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The Role of AI-Powered Learning Tools in Enhancing Vocabulary Acquisition for ESP/EFL Students: Teachers' and Students' Perceptions at M'Sila University

Dissertation Submitted to the Department of English in Partial fulfillment of the Requirements for the Master's Degree

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DEDICATION I

To my beloved family and dear friends—

This dissertation would not have been possible without the loyal support of my family. Their encouragement through every challenge has been the cornerstone of my journey. I am profoundly proud of my parents, whose love and guidance have been my inner strength, I will carry their support and wisdom with me wherever life takes me, now and always.

To my colleagues and friends—your belief in me and your thoughtful words have been invaluable. Whether near or far, your support has been a source of strength, guiding me through both academic career and personal growth.

Thank you from the bottom of my heart to all who have been part of this journey whether near or far, I am deeply grateful for everything.

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After the name of Allah, I dedicate this work to my cherished parents Smail and Salima

Your endless love, sacrifices, and unwavering faith have been my guiding light. Every step I take is because of the foundation you built. I will be always indebted to you.

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Abstract

This study investigates the perceptions of teachers and students regarding the use of AI-powered learning platforms to enhance vocabulary acquisition in English for Specific Purposes (ESP) courses at M'sila University. Considering the growing of artificial intelligence in education, particularly in language learning, the research explores how these AI-driven platforms are perceived in terms of their effectiveness, usability, and impact on learning outcomes. The study uses a quantitative descriptive research approach, collecting data through questionnaires to examine ESP teachers' and students' perspectives, and therefore, descriptive statistics and inductive data are applied to find the sequences and group differences. Findings reveal diverse perspectives: students' perceptions of AI-powered learning tools showed a mean of 3.84 (on a 5-point scale), while teachers' perceptions reached a slightly higher mean of 3.94. Usage-related responses were slightly lower, with a mean of 3.41 for students and 3.40 for teaching practices. Although many participants recognize the potential of AI tools to provide personalized, adaptive, and engaging vocabulary practice, in addition to challenges such as technical limitations, lack of domain-specific vocabulary, and user resistance are also highlighted in this research. The research pinpoints important elements which impact the effective integration of AI-powered platforms into ESP teaching, including teacher training, accessibility, and alignment with specialized vocabulary needs.

Keywords: ESP teachers'/ students' perceptions, AI-powered learning platforms, Vocabulary acquisition, Integration of AI in ESP.

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LIST OF SYMBOLS AND ABBREVIATIONS

AI: Artificial Intelligence

CALL: Computer-Assisted Language Learning

ESP: English for Specific Purposes

ML: Machine Learning

NLP: Natural language processing

RL: Reinforcement Learning

SL: Second Language

SRS: Spaced repetition systems

TBL: Task-Based Learning

General Introduction

Recently, the Integration of AI has improved and reinvented traditional education, creating dynamic solutions for conventional problems. Language education had never witnessed such change until AI-plagued platforms like Duolingo, Quizlet, or Babbel provided personalized, adaptive, and interactive learning experiences. They use natural language processing (NLP), machine learning, and spaced repetition systems (SRS) more effectively to teach vocabulary, grammar, and communication skills. Nevertheless, the use of these tools in more specialized contexts- namely, English for Specific Purposes (ESP)-is largely missing.

in Algeria, the ESP programs set up in universities, such as M'Sila, go for discipline-specific language proficiency, allowing students to become fluent in technical register that applies to fields like engineering, medicine, and law. AI language tools often disregard some specific terminology which has emphasized by ESP and other general English courses. Traditional methods-such as flash cards, role plays, and contextualized exercises-have formed the foundation of ESP instruction for many years, but their usefulness has been limited, and they have not been improved enough to cater to the varied needs of students in larger classrooms.

The Algerian educational context makes things even more complicated. While most of Algerians speak French and Arabic, students of ESP at M'Sila University tend to struggle to move from their native languages into English technical jargon. AI tools show the possibility in avoiding some struggles such as shifting; however, their adaptation to the linguistic convolutedness becomes a prerequisite. Unfortunately, there is a lack of research examining the applicability of AI to ESP vocabulary acquisition in Algeria, and more broadly in the Global South, is scanty. Thus, this study aims at filling these gaps by specifically focusing on how AI platforms can be made appropriate and optimal for the ESP context at M'Sila University.

1. Problem Statement

Even as many institutions embrace AI technologies for educational purposes, skepticism still surrounds the degree of its efficiency in facilitating learning in terms of vocabulary acquisition in ESP. There are few platforms available that are specifically for the specialized vocabulary that is helpful for professional use, for example, in medical or engineering careers- most platforms are for general vocabulary. An ESP teacher at M'Sila University informs that he cannot identify any learning of the domain-specific terminology reading among students, since they do not have enough source material to provide classroom teaching and are too many for this teaching. On the other hand, AI tools might be addressing these issues theoretically but face skepticism because of their technical limitations (for instance, unstable internet connectivity), lack of tailoring for Algerian French-Arabic bilingual learners, and little training for educators.

This disconnect raises critical questions: How do teachers and students view the usefulness and relevance of AI tools in ESP register? What barriers tend to block their access to specialized language programs?

Unless these concerns are addressed could become just another underutilized tools in ESP pedagogy, limited by both its quality and persistent reliance to old teaching techniques.

By critically addressing these challenges, our study adds to the larger debate about AI in language learning, aiming for context-aware, pedagogically effective technology applications in ESP settings.

2. Research Questions

1. What perceptions do ESP teachers at M’Sila University hold about the use of AI tools in language instruction and vocabulary acquisition?

2. What perceptions do ESP/EFL students at M'Sila University hold about the effectiveness and challenges of using AI tools for vocabulary learning?
3. What are the key technical, pedagogical, and linguistic barriers hindering the effective implementation of AI tools in ESP instruction?

3. Research Objectives

This study seeks to:

1. Evaluate the perceptions of ESP teachers and students at M'Sila University regarding AI-powered platforms for vocabulary acquisition.
2. Identify technical, pedagogical, and linguistic challenges in implementing AI tools in ESP contexts.
3. To examine the effectiveness of AI tools in enhancing domain-specific vocabulary learning in ESP contexts.

4. Research Hypotheses

H.1: Teachers and students may express fair to outstanding satisfaction with AI-platforms interactive aspects. However, they may recognize limitations and gaps in domain-specific vocabulary coverage.

H.2: The Higher engagement with AI-driven platforms may lead to better vocabulary retention especially when these tools cater the students' professional needs.

5. Significance of the Study

This study will offer helpful suggestions and instructions that can be useful for both teachers and students by showing how AI-driven data are effectively integrated into ESP courses, which can lead to better vocabulary acquisition and effective preparation for professional communication in specialized fields. In addition to several reasons:

1. It attempts to fill the gaps between AI-technologies and the linguistic needs for ESP learners
2. It offers practical insights into the integration of AI tools in ESP teaching by addressing both challenges and opportunities
3. It aims to contribute to the growing body of literature on AI in language learning, particularly in specialized fields
4. Examine the specific vocabulary needs of ESP learners in various disciplines to inform the effective use of AI tools.

6. Methodology

6.2. Research Design and Methodology

This study adopts a quantitative approach to provide a comprehensive and measurable understanding of teachers' and students' perceptions regarding the integration of AI tools in ESP vocabulary acquisition. A quantitative method is particularly suitable for this research because it allows for the collection of standardized data from a relatively large sample, ensuring greater objectivity and generalizability of the findings. By using structured surveys, the study captures a broad range of responses that can be systematically analyzed to identify patterns, trends, and differences across groups.

Moreover, the research aims to evaluate perceptions, assess challenges, and explore the effectiveness of AI-driven platforms, all of which can be effectively quantified and compared through statistical analysis. Therefore, a quantitative approach not only aligns with the study's objectives but also provides reliable and replicable results that contribute to evidence-based conclusions.

6.3. Population

The population is selected based on their prior experiences with ESP courses and their ability to utilize AI-powered learning tools. Teachers are obtained from various disciplines to ensure a diverse perspective, while students are chosen from different academic years to gather a range of experiences.

1. ESP Teachers: 5 teachers at M'sila University who teach ESP courses across various disciplines.
2. ESP Students: 33 students involved in ESP courses from diverse fields such as business, engineering, and biology.

6.4. Data Collection Methods

Structured surveys serve as the primary tool for collecting quantitative data from both teachers and students regarding their perceptions of AI platforms. The questionnaires focus on key areas such as perceived effectiveness, usability, benefits, and challenges related to the use of AI tools in ESP contexts.

6.5. Data Analysis

Quantitative data analysis involves the use of both descriptive and inferential statistics to interpret the survey results. This approach helps identify patterns, relationships, and trends in the participants' responses.

Chapter One

Theoretical Framework

1. Introduction

This chapter introduces the theoretical bases of the research. It focuses mostly on providing a targeted insight of the main variables of the research. which deals with the vocabulary acquisition within the context of the technological integration, with a specific focus on artificial intelligence in English for specific purposes learning (ESP). Thus, it starts by defining AI-driven tools and their applications in language education, particularly in adaptive learning, individualized feedback, and progress tracking. Then the discussion shifts to the vocabulary acquisition strategies in ESP, noting the challenges that both learners and teachers face while learning specialized terminology. Moreover, the chapter shows both teachers' and students' perspectives on the role of AI platforms in ESP. Lastly, by merging these theoretical views, this research chapter provides a framework for understanding how AI could boost vocabulary acquisition, as well as addressing the pedagogical and practical aspects of using technology in ESP settings.

2. Overview of Theories Related to Vocabulary Acquisition

The vocabulary acquisition is an essential part of language learning as that impacts the understanding, communication, and academic achievements. Having a wide vocabulary is crucial for the learners when it comes to the academic success. Nation’s Vocabulary Knowledge Framework (2001) and Task-Based Learning (TBL) are two key theories that establish a basis of comprehending vocabulary acquisition processes, and therefore they are considered to be the foundation of enhancing learning vocabulary.

2.1. Nation’s Vocabulary Knowledge Framework (2001)

Initially, Nation’s Vocabulary Knowledge Framework (Nation, 2001) divides vocabulary knowledge into three aspects: form, meaning, and use. The division of each dimension unto receptive and productive components emphasizes that vocabulary acquisition includes both word

recognition and proper usage in diverse situations. The four aspects of the vocabulary acquisition – meaning-focused input, meaning-focused output, language focused learning, and fluency improvement were also mentioned by (Nation's 2001). These elements highlight the need for an inclusive approach to vocabulary learning.

Furthermore, this method has gained a broad support in L2 vocabulary acquisition and pedagogy (Nation, 2013; Schmitt, 2019) due to its focus on the necessity of systematic instruction that addresses all aspects of words knowledge rather than repetition.

However, some researchers highlighted difficulties in fairly addressing all components for a variety of learners' profiles, empirical investigations (e.g., Webb & Nation, 2017) have further checked that it is useful in creating tasks that foster deeper lexical competence (Elgort, 2018).

Because of its accuracy Nation's (2001) framework offers a solid basis for the investigation of how vocabulary acquisition develops in various learning environments, by emphasizing the role of repetition, context, and the depth of processing, providing a comprehensive examination of how students retain and acquire vocabulary.

2.2. Task-based learning (TBL)

Task-based learning (TBL) (Ellis, 2003; Willis, 1996) enhances vocabulary learning by engaging students in purposeful, meaningful tasks that necessitate the use of language in real-life situations. Unlike conventional memorization methods, TBL focuses on incident learning, enabling learners to gain new vocabulary through interaction and problem-solving activities. Studies indicate that TBL improves vocabulary retention by incorporating new terms into learners' communication activities (Skehan, 1998).

Presently, Empirical studies such as Baralt's (2013) found that technology-mediated tasks improve speaking abilities via offering real-world context and targeted exercises as well, while it is higher syntactic complexity than the ordinal practices.

Additionally, some recent advancements in task-based learning have shown its integration with new technologies by such as chatbots, learning apps, virtual exchanges, and game-based learning environments in order to improve the learning quality as well as provide immersive and interactive settings. This enables students to acquire language and grammatical patterns implicitly (Gonzàlez-Lloret and Ortega, 2014).

In short, task-based learning delivers a dynamic and useful method for expanding the learners' vocabulary, particularly if it is combined with the current technologies. And therefore, it emphasis on problem-solving and real-world communication which guarantees that the students not only memorize new words but also be able to use them in the appropriate situations.

3. The integration of Technology into Language Education Frameworks

Technology is now a major part of language instruction. It affects how instructors instruct and how learners learn, from kindergarten to college. Technology does not just aid but supports instruction, stimulates pupils, and exposes them to real language and culture (Tomlinson, 2001). And therefore, to be able to integrate AI effectively in educational contexts, instructors and learners must recognize its dynamic connection with humans and their environments.

Firstly, AI-driven platforms as a modern instructional technology have transformed language learning through the personalization of lessons (Godwin-Jones, 2019). An important benefit of AI-powered platforms is that they are capable of delivering multiple types of instruction to meet the various needs and interests of learners.

These platforms use natural language processing (NLP) and machine learning algorithms to gauge how well the learner comprehends the material and adjust vocabulary practice, grammar practice, and conversation training to each individual learner (Xu et al., 2022). Moreover, AI-driven chatbots and virtual tutors enable language learning through the simulation of real-life communicative situations, improving the speaking and listening abilities of students (Zawacki-Richter et al., 2019). So, these AI's abilities to facilitate "Naturalistic language acquisition" through conversational agents and chatbots are one of its contributions to language learning (Xu., et al., 2020). For instance, platforms like *ChatGPT*, and *Replika*, simulate learner needs, allowing them to practice speaking, writing, and comprehension with low-anxiety environment (Kukulska-hulme et al., 2021).

In the digital age, Multimodal learning is supported through AI-driven platforms with text, audio, video, and interactive practice. Building all four language skills — reading, writing, listening, and speaking. They even improve learner engagement by providing gamified experiences, on-demand feedback, and progress tracking. This also makes learning more engaging. This renders learning more interactive and effective (Burden & Kearney, 2017).

The application of artificial intelligence (AI) in language teaching has the potential to transform the conventional learning with the improvement in technology in order to language competency and student autonomy. Educators can utilize AI platforms to facilitate learning, customize learning activities, and close the gap between classroom instructions and real-life applications for the betterment of student's language skills and independent learning (Godwin-Jones, 2020).

Meanwhile, this adapted method aligns with Vygotsky's (1978) zone of proximal development, since AI supports learning by giving just-in-time support, thereby maximizing cognitive load and retention (Sweller, 2011).

To summarize, the integration of AI-driven programs is changing language education and learning by making it more accessible, interactive, and objectively successful. However, their ongoing efficacy is based on addressing authentic issues and guaranteeing pedagogical inclusion.

3.1. Definitions and Examples of AI-driven Tools

Recent developments have significantly impacted several fields including education and English language learning teaching (ELT) and learning (Jomaa & Kamal, 2023; Keerthiwansha, 2018; Rao, 2019; Alwahoub et al. 2020; Özyildirim & Jomaa, 2023). Since the students struggle to learn because of the lack of suitable vocabulary (Oktadela et al., 2023). Integrating new technologies such as artificial intelligence (AI) creates both possibilities and obstacles.

Initially, AI learning platforms are playing a transformative role in the vocabulary acquisition of English for specific purpose (ESP) by offering personalized, adaptive, and interactive learning experiences. while the traditional vocabulary learning methods have been employed in the ESP classrooms, The development of AI-driven technology offers new opportunities for enhancing learning outcomes. These platforms make effective use of the advanced technologies such as natural learning processing (NLP), intelligent tutoring system, and AI-powered chatbots to improve the vocabulary acquisition of ESP. Within this context, the acquisition and retention of the lexical collections which are regularly occurring word pairs, play an effective role in facilitating communication (Biber & Barbieri, 2007).

Moreover, these chatbots are artificial intelligence machines that imitate human speech by replying to voice instructions, text messages, or both of them. In the words of Y. F. Wang and Petrina (2013), a chatbot is a computer program that mimics human conversation using textual or audio methods in order to seem intelligent.

3.2. Adaptive Language Learning Apps (e.g. Duolingo, Quizlet)

AI-driven programs such as *Duolingo*, *Quizlet*, or *Memrise* use adaptive algorithms to tailor courses to the needs of each individual learner. These programs use performance data to reduce the degree of difficulty, focused on the areas where the students are struggling, and ensure good vocabulary learning and retention. (Vesselinov & Grego, 2012).

For example, *Memrise* depends on time varying repetition algorithms that emphasize memorizing difficult words while reducing the frequency of looking over the learned language. This approach optimizes the memory retention by ensuring the learners focus on areas where they need improvement (Xu, J., Jones, E., Laxton, V., & Galaczi, E., 2021).

In the other hand, *Duolingo* is a platform that serves specialized modules focusing on the target vocabulary such as business English or medical terminology through a gamified approach to enhance interaction and motivation. In other words, it employs algorithm to adjust content based on the learner's progress by offering exercises in grammar, vocabulary, and pronunciation with a focus on the instant feedback on performance, gamified learning experiences to enhance engagement, and daily tasks to increase language improvement.

3.3. Conversational AI and Chatbots

In addition to other chatbots such as *Skillsoft's CAISY* simulator and *Blueprint Test* Prep's AI tutor, also conversational programs which support ESP education by offering tailored training experiences, authentic conversational exchanges, allowing learners to practice vocabulary, fluency, and grammar (Hwang et al., 2023).While Blueprint's AI act as a coach and customizes study advice based on each student's strengths and weaknesses, *Skillsoft's CAISY* allows students to practice business communication skills interactively (Built In, 2025). These materials provide an excellent

example of how AI technology might be used to address the unique demands of ESP learners in a range of professional domains.

4. Vocabulary Acquisition in ESP: Strategies and Challenges

Developing vocabulary is crucial in English for specific purposes (ESP) because it directly impacts the students' capacity to communicate in professional settings. Unlike general English, ESP uses specialist terminology used in specific fields such as engineering or medicine. However, learners and teachers face key challenges settings where industry specific materials are limited and second language often dominates the technical conversations (Hutchinson, T., & Waters, A., 1987).

Additionally, the lack of authentic ESP materials that are tailored to local industries are concerned as a major issue. For instance, medical students acquire common English terms but they struggle to use them. Also, the insufficient teacher's preparation in ESP techniques and unused digital may limit the successful vocabulary acquisition. This gap limits students from working easily in professional contexts where the most essential thing is to combine both English and technical jargon. Furthermore, to close these gaps such as pairing industry specialists (e.g., using real engineering reports or medical case studies, with integrating technology (e.g., AI-driven platforms), which can improve contextual learning.

While ESP is treated more as a pedagogical concern rather than a matter of teaching methodologies, many challenges have emerged. With rapid technological developments, teachers often struggle to implement appropriate theories and techniques to meet the demands of an effective learning curve (Ahmed, 2014). Put simply, ESP teachers should conduct a needs analysis. Before beginning any kind of lesson planning and transferring information through various techniques, teachers have several essential tasks—for example, identifying students' linguistic competence and language level, understanding their different learning styles, and determining the gap between their current abilities and their desired outcomes (Dudley-Evans & St John, 1998).

In short, collaboration between academia and industry professionals is needed. Collaborations with engineering firms and hospitals or energy groups could result in efficient materials such as technical reports or case studies that represent actual language use. Engineering students could analyze project documentation from local companies in order to learn the vocabulary used in different language's infrastructure projects. Such cooperation will help in bridging the gap education with the changing demands of these countries' job market. Also, strengthening teachers training in ESP pedagogy would also enhance more effective vocabulary retention. By providing educators with abilities like workshops.

4.1. The Nature of ESP Vocabulary

"Vocabulary is an inseparable component of any teaching syllabus, and it is to be taught not only in a well-organized way, but also on a regular basis" (Costeleanu, 2019, p. 7). Educators must train vocabulary with a powerful multi-dimensional approach that combines both training and context. Explicit teaching of phrases, their meanings, pronunciation, and usage is essential; contextual learning embeds them into real situations, including common passages, listening activities, and real-life conversations. For instance, a teacher may supply students with a list of phrases on the topic of environmentalism, and then have students examine introductory texts or engage in dialogues related to environmental issues. This dual strategy promotes and encourages deeper recall by pairing memorization with meaningful application, such as reading articles and acting out stakeholder interactions (Nation, 2001; Marzano, 2004). This also aligns with the Depth of Processing Theory (Craik & Lockhart, 1972), which claims that active engagement with language improves long-term memory.

It is necessary to assess and reinforce vocabulary learning on a regular basis. Quizzes, games, and flashcards help to reinforce previously taught concepts and enhance recall (Nation, 2001). Teachers should encourage students to use new vocabulary in speaking and writing tasks, as well

as in discussions and journal entries. This encourages the transition from passive recognition to active application (Webb, 2008). Group conversations or vocabulary-based physical activities promote collaborative experiences among learners. Additionally, a supportive and friendly environment further enhances these interactions. Assisting students in accumulating a flexible vocabulary helps build their language competence and verbal communication skills. Overall, as previously mentioned, consistency and order in vocabulary teaching are crucial to developing confident and proficient language users (Schmitt, 2000).

Hutchinson and Waters (1987, pp. 53–55) explain that vocabulary in English for Specific Purposes (ESP) is characterized by its specificity and practical importance within professional domains. They distinguish between two types of vocabulary: first, semi-technical vocabulary, which consists of words that have general meanings but take on specialized definitions in particular fields—for instance, resistance in physics differs from its everyday sense; and second, technical vocabulary, which includes terms unique to a specific discipline, such as myocardial infarction in medicine or tort in law. This distinction highlights how ESP vocabulary serves the precise communicative needs of learners in their respective professional contexts.

One must understand these terms; they should also be memorized for professional competence. An engineering student must understand such terminologies so the student can comprehend and interpret technical manuals; medical students need to know what diagnostic criterias are to be able to participate in clinical discussions. Failure to learn such vocabulary often affects performance in academic and professional areas (Nation, 2001).

Such a hybrid terminology adds to the complexity of this high but significantly-interesting-to-track class of lexicons, wherein students that code switch between French, Arabic, and English may encounter challenges: Engineering graduates may for e.g. use the word "*châssis"* instead of "chassis" due to the educational legacy of the French-speaking country. A medical scholar might

also say *"radiographie"* (French word for X-ray) rather than its English term. (Al-Fanar Media, 2019).

Learners often experience cognitive stress due to the linguistic mixture in their educational environment, as they must map similar terms from other linguistic systems to their English equivalents (Melouah, 2013). For instance, an engineering student studying renewable energy may struggle with the term *"éolienne"* which means "wind turbine" in French but may not appear clearly in English learning materials potentially leading to inaccuracies in technical writing (Mounnes & Bouhadjar Fethi, 2024). In medical contexts, terms like *"bilan sanguin"* used in multilingual conference settings may lead to confusion or misinformation, reflecting the challenges posed by the dominance of French in Algerian medical education (Al-Fanar Media, 2019).

However, ESP lecturers particularly in multilingual universities such as M'Sila may consider developing comparative glossaries that link French-Arabic terms with their English equivalents. allowing students to maintain and apply their multilingual abilities in academic and professional settings.

4.2. Traditional Pedagogical Strategies

ESP teachers have long employed tailor-made methods for goal-oriented learning. Contextualized role-plays, such as simulated patient consultations for medical students, help learners acquire terminology in realistic settings (Dudley-Evans & St John, 1998). Corpus-based learning involves analyzing discipline-specific texts to identify common phrases (Allan, 2009). Lexical chunking, focusing on collocations like submit a proposal or undertake an experiment, enhances professional communication fluency (Ismail, 2023). Traditional tools like flashcards and glossaries, including mnemonics and visual aids, support vocabulary learning (Richards & Schmidt, 2010).

However, these methods face limitations. Scalability is a concern, especially in large classes. Personalization is difficult due to differences in learning styles and institutional limitations. Finally, resource constraints in Algerian universities hinder access to updated materials (Bouhafs, 2022; Benlahcene, 2023).

5. Challenges in ESP Vocabulary Acquisition

The use of hybrid professional vocabulary has become increasingly common across various languages, particularly within specialized fields, as a result of growing globalization in the professional world. This linguistic blending often reflects the need for precision, adaptability, and mutual understanding among professionals from diverse linguistic backgrounds. The hybridization of vocabulary highlights how specialized terminology evolves to accommodate multicultural and multilingual interactions. It also mirrors the dynamic nature of technical communication, which is continually shaped by the demands of international collaboration.

In this context, learners of English for Specific Purposes (ESP) at multicultural universities face increasingly complex challenges in mastering and interpreting such hybrid forms of language. One major challenge is lexical complexity. Many technical terms have no direct equivalents in learners' native languages, such as French or Arabic, making memorization and internalization difficult. Additionally, multilingual interference complicates vocabulary acquisition. In environments where French, Arabic, and English are frequently code-switched, hybrid terminology emerges—for example, in engineering contexts, the French term châssis may be used in place of the English chassis. This overlap in terminology can hinder clarity and lead to errors in communication. (Holmes et al., 2021; Chen et al., 2022; Kukulska-Hulme, 2020)

Another contributing factor is low exposure to field-specific vocabulary. In many institutional or professional settings, communication tends to focus on general, shared terminology

rather than domain-specific expressions. As a result, learners often lack the necessary engagement with technical language in authentic, specialized contexts. This insufficient exposure reduces the opportunity for repeated encounters with key terms, which is essential for vocabulary acquisition and retention.

Moreover, contextual application remains a critical challenge. Students must not only memorize definitions but also learn how to apply technical terms appropriately in real-world tasks, such as writing reports or delivering presentations. Simple rote memorization does not support the depth of understanding required for effective communication in professional domains.

In addressing these challenges, AI-powered platforms offer a promising solution. By pre-teaching technical terms relevant to specific fields, such tools can bridge the gap between subject-oriented content and ESP learning objectives. Using advanced techniques such as machine learning (ML) and reinforcement learning (RL), modern AI platforms can personalize learning experiences based on an individual's profile, prior knowledge, and progression. This adaptive functionality enhances vocabulary acquisition by aligning content delivery with learner needs, ultimately contributing to more effective and meaningful language learning experiences (Holmes et al., 2021; Chen et al., 2022; Kukulska-Hulme, 2020).

5.1.AI-Powered Tools: Opportunities and Limitations

AI, within the classroom of educational technology, has a huge potential capacity for innovation as well as getting serious critiques. AI-powered solutions, particularly concerning ESP, take on a new dimension in education as well as learner engagement while challenging rooted traditional teaching boundaries.

Additionally, these benefits come alongside great pedagogical, cultural, and infrastructure challenges which needed to be carefully reviewed. In this part, we will elaborate on the benefits

and limitations of AI-powered platforms in ESP scenarios, particularly in places like Algeria (LAGGOUN BELHOUL, R., & BENMOUSSAT, S., 2023; Holmes, Bialik, & Fadel, 2021; TIHAL, W., 2023, 2021; Selwyn, 2019).

AI-driven platforms offer several promising opportunities for enhancing vocabulary acquisition in English for Specific Purposes (ESP) contexts. One significant advantage is adaptive learning. Spaced repetition systems (SRS), such as Quizlet and Anki, are particularly effective in reinforcing challenging vocabulary items over time. These systems align with Nation's (2001) principle of gradual mastery, ensuring that learners retain vocabulary through repeated, spaced exposure.

Additionally, customizable content is a valuable feature of platforms like *ClozeMaster*, which allow educators to import discipline-specific materials and create targeted exercises, such as fill-in-the-blank activities with legal or scientific terminology. Another key opportunity lies in immersive simulations. AI-powered environments, like Labster for virtual medical labs, enable students to apply domain-specific language in lifelike professional scenarios. These platforms highlight the principles of Task-Based Learning (TBL), offering contextualized practice that enhances retention and relevance (Ellis, 2003). Moreover, multilingual support tools, such as *DeepL*, assist learners in navigating multilingual settings by facilitating accurate translation and code-switching between English, French, and Arabic.

Despite these advantages, limitations emerge. One major constraint is the generic nature of many language-learning platforms. Tools like *Duolingo*, for example, lack specialized ESP content, often requiring teachers to manually adapt or supplement existing materials to fit their learners' needs. Additionally, cultural bias within AI algorithms poses a challenge. Many platforms are trained on Western corpora and may struggle to recognize regional accents or hybrid terminology common in Algerian educational contexts. Finally, infrastructural barriers remain a pressing

concern. Internet connectivity in Algeria can be unreliable, particularly in rural or underserved areas, making it difficult for students to access cloud-based AI applications consistently. These limitations highlight the importance of contextual adaptation and infrastructure development when integrating AI into ESP instruction.

5.2.Toward a Hybrid Pedagogical Model

It goes without saying that coming to the next step in vocabulary acquisition, as students and teacher perceived, demands indicating the necessary approaches for vocabulary acquisition, whether in domain-specific or broader topic-based dimensions: different approaches to vocabulary acquisition could go beyond these two.

In integrative approaches, students learn to use a variety of technological tools as an ongoing process of language learning and use, rather than visiting the computer lab on a once-a-week basis for isolated exercises (Warschauer & Healey, 1998). These shifts towards digital learning or e-learning demands careful interpretation to make sure that technology serve a clear purpose in developing competency rather than harming the student's potential. This means integrating tools like corpus analysis softwares that focuses on subject-specific lesson plans.

These shifts towards digital learning or e-learning demands even careful interpretation to ensure that technology serve a clear purpose in developing competency instead of harming the student's potential (Coman et al., 2020). This includes incorporating tools like corpus analysis software to create subject-specific lesson plans across disciplines (Basal et al., 2023). In other words, ranging from scientific specialties to humanities fields, the specific use of platforms should be according to the actual needs of students. For example, civil or petroleum engineering students might utilize operation simulators that combine technical procedures with relevant English

terminology, emphasizing the importance of context in learning and assessment (Champeny et al., 2004).

However, successful integration is being mainly challenged by training and infrastructural obstacles that colleges faces, the unreliable internet connectivity, quite limited access to modern equipements, and most importantly the lack of staff capabilities and their unfamiliarity makes the development more concerning, so, to ensure that teachers can properly guide students in using effectively digital tools across all ESP contexts requires infrastructure investments, from local collaborations using basic AI writing assistances to international conferences and webinars participations of M'Sila university students'. "An ongoing process of language learning" as Warschauer and Healey (1998) stated can only be achieved if efforts and commitments are put.

For better utilization of AI potentials, ESP instructors may consider incorporating hybrid approaches:

1- AI for Drills: Automating the vocabulary drills, as seen in SRS, may help save more class time so that interaction can become achievable.
2- Human Instruction for Pragmatics: Poring over vocabulary books is a tactic that (as the teacher understands) will not bear the fruits of true learning.
3- Localized AI Development: Collaborating with developers to build tools specifically designed for Algerian French and Arabic, for example, launching user-centered platforms branded as "*DZ-Lingua"*, as well as specialist lexicons.

6. Perspectives on AI in ESP

Artificial intelligence for ESP education is much more than a technological change; it is pedagogical and socio-cultural, requiring acceptance by its principal users, the teachers and students. AI-empowered *Quizlet*, *Grammarly*, and *ChatGPT* are increasingly embraced and

gradually accepted in language education, although their use remains heavily localized in specialized contexts, especially ESP, regarding how well they connect with the linguistic, cultural, and professional needs of learners and educators. In ESP, where learning the specific vocabulary of a disciplinary area—such as “ischemia” in health or “tort” in law—is vital for real-world engagement, AI gets a chance to prove it is worth when it acts as a bridge between classroom-oriented teachings and field application.

In addition, in teaching alignment, cultural relevance, and practicality, this potential is suckered. AI technologies would be trained pedagogically to aid in putting beyond an intent situation-specific: simulate civil engineering project briefings, medical consultations, and not develop standardized language skills. However, these instruments would journey across multilingual environment where students frequently code-switch between French, Arabic, and English, such as the hybrid terms (LAGGOUN BELHOUL, R., & BENMOUSSAT, S., 2023; Holmes et al., 2021; Kukulska-Hulme, 2020).

People consider these factors when evaluating participants based on their perceptions. They weigh the perceived benefits of AI systems in reducing administrative hurdles against their fears of dependence. At the same time, they contrast the joy of gamification with the frustration of technical limitations. Students make decisions based on this balance. Understanding how these interactions function is crucial for developing an AI solution that is technologically advanced, pedagogically effective, culturally suitable, and bespoke to be used in resource-limited institutions like M'Sila University. This section provides detailed critiques of these perspectives, drawing from global studies and regional viewpoints that highlight the potential, challenges, and methods for fair AI integration into ESP learning (LAGGOUN BELHOUL, R., & BENMOUSSAT, S., 2023; Hamari, Koivisto, & Sarsa, 2014; TIHAL, W., 2023; Selwyn, 2019).

6.1. Teachers' Perspectives

Overall, teachers have had mixed feelings towards using AI-powered tools in teaching English for Specific Purposes (ESP). While some are hopeful that it will make their work more efficient (Mogbel et al., 2023), others are skeptical about its impact on teaching methods (Bauerlein, 2023). Teachers appreciate the potential of AI to reduce their administrative tasks and provide valuable data for decision-making (Troudi, 2020). However, they are concerned that AI may not be effective in addressing the specific needs of ESP learners, particularly in multilingual environments like Algeria (Benmouffok & Benachaiba, 2023).

One of the greatest advantages of AI systems is their ability to reduce administrative workload so teachers do not get easily overwhelmed with abundant data (Hockly, 2023; Kessler, 2023). Platforms like *Quizlet* automate the scoring of vocabulary quizzes, enabling teachers to spend that time on lesson planning and targeted instruction rather than assessing student performances (Quizlet Impact Report, 2022; Godwin-Jones, 2023). Similarly, *Grammarly* gives instant feedback on important documents like research abstracts and case reports, which reduces the manual revision burden for teachers (Lee, 2024; Grammarly EDU Study, 2023).

In addition to saving time, AI platforms provide data-driven insights into student performance (Godwin-Jones, 2023; Pérez-Cañado, 2022). For example, *ClozeMaster* analytics can help identify trends in language retention, such as a class struggling with specific medical terms, allowing for targeted interventions to address those needs (ClozeMaster, 2023; Chen & Baker, 2024).

These advantages; however, are frequently coupled with significant challenges (Troudi, 2020; Bauerlein, 2023). In this case, the first question which comes to teachers' minds that needs be answered is, 'how do I teach with artificial intelligence?' (Kessler, 2023; Hockly, 2023), while

more popular applications of artificial intelligence such as Duolingo focus on general vocabulary instead of domain-specific language (Godwin-Jones, 2023; Ameziane, 2024). instructors argue about how much time they spend realigning content to fit their syllabus, citing that these platforms ignore hybrid terms, which requires manual adjustments (Benmouffok & Benachaiba, 2023; Khababa, 2024). Besides, they express concerns about over-dependence on technology, worrying that students using *ChatGPT* to write reports may undermine critical thinking by avoiding deep engagement (Bauerlein, 2023; Atwell, 2024).

6.2. Students' Perspectives

Students have mixed feelings about AI-assisted technologies in English for Specific Purposes (ESP) education. On one hand, they are excited about the interactive nature of learning with these tools. On the other hand, they are not satisfied with the limitations imposed by technology and the specific context in which they are used. While these technologies offer the potential for flexibility and engagement, there are also concerns raised by some individuals regarding the effectiveness of these technologies, especially in Algeria's diverse language environment and resource-constrained situation (TIHAL, W. 2023; LAGGOUN BELHOUL, R., & BENMOUSSAT, S., 2023; Alqahtani, 2022).

Interactivity in AI learning platforms excites students. For example, *Mondly* allows points for mastering specialized topics finite element analysis in engineering or clinical diagnostic criteria in medicine thereby making vocabulary drills both engaging and goal-oriented challenges. In this way, the mechanics are similar to games, encouraging players to build upon their knowledge and gain concrete achievements for what previously were abstract concepts (Hamari, Koivisto, & Sarsa, 2014; Johnson et al., 2020; Mondly, 2023).

However, students face barriers to learning. Often, such material produced by AI will be criticized for its irrelevance. Consider an engineering student who gets asked about an apple before something more specialized, like aerodynamic drag. This could very well decrease the AI's validity in a specialized context, such as ESP, where precision on domain-specific language is crucial

The second problem is the language barrier. In multilingual classrooms where French, Arabic, and English are being used interchangeably, *DeepL* would remain mostly untested. For example, translating "مسكنات" (painkillers in Arabic) along with perfusion (French for Intravenous drip) creates an output that is chaotic and disconnected. For students, therefore, untangling such mistakes is frustrating and are a mental barrier they do not need to engage in. (Huang & Johnson, 2022; LAGGOUN BELHOUL, R., & BENMOUSSAT, S., 2023; Alqahtani, 2022).

The internet offers a variety of services in addition to the World Wide Web. Information and communication technology (ICT) is a critical tool in numerous fields for acquisition, whether outside or within the classroom, and in both teaching and learning. To facilitate communication among participants, a solid internet connection, as well as superior technological and power infrastructure, should be provided (Lead School, 2025; UNESCO IIEP, n.d.; International Journal on Cybernetics & Informatics, 2023).

Ngoumandjoka (2012) conduct case studies on college students, finding that the majority of these users use it for academic purposes as well as personal fulfillment. He also discovered that grades improve when students focus on academic research to help them improve their research processes. In other words, learners who have been exposed to the internet and have easy access to it do better.

In Algeria, these problems become worse by infrastructure obstacles:

Connectivity issues, particularly in rural areas, pose a significant barrier to effective learning, often due to unstable electricity which leads to frequent power outages and disrupts lessons mid-session. To enhance the learning experience and mitigate these challenges, several solutions are proposed. One approach is the use of offline AI tools, such as applications that incorporate English for Specific Purposes (ESP) content, like Anki decks for medical terminology, eliminating the need for constant internet access. Additionally, fostering public-private partnerships with Algerian telecom providers like *Djezzy* and *Mobilis* can help subsidize data plans for students using AI platforms. Collaborating with departments at M'Sila University to develop localized AI training datasets based on Algerian academic resources can further tailor content to local needs. Advocacy for stronger government investment in rural internet infrastructure, aligned with Algeria's National Digital Plan 2023–2027, is also essential. Lastly, involving both teachers and students in co-designing AI tools, such as generating hybrid terminology (e.g., "*radiographie*" → "X-ray") can ensure the technology is user-centered and contextually relevant.

Yet, there are certain disadvantages to using technical instruments in academic research. When conducting research and utilizing AI-powered platforms, students rely entirely on data to aid them in their knowledge extraction process. Due to the mechanical process of extensively depending on these AI platforms, students tend to lose the critical thinking and analytical mind that is essential for carrying out effective research over time. In other words, as students accept algorithmic-generated data from vocabulary-specific platforms, they may oversimplify or misunderstand the AI model's output (Selwyn, 2019; Holmes et al., 2021; Zawacki-Richter et al., 2019).

Chapter Two

Research Methodology

1.Introduction

While the first chapter provided a comprehensive review of literature related to ESP Vocabulary acquisition and AI platforms usage with both advantages and faced challenges, this chapter focuses on the fieldwork aspect of our research, specifically analyzing teachers' and students' attitudes towards the integration of AI platforms in both lesson planning for teachers and AI tools usage for students. It describes the instrument utilized for data collection, the research methodology used, and the rationale behind their selection. The findings from the questionnaires distributed to teachers and students are also analyzed and discussed in this chapter, which concludes with recommendations for more research.

While this chapter provides a complete overview of data research methods and sample techniques, it also outlines the tools and procedures necessary to collect accurate data. Simply put, this chapter sets the framework for the study's practical implementation.

2.Research Methodology

In this chapter, we examine the practical side of our study. It is essential to use a suitable research methodology in order to adequately answer the research questions and assess the research problem. Therefore, for the purpose of this study, a descriptive research method was chosen, utilizing questionnaires as the primary data collection tool, as it enables the researcher to systematically describe the perceptions and experiences of ESP teachers and students regarding AI tools in vocabulary learning. This method is particularly appropriate for educational research where the goal is to gather detailed information about existing conditions or views without manipulating variables.

Questionnaires are effective in gathering large amounts of data in a relatively short time and allow for the inclusion of both closed- and open-ended questions, which help capture both quantitative trends and qualitative insights. They are especially suitable for this study because they

enable participants to express their perceptions and experiences regarding the integration of AI platforms in ESP contexts. Brown (2001, as cited in Mackey & Gass, 2005, p. 92) defines a questionnaire as a written instrument that presents respondents with a series of questions or statements, to which they respond either by writing their answers or selecting from existing options.

3.Data collection tools

This study uses a quantitative approach to identify and analyze teachers' and students' perceptions regarding the integration of AI-driven platforms into ESP vocabulary acquisition.

- **Structured Questionnaire**

The primary data collection tool is a structured questionnaire that uses a 5-point Likert scale to capture participants' attitudes toward perceived effectiveness, usability, benefits, and challenges. Questionnaires suit this study because they allow respondents to express their views in a consistent format and are efficient for reaching a large number of participants. They are also effective in exploring abstract psychological constructs, such as motivation, which stems from the learner's internal needs.

- **Statistical Package for the Social Sciences (SPSS)**

SPSS serves as the main tool for analyzing the quantitative data collected from both teacher and student responses.

- **Excel 2019**

Excel serves as a secondary tool for analyzing the quantitative data collected from both teacher and student responses. It is used primarily for organizing data and calculating basic statistical measures such as frequencies and percentages, which support the descriptive analysis alongside SPSS.

- **Descriptive Statistics**

Summarize the data using measures such as mean, frequency, and standard deviation, and provide a clear overview of trends and response distributions.

- **Reliability and validity Analysis**

This is conducted to ensure the accuracy and appropriateness of the instrument. Cronbach's alpha assesses the internal consistency of the questionnaire items. In addition, face validity is established by consulting experts in the field to confirm that the questionnaire items appropriately reflect the constructs being measured.

Students' questionnaire

Second section

Reliability Statistics

Cronbach's Alpha	N of Items
.729	7

Third section

Reliability Statistics

Cronbach's Alpha	N of Items
.760	7

Teachers' questionnaire

Second section

Reliability Statistics

Cronbach's Alpha	N of Items
.822	10

Third section

Reliability Statistics

Cronbach's Alpha	N of Items
.916	6

4. Settings and Participants

The entire selected population includes teachers and students at M'sila University. A total of 5 English teachers and 33 students were chosen from various ESP fields and levels of study. A stratified purposive sampling technique was used to ensure diversity across academic disciplines and levels, which is essential for capturing a broad range of AI applications in ESP teaching and learning. This method helped minimize selection bias and improve the representativeness of the findings. The study was conducted during the second semester of the academic year 2024–2025.

5. Data Collection Procedures

The quantitative research seeks to establish a cause-and-effect relationship between two variables through using numerical data and statistical techniques (Sharique, Saeeda, Irfan & Gogoi, 2019, p.28-29). Means that analyzing numerical data or the data that can be easily transformed into numerical form without losing significance. The provided data can be arranged

in a form of categories, tables, and graphs to make the study easy for the researchers to analyze the findings.

The data collection process begins with the design and validation of a structured questionnaire, designed to gather quantitative data from both ESP teachers and students. After confirming the questionnaire's clarity and face validity through expert review, it is converted into an online format using Google Forms.

The questionnaire is then distributed electronically via institutional emails. Teachers from various departments and students enrolled in ESP courses receive the link along with brief instructions and assurances of confidentiality. Distribution occurs in the morning, and most responses are received within 48 hours.

Data collection spans one week to allow for late submissions. All responses are automatically stored in a secure digital format, then exported to SPSS for statistical analysis and to Excel for basic calculations.

6. Results and Discussion

Part One: Students' Questionnaire

Section One: Demographic Information

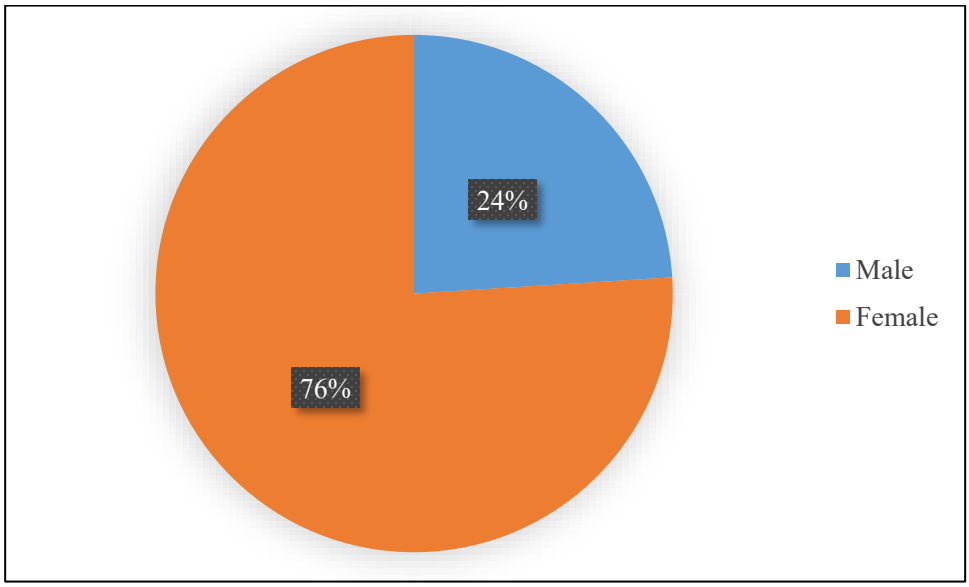
The purpose of this section is to provide demographic or personal information on students, such as their age, English-learning background, and their field of study.

1- Students' Gender:

Table N° (01): Students' Gender

Students' Gender	Frequency	Percentage %
Male	08	24%
Female	25	76%
Total	**33**	**100%**

Chart N° (01): Students' Gender



Based on the preceding figure, 76% of respondents are female (with a total of 25 students), whereas 24% are male (with a total of 8 students).

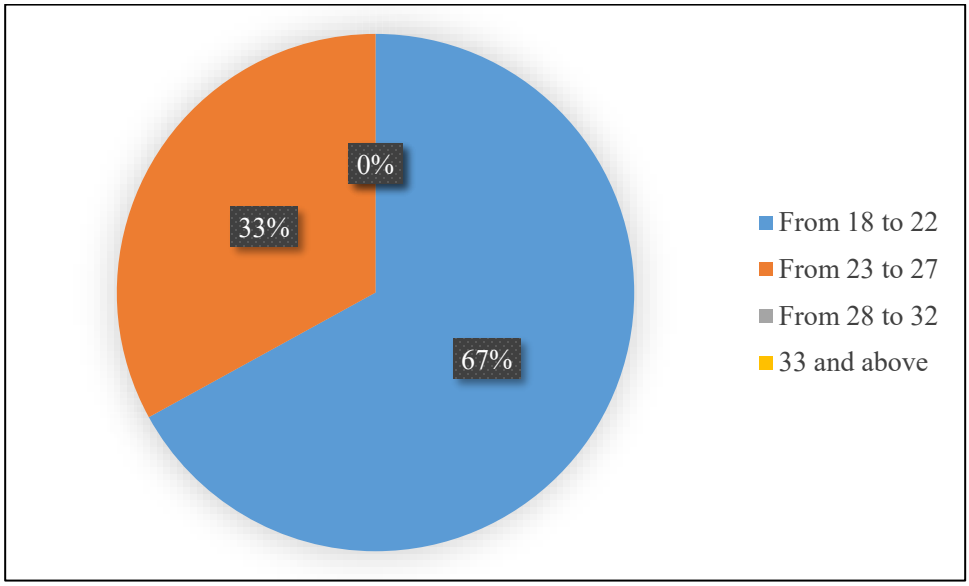
02- Students' Age:

Table N° (02): Students' Age

Students' Age	Frequency	Percentage %
From 18 to 22	22	67%

From 23 to 27	11	33%
From 28 to 32	00	00%
33 and above	00	00%
Total	**33**	**100%**

Chart N° (02): Students' Age



The above statistic and table show that ages range from 18 to 27. The majority, or 67% of the sample, are between the ages of 18 and 22, whereas 33% are between the ages of 23 and 27.

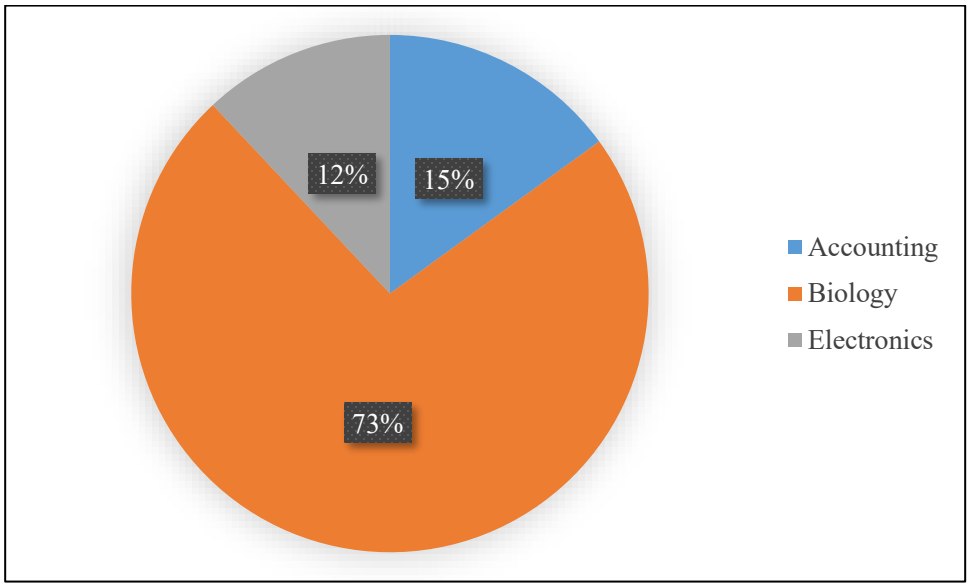
3- Field of Study:

Table N° (03): Field of Study

Field of Study	**Frequency**	**Percentage %**

Accounting	05	15%
Biology	24	73%
Electronics	04	12%
Total	**33**	**100%**

Chart N° (03): Field of Study



The three primary specialties in the above chart are biology, electronics, and accounting. The table indicates that the majority of responders are biology students (73%, or 24 students), followed by accounting students (15%, or 5 students) and electronics students (12%, or 4 students).

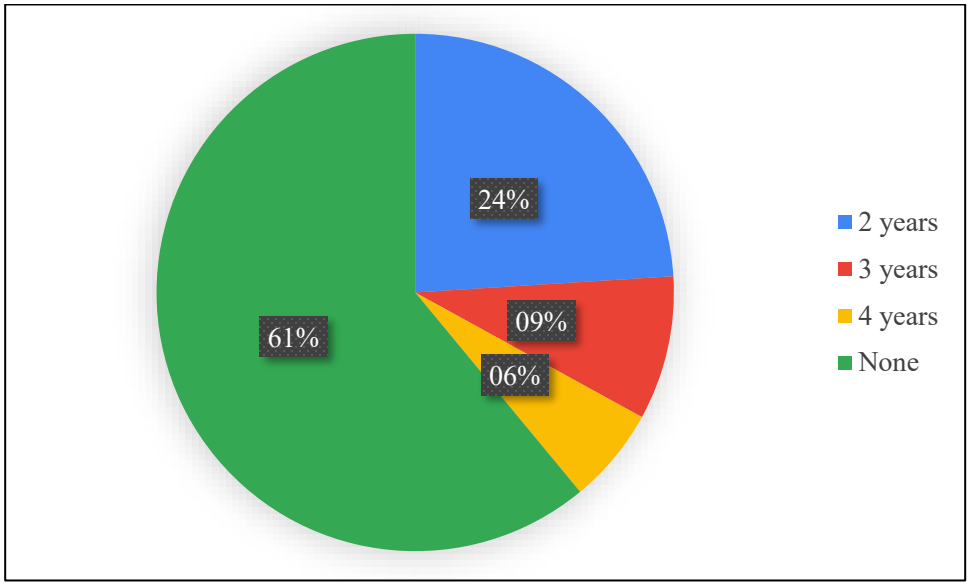
4- Years of Studying:

How many years have you been studying English for specific purposes?

Table N° (04): Years of Studying

Years of Studying	Frequency	Percentage %
2 years	08	24%
3 years	03	09%
4 years	02	06%
None	20	61%
Total	**33**	**100%**

Chart N° (04): Years of Studying



The above table and graph show how many years students spent studying ESP, ranging from none to four years. Of the students in the program, the majority (61% or 20 students) did not study ESP, 24% or 8 students reported taking ESP courses for two years, 9% or 3 students studied ESP for three years, and only 6% or 2 students took ESP courses for four years.

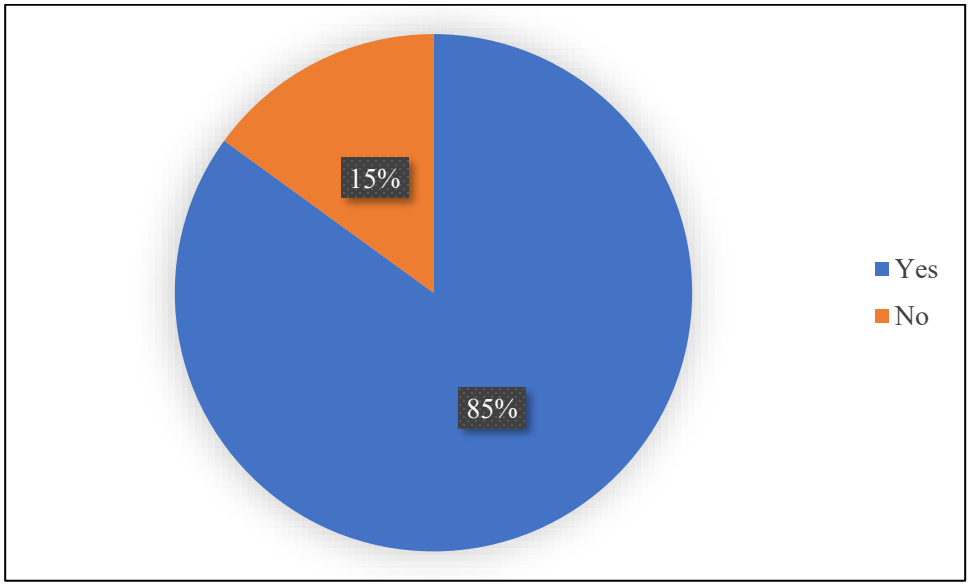
5- AI Tools Usage:

Have you used AI tools (e.g., ChatGPT, Grammarly, Quizlet) to learn vocabulary?

Table N° (05): AI Tools Usage

AI Tools Usage	Frequency	Percentage %
Yes	28	85%
No	05	15%
Total	**33**	**100%**

Chart N° (05): AI Tools Usage



According to the above chart, 85% of students, or 28 students, have previously utilized AI tools, whereas 15% of students, or 5 students, have not.

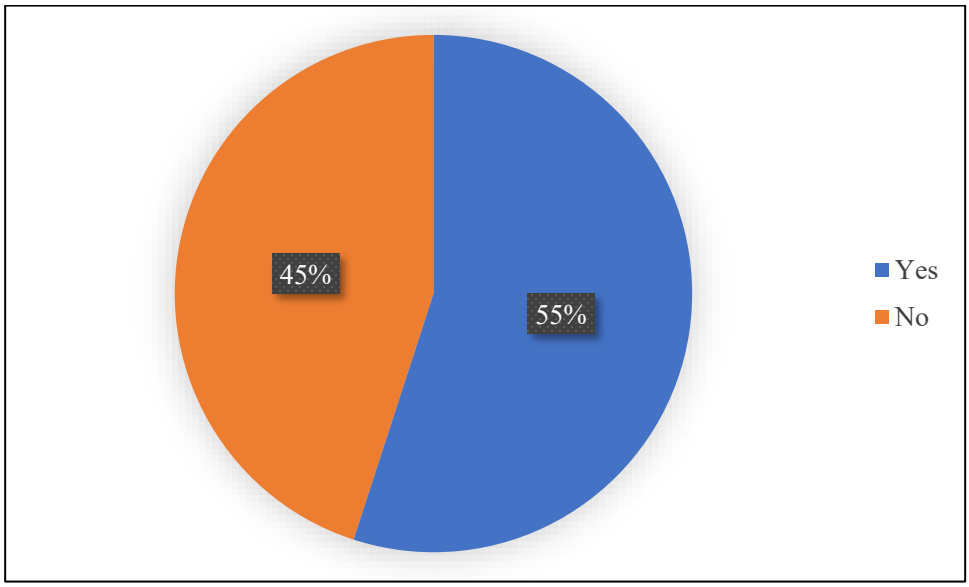
6- Field First Choice:

Was your current learning field the first choice?

Table N° (06): Field First Choice

Feld First Choice	Frequency	Percentage %
Yes	18	55%
No	15	45%
Total	**33**	**100%**

Chart N° (06): Field First Choice



The chart above reveals that 55% of students chose their current field as their first option, whereas 45%, or 15 students, did not.

7- English Learning:

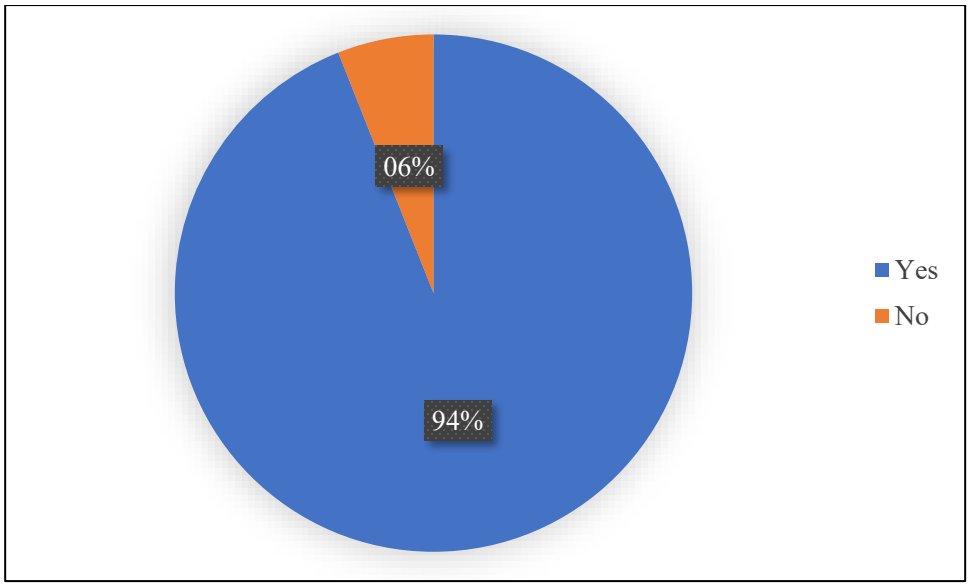
Do you like learning English?

Table N° (07): Learning English

Learning English	Frequency	Percentage %

Yes	31	94%
No	02	06%
Total	**33**	**100%**

Chart N° (07): Learning English



Learning English as a second language is preferred to not according to the data above, as 94% said yes compared to only 6% said they do not have any interest in learning English.

8-English Level

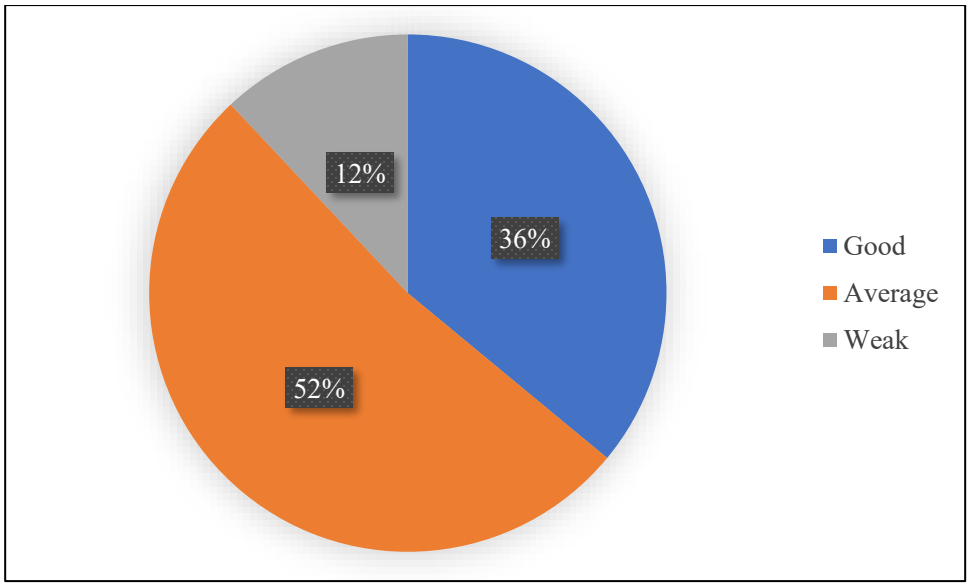
How do you describe your English level?

Table N° (08): English Level

Learning English	**Frequency**	**Percentage %**
Good	12	36%

Average	17	52%
Weak	04	12%
Total	**33**	**100%**

Chart N° (08): English Level



According to the data above, 52% of students have an average level of English, 36% believe they are good, and only 12% have a weak level.

Section Two: Perceptions of AI-powered Learning Tools

In this section, we intended to investigate AI integration into ESP vocabulary acquisition: the main challenges, learning interactions, and impact on the study process.

Question 01:

Which of the following statements about AI tools can be relatable to the most?

Table N° (09): Perceptions of AI-powered Learning Tools

Statistics

Statements		S1	S2	S3	S4	S5	S6	S7	Section 1
N	Valid	33	33	33	33	33	33	33	33
	Missing	0	0	0	0	0	0	0	0
Mean		4.0909	4.2424	4.5758	4.6061	3.2121	2.9091	3.2424	3.8398
Std. Deviation		0.52223	0.56071	0.61392	0.55562	0.64988	0.80482	0.56071	0.61493
Minimum		3.00	3.00	3.00	3.00	2.00	2.00	2.00	3.29
Maximum		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
	Rank	4	3	2	1	6	7	5	//
	Level	Moderate	High	Very High	Very High	Low	Low	Moderate	//

S1: AI tools help me learn new vocabulary more effectively

S2: I enjoy using AI tools to learn vocabulary for my field of study

S3: AI tools are more engaging than traditional vocabulary learning methods

S4: AI tools provide clear explanations and useful examples of new words

S5: Using AI tools motivates me to study vocabulary more regularly

S6: AI tools help me remember technical terms better

S7: AI tools make me feel more confident about my vocabulary knowledge

An arithmetic mean of 3.84 and a standard deviation of 0.61 indicate that the respondents' responses to each statement associated with perceptions of AI learning tools are highly significant, as can be seen by looking at the above table and evaluating their responses. As a result, the responses were distributed as follows:

- With an arithmetic mean of 4.61 and a standard deviation of 0.56, the statement N4—"AI tools provide clear explanations and useful examples of new words"—ranks first among the other sentences. Its "very high" importance level simply indicates that sample participants agreed most with the fact that AI delivers clear definitions of the newly acquired words.
- With an arithmetic mean of 4.58 and a standard of 0.61, the statement N3 "AI tools are more engaging than traditional vocabulary learning methods" ranks second in terms of answers from participants, with a "very high" level of importance. Simply put, participants agree that AI tools are more productive and engaging than traditional methods.
- The statements N2 "I enjoy using AI tools to learn vocabulary for my field of study" have an arithmetic mean of 4.24 and a standard deviation of 0.56, and while the level of importance of respondents is "high", the statement is ranked third, indicating a strong conviction from students that AI tools can help in making education more enjoyable.
- The statement N1 "AI tools help me learn new vocabulary more effectively" is ranked fourth, with an arithmetic mean of 4.09 and a standard deviation of 0.52, but its level of importance relative to the responses is "moderate," indicating that respondents agree on average that AI tools can effectively help learners acquire new vocabulary.
- The statement N7 "AI tools make me feel more confident about my vocabulary knowledge" has a "moderate" level of importance when compared to the previous four

statements, with an arithmetic mean of 3.24 and a standard deviation of 0.56, and is ranked fifth, indicating that participants have a neutral perception of whether AI tools can affect how confident they are in their vocabulary.

- The statement N5 "Using AI tools motivates me to study vocabulary more regularly" is ranked the sixth and has a "moderate" level of importance, with an arithmetic mean of 3.21 and a standard deviation of 0.65. The responses indicate a relatively low perception of the motivational role that AI can play in assisting students in learning new vocabulary on a consistent basis.
- The last ranked statement, the 6th statement, "AI tools help me remember technical terms better," has the lowest level of importance, indicating a "low" level compared to the other six statements, with an arithmetic mean of 2.91 and a standard deviation of 0.80, indicating the low significance of AI tools in assisting with technical term memory.

Question 02:

Do you believe that using AI tools are effective in improving your language skills?

Table N° (10): AI Role

AI Role	Frequency	Percentage %
Not Effective	01	03%
Effective	19	58%
Very Effective	13	39%
Total	**33**	**100%**

The data above indicates that the prevailing response was "Effective" (58%), "Very effective" (39%), with only 3% responding "Not effective".

Question 03:

If AI tools were fully integrated into education, how do you think it would influence the way you learn and interact with teachers? (Select all that apply)

Table N° (11): AI Integration

AI Integration	Frequency	Percentage %
AI would enhance collaboration..	18	55%
AI tools could create more engaging..	14	39%
AI provides me with instant feedback..	14	39%
I would be more independent..	13	42%

The table above display responses to the following question: "If AI tools were fully integrated into education, how do you think it would influence the way you learn and interact with teachers? (Select all that apply)." The results showed that 55% of respondents said that "AI would enhance collaboration by assisting both students and teachers", while 42% said that: "I would be more independent learner with less interaction with teacher". However, both statements: "AI provides me with instant feedback, reducing my need for the teacher's assessment" and "AI tools could create more engaging and interactive tasks" scored 39% of the poll.

Question 04:

How do you describe your experience of using AI in ESP learning process? (Select all that apply)

Table N° (12): AI Assistance

AI Assistance	Frequency	Percentage %
AI tools are available to use anytime..	15	46%
AI tools won't provide emotional support..	09	27%
Chatbots give a brief and easy explanation..	22	67%
AI programs may fail in grasping the complex..	05	15%
Using AI chatbots has directly impacted..	15	46%

Looking above at the table, it shows the answers to the question: "How do you describe your experience of using AI in ESP learning process? (Select all that apply)." The results showed that 67% of participants stated that: "Chatbots give a brief and easy explanation of definitions and word synonyms that boost my understanding to the terms that adjust my specific domain", while both statements: "Using AI chatbots has directly impacted my ability to improve, and reinforces each new acquired vocabulary" and "AI tools are available to use anytime and wherever I am, allowing me to learn ESP vocabulary outside the classroom and in my own pace" collected 46% of responses. However, 27% of students said that "AI tools won't provide emotional support and motivation in the same manner of human treatment" and only 15% indicated that "AI programs may fail in grasping the complex meaning of specific terminology."

Question 05:

What are the biggest challenges you face when using AI-powered tools for ESP vocabulary learning? (Select all that apply)

Table N° (13): AI Challenges

AI Challenges	Frequency	Percentage %
Lack of access to reliable..	10	30%
The whole depending on AI could..	27	82%
AI-generated answers are sometimes..	21	64%

Given the table above, it displays the responses to the question: What are the biggest challenges you face when using AI-powered tools for ESP vocabulary learning? (Select all that apply). 82% stated that "The whole depending on AI could reduce the critical thinking and problem-solving skills", while 64% mentioned that "AI-generated answers are sometimes inaccurate or misleading" and 30% indicated that "Lack of access to reliable AI tools or internet connectivity" can be a challenge for users.

Section Three: Use of AI-powered Tools for Vocabulary Learning

Question 01:

Which of the following statements describes your experience the most?

Table N° (14): Use of AI-powered Tools for Vocabulary Learning

Statistics

Statements		S1	S2	S3	S4	S5	S6	S7	Section 2
N	Valid	33	33	33	33	33	33	33	33
	Missing	0	0	0	0	0	0	0	0
Mean		4.0606	3.6667	2.7879	3.8182	2.6061	3.2424	3.6667	3.4069
Std. Deviation		0.49620	0.73598	0.96039	0.58387	0.86384	0.66287	0.73598	0.72125
Minimum		3.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00
Maximum		5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.86
	Rank	1	3	6	2	7	5	3	//
	Level	Very High	Moderate	Low	Very High	Low	Moderate	Moderate	//

S1: I use AI tools regularly to learn vocabulary related to my field

S2: I use AI tools to check the meaning and usage of new words

S3: I use AI tools to test myself on vocabulary (e.g., through quizzes or flashcards).

S4: I use AI tools to practice using new vocabulary in writing or speaking

S5: I explore AI suggestions to expand my technical vocabulary.

S6: I follow my teacher's guidance in using AI tools for vocabulary learning

S7: I choose specific AI tools based on my vocabulary learning needs

As can be seen by looking at the above table and evaluating the responses. An arithmetic mean of 3.41 and a standard deviation of 0.72 indicate that the respondents' responses to each statement associated with the use of AI-powered learning tools are highly significant. As a result, the responses were distributed as follows:

- The statement N1 "I use AI tools regularly to learn vocabulary related to my field" is ranked first as it is the statement with the highest average value with an arithmetic value of 4.06 and a standard deviation value of 0.50, the level in which the statement appears is "very high" which demonstrate a high significance importance to students in how is AI is used regularly to learn vocabulary in ESP.
- The statement N4 "I use AI tools to practice using new vocabulary in writing or speaking" is ranked second since it has the second highest mean with a value of 3.82 and a standard deviation of 0.58. When assessing the level of this statement, it indicates "very high" agreement among students in using AI as an efficient tool in new vocabulary acquisition, whether in speaking or writing.
- Both statements N2 and N7 "I use AI tools to check the meaning and usage of new words" and "I choose specific AI tools based on my vocabulary learning needs" indicate a "moderate" level of significance, with a mean value of 3.67 and a standard deviation of 0.74, while both ranked third, they demonstrate a moderate use of AI tools among students for checking the meaning and usage of newer words, also the careful selection of specific AI tools in vocabulary learning.
- The statement N6 "I follow my teacher's guidance in using AI tools for vocabulary learning" is ranked fifth with a mean value of 3.24 and a standard deviation of 0.66, indicating a "moderate" level of significance when compared to other statements. However, it shows

that students tend to follow their teachers' instructions when it comes to using AI-powered tools in their vocabulary acquisition process.

- The statement N3 stands for the following: "I use AI tools to test myself on vocabulary (e.g., through quizzes or flashcards)." In comparison to other statements, it is rated sixth with a mean value of 2.79 and a standard deviation of 0.96, indicating a relatively "low" level of significance when it comes to students' self-tests on vocabulary AI tools.
- At last, the fifth statement "I explore AI suggestions to expand my technical vocabulary" ranked seventh with the lowest mean value of 2.61 and a standard deviation of 0.86; it has the lowest level of significance when compared to other statements, indicating students' lack of reliance on AI tools for technical vocabulary suggestions.

Question 02:

How often do you utilize AI platforms for vocabulary acquisition?

Table N° (15): AI Usage

AI Usage	Frequency	Percentage %
Everyday	08	24%
Every Week	13	39%
Every Month	11	33%
Never	01	03%
Total	**33**	**100%**

As shown in the above frequency table, the three most common responses are "every week, every month, and every day". With a proportion of responses of 39%, 33%, and 24%, respectively, while only 3% claimed that they never utilize AI platforms for vocabulary acquisition.

Question 03:

Do you agree that AI-driven data tools are more engaging than the ordinal strategies for ESP vocabulary learning?

Table N° (16): AI Usefulness

AI Usefulness	**Frequency**	**Percentage %**
Strongly Agree	07	21%
Agree	15	46%
Neutral	09	27%
Disagree	02	06%
Strongly Disagree	00	00%
Total	**33**	**100%**

Do you agree that AI-driven data tools are more engaging than the ordinal strategies for ESP vocabulary learning? Based on the frequency table, the majority of students chose "Agree" (46%) followed by "Neutral" (27%), and "Strongly Agree" (21%), with only 6% choosing "Disagree" and 0% choosing "Strongly Disagree" when it comes to whether AI-driven tools are more engaging than traditional strategies.

Question 04:

What are the language skills you think AI tools may help to develop the most? (Select all that apply)

Table N° (17): AI Implementation

AI Implementation	Frequency	Percentage %
Reading	16	49%
Speaking	25	76%
Writing	23	70%
Listening	16	49%

According to the chart above, the top two skills that respondents believe AI technologies might aid them with are speaking and writing, with 76% and 70% respectively. Listening and reading were selected by 49% of participants.

Question 05:

How do you think that AI tools contribute to ESP vocabulary acquisition? (Select all that apply)

Table N° (18): AI Contribution

AI Contribution	Frequency	Percentage %
Enhancing engagement and motivation	12	36%
Encouraging independent learning	20	61%

Monitoring learning process and performance	13	39%
Providing instant feedback and assessment	16	49%
Personalizing learning experiences based on the learner's level	14	42%

Answering the question: How do you think that AI tools contribute to ESP vocabulary acquisition? (Select all that apply) The table above demonstrates that 61% of participants believe AI helps in independent learning, 49% stated that AI "Provide instant feedback and assessment", and 42% said that AI personalize learning experiences based on learner's level. On the other hand, 39% stated that AI helps in "Monitoring the learning process and performance," while 36% of respondents indicated that AI contributes to "enhancing engagement and motivation."

Part Two: Teachers' Questionnaire

A questionnaire of 12 questions has been used to investigate teachers' perceptions and practices regarding the use of AI in ESP vocabulary teaching.

Section One: Demographic Information

This demographic section provides personal information on the teacher's Age, Gender, Academic level, Years of experience, ESP Field, and AI tools prior experience.

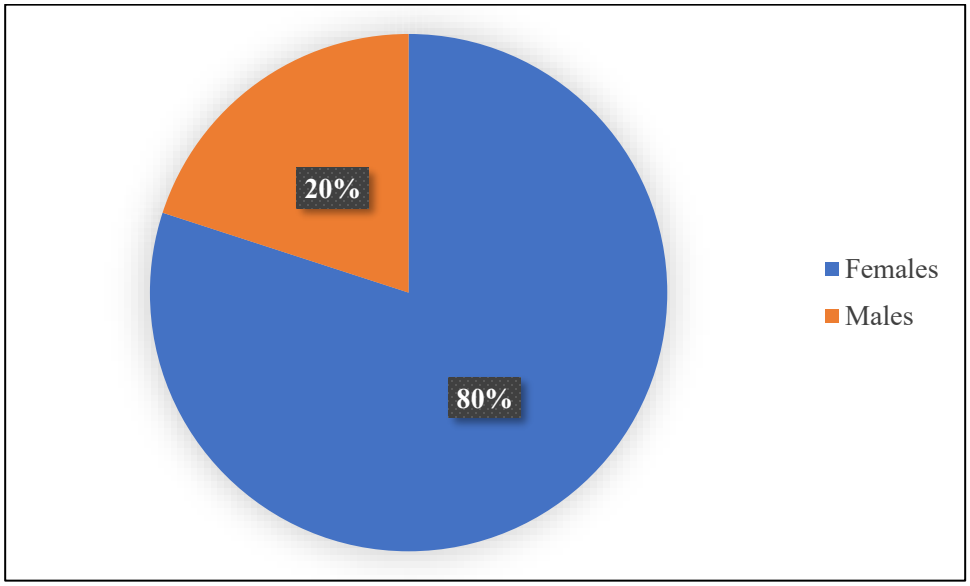
Question 01: Teachers' Gender

Table N° (19): Teachers' Gender

Teachers' Gender	Frequency	Percentage %
Male	01	20%

Female	04	80%
Total	**5**	**100%**

Chart N° (9): Teachers' Gender



In terms of gender, the respondents are 1 male and 4 females with the rate of 80% females against 20% males.

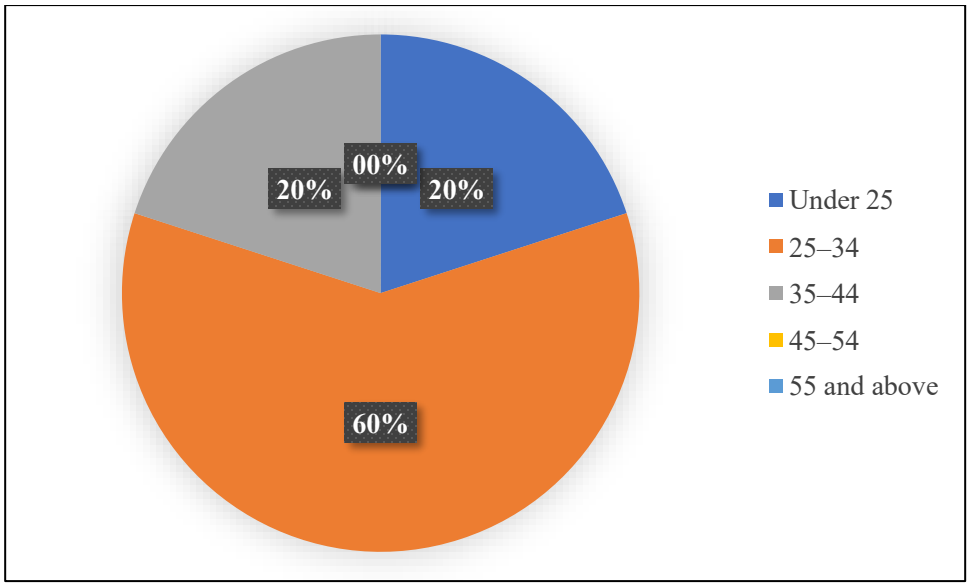
Question 02: Teachers' Age

Table N° (20): Teachers' Age

Teachers' Age	Frequency	Percentage %
Under 25	01	20%
25–34	03	60%
35–44	01	20%

45–54	00	00%
55 and above	00	00%
Total	**05**	**100%**

Chart N° (10): Teachers' Age



Depending on the table above, the majority of teachers who have responded are aged between 25 and 34, with a rate of 60%, only 20% represents those under 25 equally to those aged between 35 and 44, while none of the respondents are above 55.

Question 03:

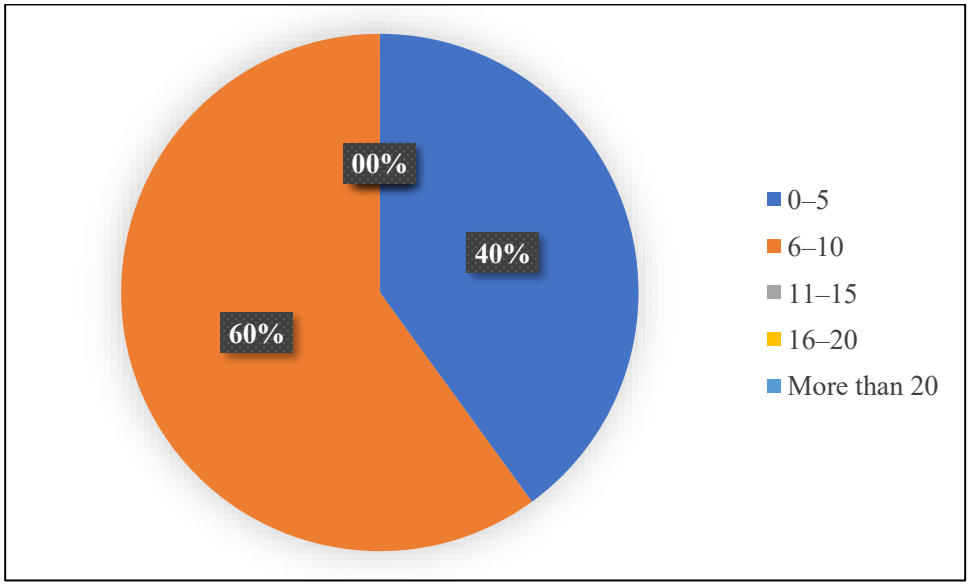
How many years have you been teaching English?

Table N° (21): English Teaching Experience

English Teaching Experience	Frequency	Percentage %

0–5	02	40%
6–10	03	60%
11–15	00	00%
16–20	00	00%
More than 20	00	00%
Total	**05**	**100%**

Chart N° (11): English Teaching Experience



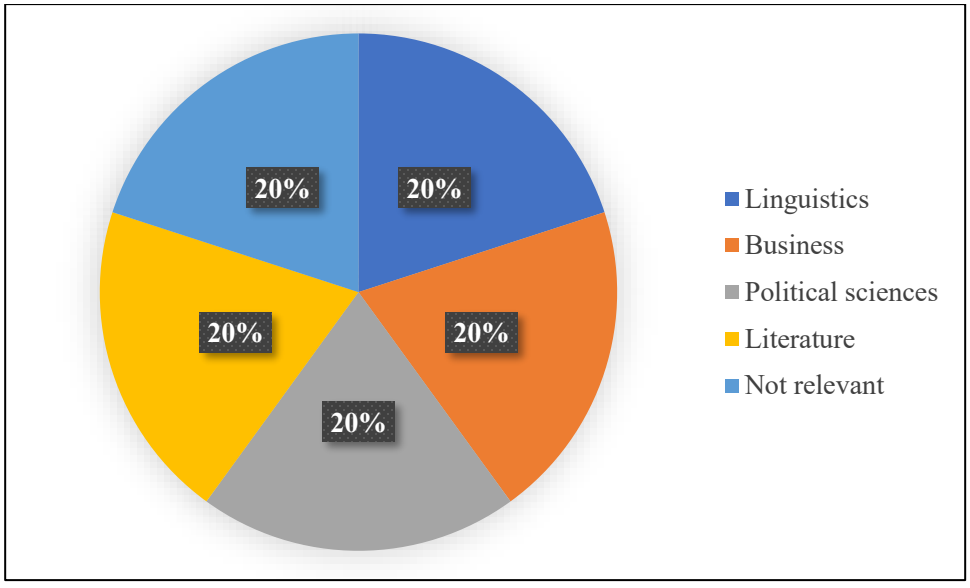
According to the table shown there, most of teachers who have answered the questionnaire are experienced teachers who have taught around 10 years in which accounted 60% of the sample. However, teachers from 0 to 5 years of experience are estimated with the percentage of 40%.

Question 04: ESP Field

Table N° (22): Field of Teaching

Field of Teaching	Frequency	Percentage %
Linguistics	01	20%
Business	01	20%
Political sciences	01	20%
Literature	01	20%
Not relevant	01	20%
Total	**05**	**100%**

Chart N° (12): Field of Teaching



The chart above notably indicates the equal rates (20%) of the five specialties, which are linguistics, business, political sciences, literature, and the rest are not relevant. One teacher of each field.

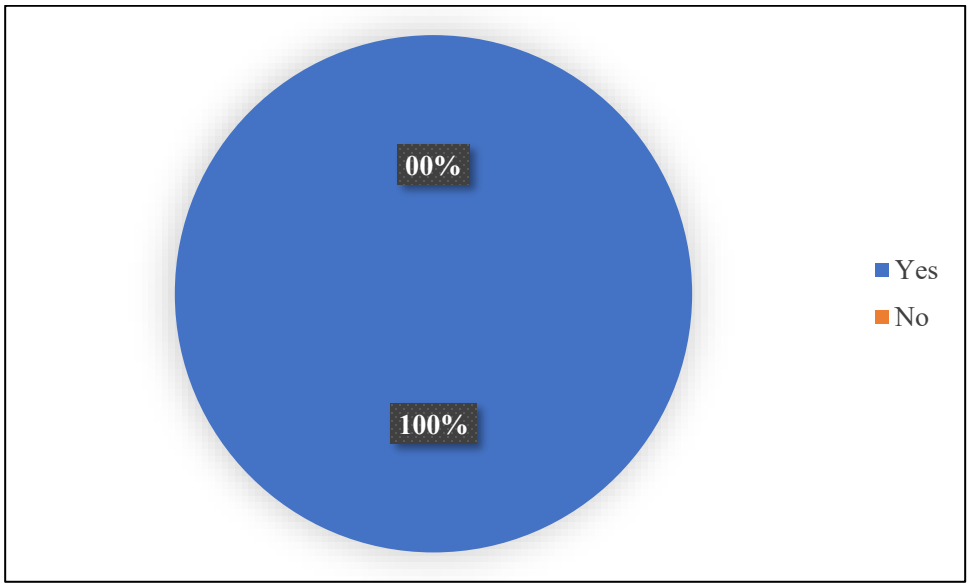
Question 05:

Have you ever used AI tools in your teaching experience?

Table N° (23): AI Tools Usage

AI Tools Usage	Frequency	Percentage %
Yes	05	100%
No	00	00%
Total	**05**	**100%**

Chart N° (13): AI Tools Usage



The total data shown on the table covers 100% of the respondents who selected the answer “yes” towards their usage of AI tools while teaching.

All teachers in various fields agreed to integrate AI platforms into their teaching methods.

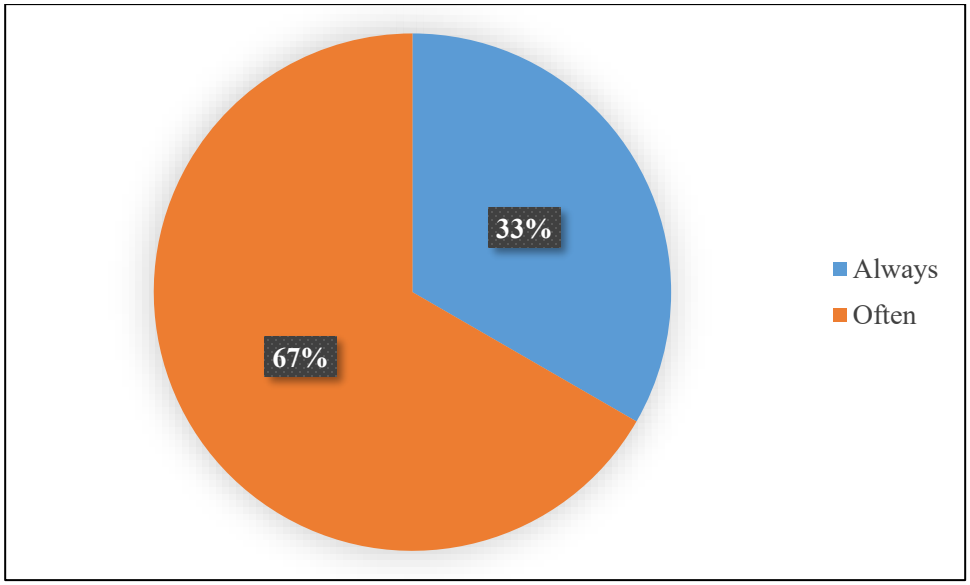
Question 06:

Have you received training in using AI tools for language teaching?

Table N° (24): AI Tools Training

AI Tools Training	Frequency	Percentage %
Yes	00	00%
No	05	100%
Total	**05**	**100%**

Chart N° (14): AI Tools Training



The table indicates that none of the teachers in the multiple domains has received any training on using AI within teaching. The whole sample of teachers selected the answer "No".

Section Two: Perceptions of AI-powered Learning Tools

In this section we wanted to evaluate the AI integration into ESP within the context of vocabulary acquisition: the main challenges, learning interaction, and impact on the teaching process.

Question 01:

Which of these statements best describes your experience with AI tools?

Table N° (25): Perceptions of AI-powered Learning Tools

Statistics

Statements		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	Section 1
N	Valid	5	5	5	5	5	5	5	5	5	5	5
	Missing	0	0	0	0	0	0	0	0	0	0	0
Mean		4.0000	4.2000	4.6000	3.6000	4.6000	3.6000	3.4000	3.8000	3.6000	4.0000	3.9400
Std. Deviation		0.70711	0.44721	0.89443	1.34164	0.54772	0.89443	1.34164	0.44721	1.14018	1.22474	0.90414
Minimum		3.00	4.00	3.00	2.00	4.00	3.00	2.00	3.00	2.00	2.00	3.10

Maximum	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.00	5.00	5.00	4.60
Rank	4	3	1	7	1	7	10	6	7	4	//
Level	High	Very High	Very High	Moderate	Very High	Moderate	Low	Moderate	Moderate	High	//

S1: AI tools (e.g., ChatGPT, Grammarly, Quizlet) can enhance vocabulary learning for ESP students

S2: AI tools help tailor vocabulary learning to the specific needs of different ESP domains (e.g., engineering, medicine, business)

S3: Compared to traditional methods, AI tools are more routine-friendly to integrate

S4: AI-powered applications in ESP have positively enhanced students' language use, motivation, and performance

S5: AI tools provide valuable feedback that supports vocabulary development in ESP contexts

S6: The use of AI in language learning aligns well with modern ESP curriculum goals

S7: AI tools help students become more autonomous vocabulary learners

S8: AI tools are helpful when it comes to interacting with students

S9: AI tools improved your implementation of traditional methods into ESP teaching

S10: AI platforms save time in lesson preparation

An estimated mean of 3,94 and a standard deviation of 0,90 show that the participants' responses to each statement that is related to the perceptions of AI learning tools are highly significant, as shown on the table above, and therefore, the answers are distributed as follows:

- Both statements N3 “Compared to traditional methods, AI tools are more routine-friendly to integrate” and N5 “AI tools provide valuable feedback that supports vocabulary development in ESP contexts” scores the first comparing to the other statements with an arithmetic mean of 4,60 and a standard deviation of 0,89 and 0,55 respectively. They have a “very high” level of agreement to integrate AI tools in their teaching methods when compared to traditional methods, also, the participants stated that they support the idea that AI provide valuable feedback that enhance vocabulary acquisition.
- The statement N2 “AI tools help tailor vocabulary learning to the specific needs of different ESP domains (e.g., engineering, medicine, business)”. Scores the third with a mean of 4,20 and a standard deviation of 0,45. Its level of importance is “very high” regarding the respondent’s responses indicate strong conviction that AI chatbots help in delivering various ESP students’ needs.
- Both statements N10 “AI platforms save time in lesson preparation” and N1 “AI tools (e.g., ChatGPT, Grammarly, Quizlet) can enhance vocabulary learning for ESP students” ranks the fourth with a mean of 4,00 and a standard deviation of 1,22 and 0,71 respectively. Their importance level is “high”, according to the participants they broadly support the role of AI tools in improving ESP vocabulary retention and save the time in lesson planning.
- The statement N8 “AI tools are helpful when it comes to interacting with students” ranks the sixth with a mean of 3,80 and a standard deviation of 0,45. Which indicates a “moderate” level, considering the participants' answers they ensure the smooth connection of AI tools with learners that may provide engaging settings.
- The three N4 “AI-powered applications in ESP have positively enhanced students’ language use, motivation, and performance”, N9” AI tools improved your implementation

of traditional methods into ESP teaching" and N6" The use of AI in language learning aligns well with modern ESP curriculum goals" comes with a similar mean of 3,60 and a standard deviation of 1,31, 1,14 and 0,89 respectively. The three scored the seventh while they indicate a "moderate" level of using modern technologies in the curriculum goals.

- At last, the statement N7" AI tools help students become more autonomous vocabulary learners" comes the last one with an estimated mean of 3,40 and standard deviation of 1,34, it has a "low" importance compared to the other statements, where the participants responses show the lack of learner's independence and the self-sufficiency as vocabulary learner.

Question 02:

AI tools help more your students in (Select all that apply)

Table N° (26): AI Implementation

AI Implementation	Frequency	Percentage %
Reading	00	00%
Speaking	03	60%
Writing	04	80%
Listening	00	00%

The shown table above demonstrate that the most two skills that may AI tools boost depending on the respondents' answers: are writing with the rate of 80% then speaking 60%, whereas none of them believe that listening and reading could be enhanced by these chatbots.

Question 03:

How could the university better support AI integration?

The responses to the question above are as follows:

1- “By:

- Integrating AI into teaching methods (assessment for instance)

- incorporating AI literacy for both teachers and students to understand it's capabilities and limitations.

- Ensure that teachers and students have free or affordable access to AI tools.

- Develop academic integration policies and ethical frameworks to avoid the inappropriate use of these tools.”

2- “Designing modern curriculums that engage the use of AI platforms, blended learning, and integrating technology will strongly boost the learning experience.”

3- “By integrating sessions to officially teach AI as a module part of tge program in each faculty.”

4- “Using AI in some filed like mathematics and medicine can enhance the application of these majors, as it gives precise results. In language learning, I believe that integrating AI in the program can lead to more relevance, because students of this generation rely on to do their daily tasks. Hence, finding it in the classroom would enhance their engagement and motivation. Also, it facilitates the learning process, and can open a wide range of teaching contexts that cannot be practiced in the classroom. For instance, it be used to progressively assess students throughout their academic year without the teacher getting involved.”

5- “Not sure, but teachers must be open to integrate them. They need training from professionals.”

Section Three: Teaching Practices Involving AI-powered Tools

<u>Question 01:</u>

Which of the following statements about AI tools can be relatable to the most? (Select all that apply)

Table N° (27): Teaching Practices Involving AI-powered Tools

Statistics

Statements		S1	S2	S3	S4	S5	S6	Section 2
N	Valid	5	5	5	5	5	5	5
	Missing	0	0	0	0	0	0	0
Mean		3.6000	3.4000	3.4000	3.2000	3.4000	3.4000	3.4000
Std. Deviation		1.14018	1.14018	1.34164	1.09545	1.14018	1.34164	1.20105
Minimum		2.00	2.00	2.00	2.00	2.00	2.00	2.00
Maximum		5.00	5.00	5.00	4.00	5.00	5.00	4.33
	Rank	1	2	2	6	2	2	//
	Level	Very High	High	High	Moderate	High	High	//

S1: I regularly incorporate AI-powered tools in my vocabulary teaching for ESP

S2: I guide students on how to use AI tools for learning field-specific vocabulary

S3: I design activities or assessments that involve the use of AI-powered vocabulary tools

S4: I evaluate the effectiveness of AI tools in my students' vocabulary learning

S5: I collaborate with other teachers to share practices involving AI tools in ESP teaching

S6: I adapt AI tools to fit the specific vocabulary needs of my ESP students

A calculated mean of 3,40 and a standard deviation of 1,20 show that the participants' responses to each statement that is linked to the teaching practices involving AI-powered tools are highly significant, as shown on the table above, and therefore, the answers are distributed as follows:

- The statement N1" I regularly incorporate AI-powered tools in my vocabulary teaching for ESP" clearly scores the first with the estimated mean of 3,60 and a standard deviation of 1,14. The participants strongly agree to integrate new technologies into their teaching process.
- The statement N2" I design activities or assessments that involve the use of AI-powered vocabulary tools" comes the second with an arithmetic mean of 3,40 and a standard deviation of 1,14. Its high level indicates that teachers create tasks and evaluations that require AI usage.
- The statement N5" I collaborate with other teachers to share practices involving AI tools in ESP teaching" and the statement N6"I adapt AI tools to fit the specific vocabulary needs of my ESP students" are also ranking the second with an estimated mean of 3,40 and a standard deviation of 1,14. Their high level of importance is regarding the participants' replies their wherein N5 the responders agree to share their using of AI with each other, while the N6 they show the agreement of tailoring AI technologies to the specific vocabulary demands of the learners.

- At the end, the statement N4" I evaluate the effectiveness of AI tools in my students' vocabulary learning" scores lower among all statements with a mean of 3,20 and a standard deviation of 1,10. Since the moderate value shows the teachers disagreement to the assessment of the learners' usage of new technologies within learning.

Question 02:

How often AI tools contribute to language teaching process?

Table N° (28): AI Usage

AI Usage	Frequency	Percentage %
Always	00	00%
Often	03	60%
Sometimes	02	40%
Rarely	00	00%
Never	00	00%
Total	**05**	**100%**

According to the above table, 3 teachers with the rate of 60% often use AI-driven platforms. However, 40% they sometimes utilize these tools.

Question 03:

How often do you incorporate AI tools in ESP teaching?

Table N° (29): AI Integration

AI Integration	Frequency	Percentage %
Always	01	20%
Often	02	40%
Sometimes	00	00%
Rarely	00	00%
Never	02	40%
Total	**05**	**100%**

The table above indicates the percentage of replies incorporating AI in teaching ESP vocabulary, where 20% are frequently recommended to integrate them. Besides, teachers almost never encourage to integrate them with the percentage of 40%.

Discussion

Combining the findings from both teachers and students regarding AI platforms in enhancing ESP vocabulary acquisition, students confirm that AI tools are becoming increasingly important in their learning and interpretation processes, demonstrating their efficient adaptation to new machine-learning powered platforms that can affect their performance, confidence, and motivation, while citing some infrastructural challenges in using them effectively compared to traditional methods. Despite their weaknesses in advanced subjects or DEA (Diplômes d'études approfondies), such as Accounting and Biology, AI-powered platforms struggle to deliver accurate results. Together, these findings highlight the need for ongoing innovation in the educational technology field to meet the needs of modern classrooms.

Building on these findings, teachers emphasize the need of customized vocabulary tasks and training exercises for both students and teachers, knowing that effectiveness is closely tied to the capacity to effectively incorporate AI tools. Most teachers agreed that adaptive learning is critical, particularly in lesson planning, allowing students to adjust at their own pace. On the other hand, several teachers emphasized the significance of properly handling the aspects of those AI systems.

Further, both teachers and students expressed concerns about the major infrastructural challenges encountered when dealing with these new types of technologies, which can lead to frustration and misapplication of these platforms, forcing organizations to accelerate their focus on modern technologies rather than traditional ones. As a result, teachers emphasized the need of institutional infrastructure investments such as high-speed Wi-Fi and next generation computers.

Looking forward, and most significantly, actual measures should be demonstrated in integrating AI as a teaching module by professionals and experts in the field. AI systems facilitate the learning process for many students by providing direct, easy to understand and less complicated definitions. Furthermore, by accurately measuring the use of these AI platforms in classrooms, teachers can easily track practitioners' needs, allowing them to organize classes based on data-driven insights. By balancing pedagogical effects with technological innovation, teachers can leverage AI's strengths to improve competence and expertise.

7. Limitations

- Sample Size and Representativeness: Both the teachers' and students' questionnaires were conducted with a limited number of participants from specific ESP fields in a particular region. This restricts the generalization ability of findings to a broader population of ESP teachers and students.

- Self-Reported Data: A significant portion of the data came from self-reported responses from teachers and students, which may contain bias or mistakes due to social desirability or poor question interpretation. A key limitation in gathering teacher's perceptions despite the small sample selected.
- Time Constraints: It's possible that the questionnaire's length restricted the participants' ability to provide in-depth answers, especially when it came to investigating complex aspects of AI platforms' difficulties, applications, and impacts on interactions and teaching and learning outcomes.
- Lack of resources: since Artificial intelligence is considered of the new emerged technologies, the study's limitations include the lack of the relevant academic references that contain the integration of AI technologies into the higher education ESP vocabulary acquisition.

8. Recommendations

In order to put the study's findings into practice the recommendations below explain steps for using AI tools in ESP instruction with a clear focus on vocabulary retention and the educational adaption:

- Employ mixed-methods approaches combining qualitative interviews with quantitative surveys to triangulate findings and provide a more comprehensive understanding of the complex interactions between AI-platforms use, teaching practices, and student outcomes.
- Assess the efficacy of the different teaching strategies by comparing traditional approaches with AI-powered alternatives. In other words, by conducting a comparative study in order to identify the best practices for improving the performance and competency of both teachers and students.

- If the selected data collection tool is a questionnaire, the online ones are more recommended due to its smooth usage.

General conclusion

The current study investigates the perspectives of M'sila teachers and student concerning the adoption of AI-powered learning aiding to improve vocabulary acquisition in English for specific purposes (ESP) courses. Also, the study's findings illustrate both the opportunities and the challenges of integrating the new technologies into ESP education.

The research revealed that nearly all teachers and students recognize the value of AI tools including personalized learning experiences, adaptive feedback, and higher engagement. And therefore, the questionnaire method is also used to in this study to evaluate their perceptions.

Students particularly appreciated the easy access and the interactive nature of AI platforms, which enable them to practice vocabulary outside classes. However, teachers acknowledged AI's efficacy in reducing the administrative issues and offering data driven insight into students' progress. These benefits are aligned with the theoretical framework that has discussed, among them, Nation's vocabulary acquisition framework and task based learning that both underline the significance of context, repetition, and the engaged involvement in vocabulary acquisition.

Nevertheless, the study also identifies some crucial challenges. Technical limits, like lack of internet access and a lack of sophisticated tools, were significant obstacles, especially in environments with limited resources such as Algeria. The generic nature of many AI platforms, which frequently neglect to meet the specific vocabulary needs of ESP learners, was another issue raised by both teachers and students. These problems are more serious by the lack of training for educators on how to successfully incorporate AI tools into their curricula.

Hopefully, the research raises the awareness of AI-driven platforms that could change ESP vocabulary acquisition. However, it is crucial to overcoming the pedagogical and cultural

challenges. The study mention that M'sila University can apply AI technologies to foster inclusive learning environment. So future researcher should look into artificial intelligence long-term impact on vocabulary acquisition and specific or professional communication capacity in ESP settings.

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11.Appendices

Appendix A: Students' Questionnaire

Section I: Background Questions

1) What is your gender?

a) Male

b) Female

2) Age

a) Under 18 ☐

b) 18–22 ☐

c) 23–27 ☐

d) 28–32 ☐

e) 33 and above

3) Field of study (e.g., Engineering, Medicine, Business):

.....

4) How many years have you been studying English for specific purposes?

a) 2 years

b) 3 years

c) 4 years

d) None

5) Have you used AI tools (e.g., ChatGPT, Grammarly, Quizlet) to learn vocabulary?

Yes ☐

No ☐

6) Was your current learning field the first choice?

Yes ☐

No ☐

7) Do you like learning English?

a) Yes

b) No

8) How do you describe your English level?

a) Good

b) Average

c) Weak

Section II: Perceptions of AI-powered Learning Tools

1) Which of the following statements about AI tools can be relatable to the most?

N°	Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	AI tools help me learn new vocabulary more effectively					
2	I enjoy using AI tools to learn vocabulary for my field of study					

3	AI tools are more engaging than traditional vocabulary learning methods					
4	AI tools provide clear explanations and useful examples of new words					
5	Using AI tools motivates me to study vocabulary more regularly					
6	AI tools help me remember technical terms better					
7	AI tools make me feel more confident about my vocabulary knowledge					

2) Do you believe that using AI tools are effective in improving your language skills?

a) Not effective ☐

b) Effective ☐

c) Very Effective ☐

3) If AI tools were fully integrated into education, how do you think it would influence the way you learn and interact with teachers? (Select all that apply)

- I would be more independent learner with less interaction with teacher ☐

- AI provides me with instant feedback, reducing my need to the teacher's assessment ☐
- AI tools could create more engaging and interactive tasks ☐
- AI would enhance collaboration by assisting both students and teachers ☐
- Other ☐

4) How do you describe your experience of using AI in ESP learning process? (Select all that apply)

- Using AI chatbots has directly impacted my ability to improve, and reinforces each new acquired vocabulary ☐
- AI programs may fail in grasping the complex meaning of the specific terminology ☐
- These chatbots give a brief and easy explanation of definitions and word synonyms that boost my understanding to the terms that adjust my specific domain ☐
- AI tools won't provide emotional support and motivation in the same manner of human treatment ☐
- AI tools are available to use anytime and wherever I am, allowing me to learn ESP vocabulary outside the classroom and in my own pace ☐

5) What are the biggest challenges you face when using AI powered tools for ESP vocabulary learning? (Select all that apply)

- Lack of access to reliable AI tools or internet connectivity ☐
- Problems of comprehending the use of these tools ☐
- AI-generated answers are sometimes inaccurate or misleading ☐

- The whole depending on AI could reduce the critical thinking and problem solving skills

□

Section III: Use of AI-powered Tools for Vocabulary Learning

1) **Which of the following statements describes your experience the most?**

N°	Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	I use AI tools regularly to learn vocabulary related to my field					
2	I use AI tools to check the meaning and usage of new words					
3	I use AI tools to test myself on vocabulary (e.g., through quizzes or flashcards)					
4	I use AI tools to practice using new vocabulary in writing or speaking					
5	I explore AI suggestions to expand my technical vocabulary					
6	I follow my teacher's guidance in using AI tools for vocabulary learning					

7	I choose specific AI tools based on my vocabulary learning needs					

2) How often do you utilize AI platforms for vocabulary acquisition?

a) Everyday ☐

b) Every week ☐

c) Every month ☐

d) Never ☐

3) Do you agree that AI-driven data tools are more engaging than the ordinal strategies for ESP vocabulary learning?

a) Strongly Agree ☐

b) Agree ☐

c) Neutral ☐

d) Disagree ☐

e) Strongly Disagree ☐

4) What are the language skills you think AI tools may help to develop the most?

a) Listening ☐

b) Writing ☐

c) Speaking ☐

d) Reading ☐

5) How do you think that AI tools contribute to ESP vocabulary acquisition? (Select all that apply)

- Personalizing learning experiences based on the learner's level
- Providing instant feedback and assessment
- Monitoring learning process and performance
- Enhancing engagement and motivation
- Encouraging independent learning
- Other…….....

Appendix B: Teacher's Questionnaire

Section I: Demographic Information

1) What is your Gender:

- Male ☐
- Female☐

2) Age

a) Under 25 ☐

b) 25–34 ☐

c) 35–44 ☐

d) 45–54 ☐

e) 55 and above ☐

3) How many years have you been teaching English?

- 0–5 ☐

- 6–10 ☐
- 11–15 ☐
- 16–20 ☐
- More than 20 ☐

4) ESP Field

……

5) Have you ever used AI tools in your teaching experience?

a) Yes ☐

b) No ☐

6) Have you received training in using AI tools for language teaching?

a. Yes ☐

b. No ☐

Section II: Perceptions of AI-powered Learning Tools

1) Which of these statements best describes your experience with AI tools?

N°	Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	AI tools (e.g., ChatGPT, Grammarly, Quizlet) can enhance vocabulary learning for ESP students					
2	AI tools help tailor vocabulary learning to the specific needs of					

	different ESP domains (e.g., engineering, medicine, business)					
3	Compared to traditional methods, AI tools are more routine-friendly to integrate					
4	AI-powered applications in ESP have positively enhanced students' language use, motivation, and performance					
5	AI tools provide valuable feedback that supports vocabulary development in ESP contexts					
6	The use of AI in language learning aligns well with modern ESP curriculum goals					
7	AI tools help students become more autonomous vocabulary learners					
8	AI tools are helpful when it comes to interacting with students					
9	AI tools improved your implementation of traditional methods into ESP teaching					

10	AI platforms save time in lesson preparation					

2) AI tools help more your students in (Select all that apply):

a) Writing ☐

b) Listening ☐

c) Speaking ☐

d) Reading ☐

3) How could the university better support AI integration?

.....

Section III: Teaching Practices Involving AI-powered Tools

1) Which of these statements best describes your experience with AI tools?

N°	**Item**	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
1	I regularly incorporate AI-powered tools in my vocabulary teaching for ESP					
2	I guide students on how to use AI tools for learning field-specific vocabulary					

3	I design activities or assessments that involve the use of AI-powered vocabulary tools					
4	I evaluate the effectiveness of AI tools in my students' vocabulary learning					
5	I collaborate with other teachers to share practices involving AI tools in ESP teaching					
6	I adapt AI tools to fit the specific vocabulary needs of my ESP students					

2) How often AI tools contribute to language teaching process?

a) Always ☐

b) Often ☐

c) Sometimes ☐

d) Rarely ☐

e) Never ☐

3) How often do you incorporate AI tools in ESP teaching?

a) Always ☐

b) Often ☐

c) Sometimes ☐

d) Rarely ☐

e) Never ☐

Appendix C

الملخص

تعرض هذه الدراسة تصورات المعلمين والطلاب بشأن استخدام منصات التعلم المدعومة بالذكاء الاصطناعي لتعزيز اكتساب المفردات في دورات اللغة الإنجليزية لغرض محدد في جامعة المسيلة. نظرًا للنمو المتزايد للذكاء الاصطناعي في التعليم، وخاصة في تعلم اللغات، تستكشف الدراسة كيفية إدراك هذه التقنيات من حيث فعاليتها وسهولة استخدامها وتأثيرها على نتائج التعلم. تستخدم الدراسة منهج البحث الوصفي الكمي، حيث يتم جمع البيانات من خلال استبيانات واستطلاعات منظمة لفحص وجهات نظر معلمي وطلاب اللغة الإنجليزية لغرض محدد، وبالتالي يتم تطبيق الإحصاءات الوصفية والبيانات الاستقرائية للعثور على التسلسلات والفروق بين المجموعات. تكشف النتائج عن وجهات نظر متنوعة: أظهرت تصورات الطلاب لأدوات التعلم المدعومة بالذكاء الاصطناعي متوسطًا قدره 3.84 (على مقياس من 5 نقاط)، بينما وصلت تصورات المعلمين إلى متوسط أعلى قليلاً قدره 3.94. كانت الاستجابات المتعلقة بالاستخدام أقل قليلاً، حيث بلغ المتوسط 3.41 للطلاب و3.40 للممارسات التعليمية. على الرغم من أن العديد من المشاركين يعترفون بإمكانات أدوات الذكاء الاصطناعي في توفير ممارسة مفردات شخصية، تكيفية، وجذابة، إلا أن التحديات مثل القيود التقنية، نقص المفردات المتخصصة، ومقاومة المستخدمين تم تسليط الضوء عليها أيضًا في هذا البحث. تحدد الدراسة العناصر المهمة التي تؤثر على التكامل الفعال للمنصات المدعومة بالذكاء الاصطناعي في تدريس اللغة الإنجليزية لغرض محدد، بما في ذلك تدريب المعلمين، وإمكانية الوصول، والتوافق مع احتياجات المفردات المتخصصة.

الكلمات المفتاحية: تصورات معلمي/طلاب اللغة الإنجليزية لأغراض محددة، منصات التعلم المدعومة بالذكاء الاصطناعي، اكتساب المفردات، دمج الذكاء الاصطناعي في اللغة الإنجليزية لأغراض محددة