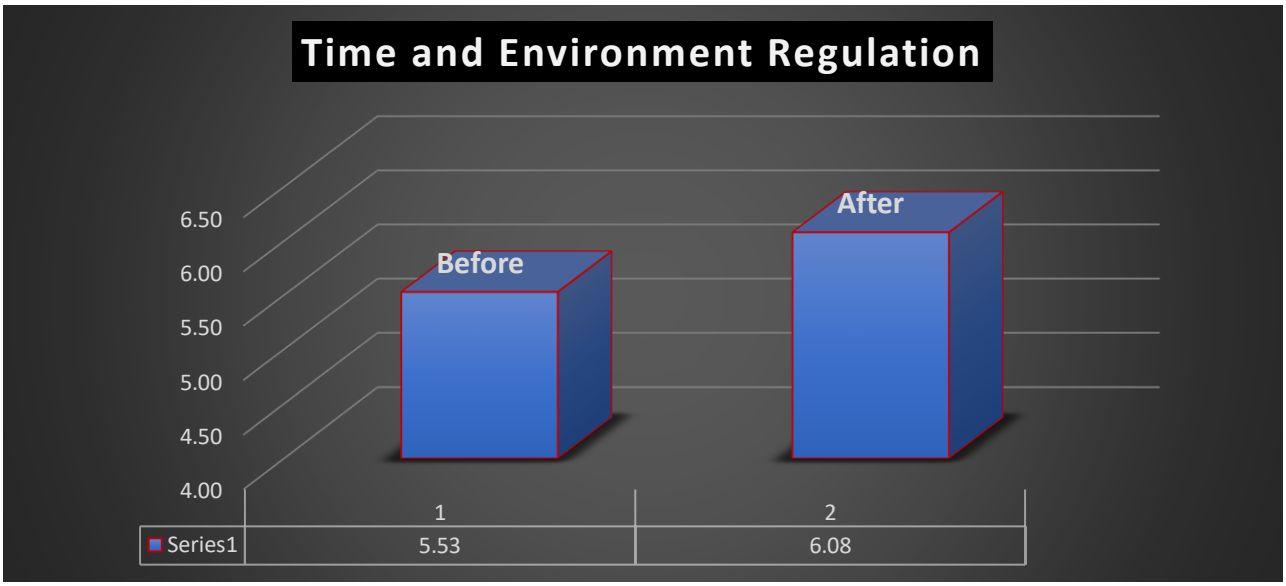
Comparison Between Learners' Effort Regulation Before and After the Treatment



The results illustrated in the graph above show a noticeable difference in terms of effort regulation between learners' before and after the treatment. The learners' average score in the pretest has been calculated at 4.85 while the average score in the post-test has been calculated at 5.38. Statistical analysis indicates a proportional increase of 10.92% in learners' average score concerning effort regulation proportionate to their average scores before the treatment. The extracted data implies that with AI applications in the learning process, learners are more willing to exert effort in studies. Learners expressed that they are willing to work harder in class, even if the subject does not align with their established interest. Learners also reported they are less willing to give up or drop out when course work becomes difficult. This increase is consistent with and supported by the findings illustrated in graph 01 which show an increase in intrinsic motivation.

Graph 4.9

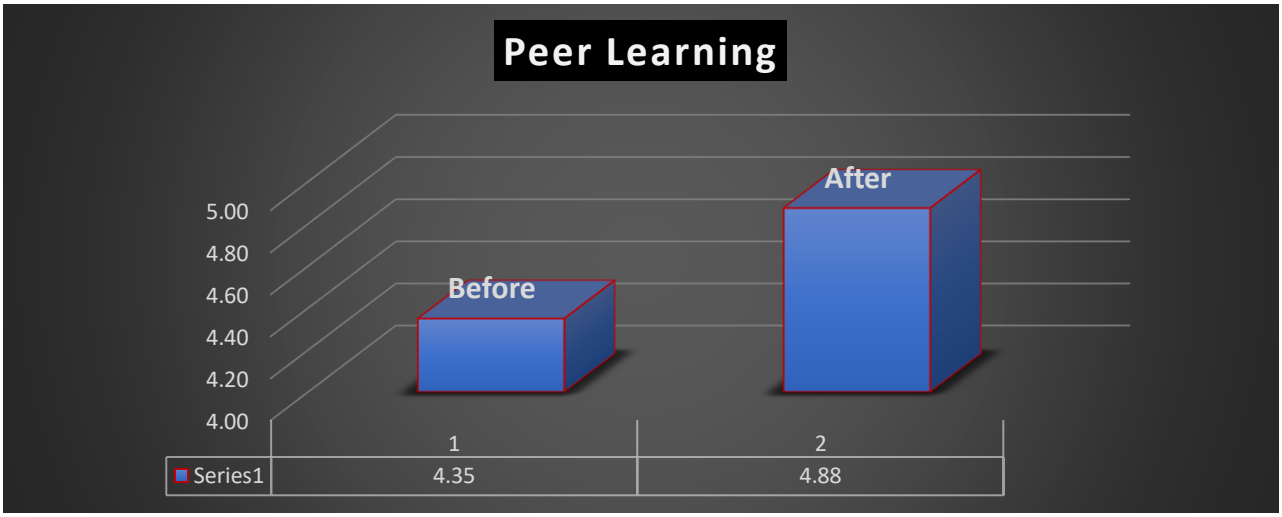
Comparison Between Learners' Time and Environment Regulation Before and After the Treatment



The data demonstrated in the graph above indicates an apparent different in learners' time and environment management scores. The average score for the pretest is 5.53 compared to an average score of 6.08 in the post-test. Analysis shows a noticeable relative increase of 9.94% between the pretest and post-test scores. The obtained results imply that using AI tools in the learning process improves learners time management and environmental structuring. Learners stated that they are more encouraged to attend classes regularly, make good use of their study time, and structure their environment in a way that eliminates distractors. This increase in time and environment management is further supported by the increase in metacognitive self-regulation (Graph 07) since these two components have a strong correlation.

Graph 4.10

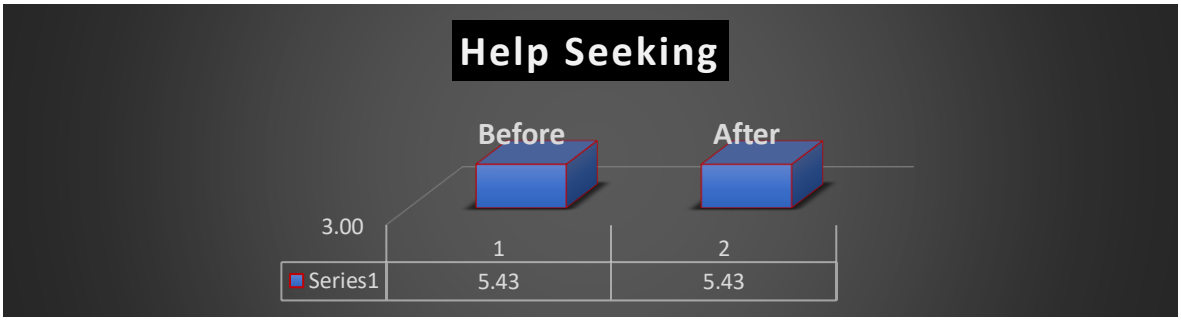
Comparison Between Learners' Peer Learning Before and After the Treatment



The results illustrated in graph 10 show a significant different in learners' average scores in terms of peer learning. Before the treatment, learners' average scores have been measured at 4.35 while their average scores after the treatment have been measured at 4.88. The results show a proportional increase of 12.18% between learners' average peer learning scores before and after the treatment. The retrieved data indicates that using AI applications incentivizes learners to engage and collaborate more with each other. Learners expressed that when using AI tools for learning, they are more encouraged to work with other students in order to complete assignments. Additionally, learners tend to be more open to explaining new information or material to a classmate.

Graph 4.11

Comparison Between Learners' Help Seeking Before and After the Treatment

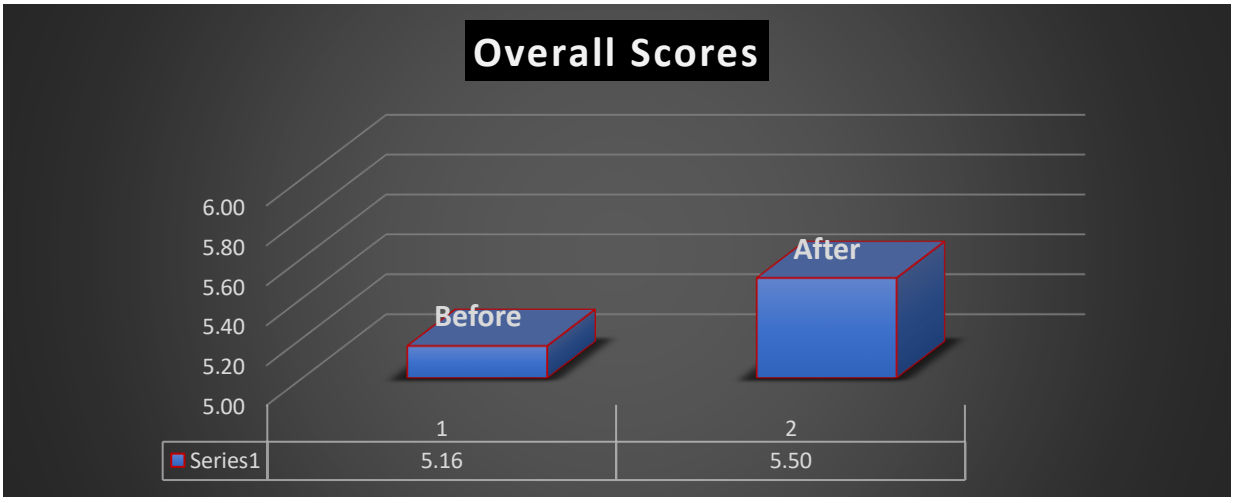


The data summarized in the graph clearly shows no difference in learners' scores in terms of help seeking. The average scores retrieved from the pretest and post-test are identical. However, this trend is not universal across all statements used in order to assess this component. With AI applications, learners stated that they are more likely to ask the teacher to clarify new or complex concepts. By contrast, they are less likely to ask a classmate for help concerning difficult concepts. Overall, the use of Artificial Intelligence tools offers no significant increase to learners help seeking strategies.

4.3.1.6 Pretest and Post-test Results Overall Difference

Graph 4.12

Comparison Between Learners' Pretest and Post-test Overall Scores



The data presented in the graph above shows the difference between the overall mean scores before and after the treatment. Statistical Analysis shows a proportional increase of 6.58% between pretest and post-test average scores. The obtained results imply that using Artificial Intelligence applications in the learning process increases learners' self-regulated learning. The results indicate significant improvements to learners' motivation and overall learning strategies. Thus, the initial research hypothesis H1 is confirmed and the null hypothesis H0 is rejected.

4.4 Summary of the Findings

The quasi-experimental study yielded some interesting results across the different self-regulated learning scales and their constituent sections. Both the motivation scale and learning strategies scale saw an overall increases; however, the different components related to these scales saw varying results.

Firstly, concerning the motivation scale, obtained results show that learners' overall motivation increased, however this increase is not consistent throughout all sections and components. Learners expressed a significant increase in their intrinsic goal motivation. They stated that they are more open to taking on more challenging tasks, even if those tasks do not align with their learning interests or attitudes. Learners also reported that they focus more on learning and understanding course content more thoroughly. The increase in learners' intrinsic motivation confirms the results gathered from the students' questionnaire in which they reported that using AI applications raises their task interest and engagement in class. Analysis also displays an increase in learners' self-efficacy beliefs. Learners expressed that they have more confidence in their abilities to master the skills and concepts taught in class. This is consistent with the findings of the students' questionnaire which indicate that learners have more positive self-judgments and attitudes towards their capacities and ability to achieve academic success.

High levels of self-efficacy are generally correlated with high levels of intrinsic motivation, which is a trend clearly observable in the results of this study. Additionally, the sample students' learning control beliefs saw a marginal increase. Learners claimed that attributions of failure are based on the learners' inability to effectively learn the course content. This implies that learners are more willing to take control of their learning and responsibility of their learning outcomes.

By contrast, Learners' test anxiety as well as extrinsic motivation saw a marginal decrease. According to the obtained results, learners stated that they are less likely to focus on getting grades or better grades than their classmates as their main learning objectives. This can be explained by the noticeable increase in learners' intrinsic goal motivation. As learners intrinsic goal motivation increases, their focus shifts from obtaining good grades to learning the course content and mastering the skills in the classroom as best as possible. Additionally, learners expressed that are likely to suffer from test anxiety, regardless of the integration of AI tools in the learning process. This may be due to the fact that AI tools are most effectively used during the preparation and performance phases of learning. Learners are well aware of the fact that they cannot rely on these tools during exams, hence the negligible impact these tools have on learners' affective components. Overall, the findings of the experiment show that AI tools for learning can improve learners' motivation noticeably. Additionally, these results confirm the findings of the students' questionnaire in which learners expressed that using AI applications makes them more confident in their abilities, engage in more challenging tasks, and take more control and responsibility for their learning.

Secondly, concerning learning strategies, learners' cognitive and metacognitive strategy use noticeably improved while using AI tools for learning. This corresponds to an increase in critical thinking skills and metacognitive regulation strategies. Learners stated that they are more

likely to question the information that they read using AI applications. This is consistent with the findings of the students' questionnaire in which learners displayed a great degree of awareness about the numerous dangerous of using AI tools; namely, reliability of sources and information. Additionally, Learners reported that they concentrate better in class and are more willing to adjust their learning strategies according to their learning needs, course requirements, and instructors teaching style. This confirms Raul Pintrich's claim that motivational orientations are relevant to cognitive engagement and classroom performance.

Similarly, learners' resource management strategies have overall improved, however not all components were affected by the treatment. Effort regulation, time and environment regulation, and peer learning were all positively affected by the intervention. Results indicate that learners are willing to exert more effort and are less likely to give up when course work becomes difficult. This increase in expectancy correlates with the observed increase in intrinsic motivation and self-efficacy beliefs and is consistent with the findings of the students' questionnaire. Learners who are intrinsically motivated tend to expend more effort on a given assignment or in a particular class. Results also show that learners are willing to attend classes more regularly, make better use of their study time, and structure their environment in order to minimize distractions. This confirms the findings of the questionnaire in which learners' chose "environmental structuring" as their preferred strategy for maintaining focus and interest. Additionally, learners expressed that they are more open to collaborate with classmates in order to complete classroom tasks. The only component which remained unaffected by the treatment is help seeking. Leaners expressed that they are reluctant to ask classmates for help when it comes to their learning. This confirms learners' views about self-regulated learning which were extracted from the student's questionnaire. The majority of learners perceive themselves as self-

regulated learners because they learn by themselves. This may explain why using AI tools for learning does not affect help seeking. Overall, learners expressed that using AI applications helps them focus better, evaluate learning material more critically, exert more effort in studying, make better use of their study time and environment, and collaborate with other learners. Additionally, learners are more persistent since they are less likely to drop out when course work becomes difficult. These findings further confirm the results of the questionnaire which indicate that using AI tools significantly increases learners' effort expenditure, time management, and cognitive and metacognitive strategy use. Additionally, this experiment also emphasizes the role of motivation in improving cognitive, metacognitive, and behavioural factors of self-regulated learning.

Conclusion

The obtained results discussed in this chapter clearly confirm the relationship between using Artificial Intelligence applications for learning and students' self-regulated learning. The results indicate noticeable changes in learners' overall motivation and use of learning strategies. This confirms that using AI applications in the learning process can positively influence learners' behavioural, motivational, cognitive, and metacognitive variables. Thus, AI applications can be used as an external measure by which learners can scaffold their self-regulated learning strategies.

GENERAL CONCLUSION

1. Summary of the Findings

The focus of this research is to find external measures by which learners' can scaffold their self-regulated learning skills and strategies. Thus, the current research has aimed at inspecting the effectiveness of using AI applications in order to promote learners' self-regulated learning. Additionally, the study attempts to investigate EFL learners' attitudes towards the use of AI tools in the learning process in order to support self-regulated learning skills.

In order to achieve this end, a mixed method has been adopted which consists of an online students' questionnaire as well as a one group quasi-experimental study. The Questionnaire was administered to a sample of fifty (50) first-year master students of English at the Department of Letters and English Language, University of 8 Mai 1945, Guelma. It aims to identify learners' views, attitudes, perceptions about using AI applications for learning in order to promote self-regulated learning. The Quasi-experiment was conducted on twenty (20) first-year master students of English at the same university. Learners were administered a questionnaire which is designed to assess their learning strategies and motivational orientations. For the treatment, an intervention was staged in which learners integrate AI tools in their learning process. The same questionnaire was administered immediately after the treatment in order to observe whether the use of AI applications for learning enhances their self-regulated learning.

Using the aforementioned data gathering tools, the research questions were answered and the alternative hypothesis (H1) is confirmed. The first question is concerned with learners' views the use of AI applications in order to promote self-regulated learning. According to the obtained data from the students' questionnaire, the overwhelming majority of learners displayed a positive disposition towards using AI tools for learning. Additionally, the majority of learners expressed

that using AI tools has a positive impact on multiple self-regulated learning components. Most specifically, learner motivation. Overall, learners stated that AI tools can help facilitate the development of self-regulatory skills. However, a significant proportion of learners also confessed that they do not take into consideration ethical principles when using AI for learning.

The second research question is concerned with effectiveness of using AI tools for learning in order to enhance learners' self-regulated learning. The results retrieved from the quasi-experimental study show that integrating AI tools in the learning process has positively influenced learners' self-regulated learning. This is reflected in the differences between learners' pretest and post-test scores. Descriptive analysis of these differences indicates an increase in learners' motivational variables, cognitive and metacognitive learning strategies, and resource management strategies.

The hypothesis presented in the beginning of this dissertation addresses whether or not the use of AI tools influences students' self-regulated learning. Based on the gathered data from the student' questionnaire and the quasi-experiment, it can be stated that the majority of learners believe that using AI tools for learning noticeably improves their self-regulated learning. Additionally, the gathered data confirms that incorporating AI applications in the learning process increases learners' motivational orientations and their use of self-regulated learning strategies. Therefore, the null hypothesis (H0) which assumes that using AI tools for learning will have no effect on students' self-regulated learning is rejected; and the alternative hypothesis (H1) which assumes that using AI tools for learning will affect students' self-regulated learning is confirmed.

2. Pedagogical Implications and Recommendations

Considering the results obtained from the quasi-experiment and students' questionnaire, it is apparent that most learners' share positive attitudes towards using AI applications for learning. It also proves that using AI applications positively influences learners' self-regulated learning strategies. Accordingly, this section presents some pedagogical implications and recommendations for EFL teachers, learners, and institutions in relation to the topic in question.

Firstly, teachers play an important role in developing learners' self-regulatory processes. Students of instructors who were trained to convey self-regulated learning skills display higher academic achievements. Thus, conveying self-regulated learning skills should be one of the major concerns of teachers' professional development. Similarly, the proper utilization of relevant AI applications and tools for learning should constitute and import part of teacher training and development. AI technology is a progressively evolving field and instructors must be up to date with the latest trends, technologies, and applications related to the field of foreign language teaching. Teachers are expected to adopt a more technologically oriented role as focus shifts from content delivery to facilitating AI-mediated learning. Since Generative AI has the ability to generate educational content and allows students to personalize their learning experience, teachers are expected oversee, support, and optimise these personalized processes. Accordingly, teacher education must be tailored to an AI-integrated educational context.

Secondly, learners must also be well informed about the plethora of AI tools and applications used for learning. Additionally, learners should uphold the ethical principles of the academic institution. Learners can make use of applications such as: Grammarly, which is used to check grammar, spelling, style, and predictive keyboarding; DeepL, which is a highly advanced machine translation tool; Consensus, which is an AI search engine specifically design to search for scientific sources; SciSpace, which is an AI website used to summarize and better

understand web content and research papers; Motion, which is an AI scheduling assistant that can be used to organize study time and help set learning goals; Quizbot, which is an AI question generator that can help learners' activate prior knowledge; and generative AI tools based on LLMs such as ChatGPT, Bing AI, Perplexity, and others. It is important to note that learners should be transparent about the use of AI tools with their instructors. Moreover, learners should make sure that the use of these tools is in accordance with the policies and ethical standards of the academic institution

Finally, academic institutions must make an effort to promote learners' AI literacy. This can be done through the addition of learning contents or teaching units which focus primarily on: the introduction of AI and its basic concepts, experience and exploration of AI tools for learning via a hands-on activity approach, and the ethical considerations of using AI. These contents can be added to existing modules such as ICT and Ethics, or can implemented as an extracurricular teaching unit. This will give learners the opportunity to experience and explore tools and material in a controlled environment and under the guidance of a trained instructor. More importantly, institutions should establish clearly articulated rules and policies considering the proper use of these AI tools and the repercussions associated with violating these rules.

3. Limitations of the Study

Although the overall results of the study were positive, there are still some key points which must be taken into consideration concerning the quasi-experimental study.

Firstly, due to time limitations, the sample size as well as the length of the intervention are relatively small which is why the SRL instrument used for the pretest and post-test was reduced from 81 items to 27. In an optimal setting, the sample would be at least forty (40) participants with an intervention of at least one week, which for first-year master students,

contains 17 sessions across 25.5 hours. This is with the assumption that first-year master teachers are willing to integrate using AI tools for learning in their sessions.

Secondly, the MSLQ as an SRL assessment instrument is limited by its retrospective nature. It relies on learners rating their use of specific learning strategies as well as various types of academic beliefs. In other words, it is highly dependent on recall and anticipatory knowledge instead of actual functioning in extensive learning situations. Regardless, the MSLQ has reported substantial correlations with measures of academic success; and considering the constraints in time and resources, other SRL assessment instruments would have been impractical.

Thirdly, the decision to select learners based on teachers' recommendations as well as academic scores may threaten the representativeness of the sample. According to the descriptive analysis of the pretest scores, the sample students' overall average score is 5.16 on a scale of 1-7, meaning that the majority of learners in the sample group already had relatively high levels of self-regulation. Consequently, this may threaten the study's generalizability because it confirms that using AI tools for learning is effective in helping learners self-regulate. However, it does not guarantee that it will show the same effectiveness for learners who struggle to self-regulate, which are the learners' that need these supporting instruments the most.

Finally, the analysis of the quasi-experiment results lacks inferential statistics. Initially, a statistical T-test was supposed to be conducted in order to compare the means of the pretest and post-test. This is in order to further confirm the hypothesis and make sure that the differences shown are statistically significant. Due to an error during the data collection process, conducting a t-test for this particular sample is impossible. The lack of inferential statistics does not necessarily disprove the findings shown in the descriptive analysis; however, it is an additional

measure used in order to make sure that the difference recorded between the samples is statistically significant.

As for the students' questionnaire, issues concerning students' participation were noticed. An online questionnaire via google forms was administered instead of a paper questionnaire. This was in order to reduce costs and save time; however, only 50 out of 177 first-year master students decided to participate in this questionnaire. Ideally, the questionnaire sample should be more than 60 students.

4. Suggestions for Future Research

In order to yield more accurate and reliable data, future researchers should take into consideration the following suggestions.

First, the sample size for the experiment should be increased to at least 40 participants and the intervention time to at least one week or the equivalent of 17 sessions. Accordingly, the MSLQ used for the pretest and post-test should also include an increased number of items and sections according to the sample size, intervention time, and the researcher's needs. Additionally, future researchers should consider a two-group experimental approach instead of a one group approach.

Secondly, future researchers should consider using SRL assessment tools alternative to the MSLQ. More modern measures such as trace logs and trace data analysis, think-aloud protocols, and direct observations are better alternatives. These approaches focus on assessing learners' self-regulation during actual learning events and provide an insight to learners' self-regulatory actions and reactions as they occur in a natural learning environment. However, these tools can be more time and effort consuming; thus, these approaches should be chosen according to the available time and resources.

Third, it is recommended to adopt an experimental approach as opposed to a quasi-experimental one. Alternatively, researchers can adopt a quasi-experimental design while attempting to select a sample which reflects the individual differences between learners. This ensures that the sample will include learners with various levels of self-regulation. This enhances the representativeness of the sample and the possibility of generalizing the findings of the experiment.

Finally, future researchers should consider using inferential statistics such as a traditional t-test, a permutation test, or a Wilcoxon test. If a one group experimental approach is adopted, a paired samples t-test should be conducted in order to further confirm or reject the research hypothesis. It is important to note that inferential statistics tests require matched results. In other words, researchers are advised to record each sample student's score before and after the treatment.

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APPENDICES

APPENDIX 1

STUDENTS' QUESTIONNAIRE

Promoting EFL Learners' Self-regulated Learning through the Use of Artificial Intelligence Applications

Dear student,

This questionnaire is a part of a Master Dissertation. It aims to collect data about Learners' attitudes towards the use of Artificial Intelligence applications to promote Self-regulated learning. We would be grateful if you could devote a few minutes of your time to fill in this questionnaire. Your contribution as first-year Master students is significant for this research.

Rest assured that your responses will remain strictly confidential and will not serve any other purpose than the one stated above. Responses are recorded anonymously so we urge students to provide honest feedback. You are kindly invited to answer by crossing ☒ the appropriate answer (s) and providing full answers when required. We appreciate your sincere contribution.

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2023/2024

Section One: General Information

1. How many years have you been learning English (including this year)?

……years

2. How would you describe your level of English language mastery?

a. Beginner ☐

b. Intermediate ☐

c. Advanced ☐

Section Two: Self-regulated Learning

3. Have you encountered the concept of Self-regulated learning previously in one of your modules?

a. Yes ☐

b. No ☐

4. On the following scale, how much do you rely on your teacher to provide you with information? (Circle the number which best describes you)

Not reliant						Very reliant
1	2	3	4	5	6	7

5. On the following scale, how important is it for you to set goals when learning?

Not important						Very Important
1	2	3	4	5	6	7

6. Do you use previous knowledge in order to deal with new learning situations?

a. Yes ☐

b. No ☐

7. Which of these factors do you believe are the most motivating while learning?

a. Self-efficacy (your beliefs in your abilities) ☐

b. Your interest in the task ☐

c. Your goals ☐

d. All of the above ☐

8. Do you think that strategic planning is necessary before attempting to solve a task?

a. Yes ☐

b. No ☐

If yes, please justify

……..…...

……..…

9. Which of these strategies do you think is most useful in order to maintain concentration and interest during the task?

a. Time Management ☐

b. Imagery ☐

c. Environmental Structuring ☐

d. Self-encouragement ☐

e. Help Seeking ☐

f. Self-rewards ☐

10. How frequently do you evaluate yourself after a task or exam?

a. Always ☐

b. Often ☐

c. Sometimes ☐

d. Rarely ☐

e. Never ☐

11. Do you attempt to find better methods and strategies of learning after you evaluate your performance?

a. Yes ☐

b. No ☐

12. To which extent do you agree with the following statement: “Self-regulated learning is a strong indicator of academic success”.

Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

13. Do you consider yourself a self-regulated learner?

a. Yes ☐

b. No ☐

Please justify your answer

……...……

……

Section Three: Artificial Intelligence Applications in the Learning Process

14. How often do you use technological tools while learning?

a. Always ☐

b. Often ☐

c. Sometimes ☐

d. Rarely ☐

e. Never ☐

15. Have you ever encountered the concept of Artificial Intelligence?

a. Yes ☐

b. No ☐

16. Which AI application/ site do you think is most beneficial?

a. ChatGPT ☐

b. Gemini ☐

c. Aithor ☐

d. Others, mention them please……...

17. What do you think about the idea that all students should use artificial intelligence tools?

Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree

Please justify your answer

……

……

18. How frequently do you use artificial intelligence tools (ChatGPT for example) to prepare for lessons?

a. Always ☐

b. Usually ☐

c. Sometimes ☐

d. Rarely ☐

e. Never ☐

19. Does the use of Artificial Intelligence tools affect your motivation to learn?

a. Yes ☐

b. No ☐

Please explain how

…….

……..

……..

20. On the following scale, rate the usefulness of Artificial Intelligence applications (for example: research projects, gathering information, revising for exams, preparing for lessons, assessing your learning…etc).

Not Useful						Useful
1	2	3	4	5	6	7

21. Do you believe that becoming a self-regulated learner can be facilitated using artificial intelligence tools?

a. Yes ☐

b. No ☐

Please justify your answer

……...……..…

……...…….

22. Do you consider the ethical risks of using artificial intelligence applications for learning?

a. Yes ☐

b. No ☐

If yes, explain how …….

……..……

……..

23. Please feel free to add any information concerning this topic.

……...…

……...…….

……...……..……...…

……

Thank you for you cooperation

APPENDIX 2

MOTIVATED STRATEGIES FOR LEARNING QUESTIONNAIRE (MSLQ)

Promoting EFL Learners' Self-regulated Learning through the Use of Artificial Intelligence Applications

Dear Students,

This questionnaire is part of a Master Dissertation. It aims to assess your motivational orientations and your use of different learning strategies. Your feedback will help improve the learning and teaching environment; thus, we encourage respondents to answer as honestly as possible. YOUR PARTICIPATION IS VOLUNTARY AND NOT RELATED IN ANY WAY TO YOUR GRADE IN THIS CLASS. You may decide to participate now but you can withdraw from the study at any time. All your responses are strictly confidential and only members of the research team will see your individual responses. THERE ARE NO RIGHT OR WRONG ANSWERS TO THIS QUESTIONNAIRE. THIS IS NOT A TEST. We encourage learners to respond to the questionnaire as accurately as possible.

Instructions:

Use the scale below to answer the questions. If you think the statement is very true of you, **circle** 7; if a statement is not at all true of you, **circle** 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

Part A. Motivation

1. I prefer tasks that really challenge	1	2	3	4	5	6	7

me so I can learn new things

2. The most satisfying thing for me is trying to understand the content as thoroughly as possible	1	2	3	4	5	6	7
3. Getting a good grade is the most satisfying thing for me.	1	2	3	4	5	6	7
4. If I can, I want to get better grades than most of the other students.	1	2	3	4	5	6	7
5. I want to do well in class because it is important to show my ability to my family, friends, employer, or others	1	2	3	4	5	6	7
6. It is my own fault if I don't learn the material in this course.	1	2	3	4	5	6	7
7. If I try hard enough, then I will understand the course material	1	2	3	4	5	6	7
8. I'm confident I can do an excellent job on assignments and tests.	1	2	3	4	5	6	7
9. I'm certain I can master the skills taught in class	1	2	3	4	5	6	7
10. When I take a test, I think about	1	2	3	4	5	6	7

questions on other parts of the test I can't answer.

11. When I take tests, I think of the consequences of failing.	1	2	3	4	5	6	7
12. I have an uneasy, upset feeling when I take an exam.	1	2	3	4	5	6	7

Part B. Learning Strategies

13. I often find myself questioning things I hear or read to decide if I find them convincing.	1	2	3	4	5	6	7
14. Whenever I read or hear a conclusion in class, I think about possible alternatives.	1	2	3	4	5	6	7
15. During class time I often miss important points because I'm thinking of other things.	1	2	3	4	5	6	7
16. Before I study new course material, I often skim it to see how it is organized.	1	2	3	4	5	6	7
17. I ask myself questions to make sure I understand the material I have been studying in this class.	1	2	3	4	5	6	7
18. I try to change the way I study in order to fit the course requirements and instructor's teaching style.	1	2	3	4	5	6	7

19. I work hard to do well this class even if I don't like what we are doing.	1	2	3	4	5	6	7
20. When course work is difficult, I give up or only study the easy parts	1	2	3	4	5	6	7
21. I usually study in a place where I can concentrate on my work.	1	2	3	4	5	6	7
22. I attend class regularly.	1	2	3	4	5	6	7
23. I make good use of my study time	1	2	3	4	5	6	7
24. I try to work with other students to complete assignments.	1	2	3	4	5	6	7
25. When studying, I often try to explain the material to a classmate or a friend.	1	2	3	4	5	6	7
26. I ask the teacher to clarify concepts I don't understand well.	1	2	3	4	5	6	7
27. When I can't understand a concept, I ask another student in this class for help.	1	2	3	4	5	6	7

Thank you for your cooperation

الملخص

التعلم ذاتي التحكم يعتبر عملية حيوية تساهم بشكل مميز في التحصيل الدراسي للمتعلمين، خاصة في سياق التعليم العالي. ومع ذلك، يواجه العديد من المتعلمين صعوبة في تطبيق استراتيجيات التعلم ذاتي التحكم من أجل تحقيق نتائج التعلم الخاصة بهم. ساعد التقدم التكنولوجي الحديث في مجال الذكاء الاصطناعي على ابتكار العديد من التطبيقات القائمة على النماذج اللغوية الكبيرة. تمتلك تطبيقات الذكاء الاصطناعي هذه القدرة على دعم التنظيم الذاتي للمتعلمين من أجل تحقيق أهداف التعلم الخاصة بهم. تهدف هذه الدراسة إلى استقصاء آراء متعلمي اللغة الإنجليزية كلغة أجنبية حول استخدام تطبيقات الذكاء الاصطناعي لتعزيز التعلم ذاتي التحكم. كما تحاول دراسة فعالية استخدام أدوات الذكاء الاصطناعي في عملية التعلم لتعزيز التعلم ذاتي التحكم لدى الطلاب. وهكذا، افترضت الدراسة أن استخدام تطبيقات الذكاء الاصطناعي للتعلم سيؤثر على تعلم الطلاب ذاتي التحكم. وبالتالي، تم اعتماد طريقة مختلطة تتكون من استبيان موجه للطلاب عبر الإنترنت واختبار تجريبي على مجموعة واحدة. تم تطبيق الاستبيان من خلال استمارات جوجل على 50 طالب ماستر مبتدئين في اللغة الإنجليزية بقسم الآداب واللغة الإنجليزية، جامعة 8 مايو 1945، قالمة. بالإضافة إلى ذلك، تم إجراء تجربة شبه تجريبية لمجموعة ما قبل الاختبار - ما بعد الاختبار مع 20 طالب ماستر مبتدئين في اللغة الإنجليزية في نفس القسم. تم تطبيق اختبار ما قبل الاختبار وما بعد الاختبار على عينة الطلاب التي تم تصميمها لتقييم استراتيجيات التعلم واتجاهات التحفيز لديهم. وتكون العلاج في تدخل تم فيه تشجيع المتعلمين على استخدام أدوات الذكاء الاصطناعي للإعداد قبل الدروس ولأدائهم أثناء الحصة. أظهرت نتائج استبيان الطلاب والتجربة شبه التجريبية أن غالبية المتعلمين لديهم موقف إيجابي تجاه استخدام تطبيقات الذكاء الاصطناعي للتعلم. كما أثبتت النتائج أن استخدام تطبيقات الذكاء الاصطناعي في عملية التعلم يحسن من التنظيم الذاتي لدى المتعلمين.

الكلمات المفتاحية: التعلم ذاتي التحكم، تطبيقات الذكاء الاصطناعي، النماذج اللغوية الكبيرة

Résumé

L'apprentissage autorégulé est un processus vital qui contribue de manière significative aux résultats académiques des apprenants, en particulier à l'ère numérique dans le contexte de l'enseignement supérieur. Cependant, de nombreux apprenants ont du mal à appliquer des stratégies d'apprentissage autorégulé afin d'atteindre leurs objectifs d'apprentissage. Par conséquent, l'objectif de cette recherche est d'étudier les points de vue des apprenants d'anglais sur l'utilisation des applications d'intelligence artificielle afin de promouvoir l'apprentissage autorégulé. Elle tente également d'examiner l'efficacité de l'utilisation de ces outils dans le processus d'apprentissage. L'étude émet donc l'hypothèse que l'utilisation d'applications d'intelligence artificielle pour l'apprentissage aura une incidence sur l'apprentissage autorégulé des apprenants. C'est pourquoi une méthode de recherche mixte, composée d'un questionnaire en ligne destiné aux étudiants et d'une post-expérimentation à groupe unique, a été adoptée. Le questionnaire a été administré via des formulaires Google à 50 étudiants en première année de master d'anglais au département de lettres et de langue anglaise de l'université du 8 mai 1945 à Guelma. En outre, une post-expérience a été menée avec 20 étudiants de première année de master d'anglais du même département. Plus précisément, un pré-test et un post-test ont été administrés aux étudiants sélectionnés afin d'évaluer leurs stratégies d'apprentissage et leurs orientations motivantes, tandis que le traitement consistait en une intervention en classe au cours de laquelle les apprenants étaient encouragés à utiliser des outils d'IA pour se préparer avant le cours et pour améliorer leurs performances pendant le cours. Les résultats du questionnaire des étudiants et de la post-expérience ont montré que la majorité des apprenants partagent une attitude positive à l'égard de l'utilisation des applications d'IA pour l'apprentissage, et l'analyse

statistique descriptive a prouvé que l'utilisation de ces applications dans le processus améliore l'autorégulation des apprenants.

Mots-clés : Apprentissage autorégulé ; Applications de l'intelligence artificielle ; Autorégulation