

The Role of Artificial Intelligence in Enhancing ESP Teaching and Learning for Global Competitiveness. Case study: 2nd Year Students at The Higher School of Computer Engineering, Sidi Bel Abbas

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Abstract

Having witnessed the profound proliferation of technology in the contemporary era, and the pivotal role AI particularly plays in education, it would be of great importance to delve into the implications it could have on both teachers and ESP learners. Thus, the present paper delineates the function of Artificial Intelligence (AI) in ESP teaching and learning, with a focus on second-year students at the Computer Engineering Department. The core questions of the research pivot upon how AI is currently integrated into ESP teaching; teachers' and students' perceptions toward AI tools; and whether it contributes to students' language performance and readiness for the professional domain. The paramount objective is to measure students' attitudes regarding AI usage in class, its merits and demerits, and then evaluate its contribution to learners' language development and holistic preparedness. Hence, to realize our preordained objective, the major methodology employed is the quantitative method, whereby a students' questionnaire is used. Preliminary findings suggest that while students routinely leverage AI tools such as grammar checkers, translators, and generative writing assistants, their formal integration into classroom instruction is notably restricted. Both students and teachers apprehend the efficacy of AI to ameliorate writing accuracy, vocabulary acquisition, and learner autonomy. However, worries were voiced concerning excessive dependence, a dearth of critical thinking, and inadequate institutional backing.

Key words: competence, AI tools, learning English, Acquisition.

Introduction

With the emergence of the artificial intelligence, and the primordial integration of technology across disciplines, most fields have been reshaped and teaching and learning processes are of no difference. In the realm of English for Specific Purposes (ESP), AI offers promising tools that can enhance learners' linguistic competencies and autonomy. Hence, the present investigation is conducted at the Higher School of Computer Engineering, sidi bel abbes, Algeria; where the adoption of AI in ESP classrooms remains a relatively underexplored area, especially among students of technical disciplines. Then, since AI can perfectly support personalised learning, leading to an improved language accuracy, preparing students for the outside demands of the global landscape; the present study seeks to investigate its current role in ESP teaching and learning. For that, the core questions of the research is: How is Artificial Intelligence (AI) currently integrated into ESP instruction, and to what extent does it contribute to students' language performance and professional preparedness? To address this, the study

adopts a mixed-method approach that includes a student questionnaire and teacher interviews. The main population is the second-year class at the Higher School of Computer Engineering in Sidi Bel Abbes. It tries to reveal both students and teachers' perceptions of AI tools, evaluates their actual usage, and identifies potential benefits and drawbacks. Preliminary results report students' confession about AI tools usage, and how beneficial it is especially grammar checkers and translation applications outside the classroom as it supports their writing tasks, yet there is limited formal integration of these tools into ESP classroom instruction. On the same line, both teachers and students acknowledged that AI tools have the potential to improve writing accuracy and vocabulary acquisition; however, concerns were raised regarding students' overreliance on these tools and the lack of institutional guidance on how to use them effectively in pedagogical settings.

Origins and Development of ESP

English for specific purposes means teaching or studying English for a particular career like law, medicine or for business in general, i.e. there is a specific reason for which English is learned. There are almost as many definitions of ESP as the number of scholars who have attempted to define it. Pauline C. Robinson (1989) describes ESP as a type of English language teaching (ELT). To be more specific, ESP is a goal slanted towards language learning as argued by Pauline Robinson (1989, 39) That is to say; students have a specific objective that they want to reach. Furthermore, Mackay and Mountford (1978) define ESP as the teaching of English for a clearly utilitarian purpose (p. 2). The purpose they refer to is clarified by the needs of learners, which could be academic, occupational, or scientific. In other words, ESP meets the needs of adult learners who need to learn English for use in their specific fields, such as science, technology. ESP combines a subject matter and English language teaching, a combination that is highly motivating because students can apply what they learn in their English classes to their main field of study, whether it be accounting, business management, computer science or engineering.

Moreover, ESP (English for Specific Purposes) emerged from a convergence of global trends, particularly after World War II, when technological and commercial expansion created a demand for English as the language of international communication. This was intensified by the 1970s Oil Crisis, which brought Western expertise to oil-rich countries, accelerating the need for targeted English instruction. Simultaneously, a revolution in linguistics shifted focus from traditional grammar to real-life language use, highlighting the need to tailor English teaching to specific professional contexts. Educational psychology further emphasized the importance of learner-centered approaches, recognizing that students' needs, interests, and motivation greatly affect learning outcomes. Together, these factors shaped ESP as a specialized, needs-based approach to teaching English, distinguished by its focus on purpose, methodology, and relevance to learners' fields. According to Dudley-Evans and St John (1998), ESP is defined both by absolute characteristics (meeting specific learner needs, using discipline-specific methods, and focusing on relevant language and skills) and variable ones (its flexibility in discipline, age group, level, and methodology). Thus, ESP is best understood not as a fixed set of content, but as an adaptable teaching approach based on why learners need English, as emphasized by Hutchinson & Waters (1987).

English For Science and Technology (EST)

The rapid advances of Technology gave birth to a new language called EST; English for Science and technology. EST belongs to ESP approach; that is, EST is in the context of ESP. EST started soon after the Second World War when a large expansion in scientific, technical and economic activity began. The world was dominated by technology and commerce. Hence, the aim of states and educational institutions was to develop people who wanted to learn English. They knew what they would use, the knowledge of special English for “Learners were seen to have different needs and interests, which would have an important influence on their motivation to learn and therefore on the effectiveness of their learning” (Hutchinson and Waters, 1992, Page 96).

This kind of English EST is important not only in scientific and technological activities but also in universities which are responsible for providing EST-related English skills to an ever-expanding population of science and technology students.

“EST is known to have been developed especially rapidly. English for Science and Technology has always set and continues to set the trend in theoretical discussion, in ways analyzing language and the variety of actual teaching materials” (Swales, 1985, page 96)

Many theorists started producing EST courses and syllabuses, which would give priority to the language and learners’ needs. Thus, ESP and its branch EST are the approaches to language learning-teaching in which the choice of the content and techniques are based on the learners’ reasons to study. In other words, EST courses are usually taught designed to teach students the ability to read and write the scientifically and technologically oriented English that they are likely to encounter in their professional careers. Therefore, the following quotation clearly shows that EST is considered by the majority as an indistinguishable part of ESP.

The Emergence and Integration of AI in Education

The birth of AI has literally shifted the whole teaching and learning processes across all levels. In other words, AI technologies, ranging from intelligent tutoring systems, automated assessment tools, to personalized learning platforms are progressively being introduced in classrooms to enhance efficiency, engagements, and learner’s autonomy (Luckin et al., 2016). These systems can adapt content to individual learners’ needs, offer real-time feedback, and support teachers in monitoring progress and identifying learning gaps (Holmes et al., 2019). In particular cases such as language teaching and learning, AI tools such as grammar checkers, automated translators, and generative language models are redefining how students acquire and practice linguistic skills. As education continues to globalize and digitize, the role of AI is expected to grow, promising both opportunities and challenges for educators and learners alike (Zawacki-Richter et al., 2019).

Global Competitiveness and the Role of ESP

In today’s interconnected world, global competitiveness gradually relies on communication skills tailored to specific professional fields. English for specific purposes plays a pivotal role in preparing learners with the linguistic and communicative competencies needed to function effectively in globalized work environments. Dissimilarly to the general English instruction, ESP centralise the vocabulary, discourse, and practical communication relevant to particular domains such as business, engineering, or medicine, thus aligning language learning with real-world demands (Dudley-Evans &

St John, 1998). As industries continue to operate across borders, mastering ESP becomes a key asset for individuals and nations aiming to thrive in international markets.

Research Questions and Hypothesis

The prime research question raised is : To what extent does the integration of Artificial Intelligence tools in ESP teaching enhance students' language performance and professional preparedness at the Higher School of Computer Engineering, Sidi Bel Abbes?

And the hypothesis advocates: The integration of AI tools in ESP teaching significantly improves students' writing accuracy, vocabulary acquisition, and learner autonomy, thereby enhancing their overall language performance and readiness for the professional domain.

Research Methodology and Design

With the objective of finding answers to the research questions, the prime approach employed is the quantitative one. It aims at finding and collecting specific data from the sample population. On the same line, students' questionnaire was designed to collect quantitative data regarding learners' experiences with and attitudes toward Artificial Intelligence in ESP classes. It included both closed-ended and Likert-scale questions to assess students' frequency of AI tool usage, perceived benefits, challenges, and its impact on their language learning performance. This instrument was particularly suitable for reaching a larger sample of participants and allowed for statistical analysis of patterns and trends.

Research Sample

Choosing an appropriate sample population is a fundamental element in research. It has to be done depending on the problematic and the study objectives. In the present study, the population was chosen based on the fact that second year computer engineering students have already experienced the use of AI tools in their English class. In this context, the questionnaire was submitted to "120" students of computer engineering at the level of Higher School of Computer Sciences (ESI) Sidi Bel Abbes, Algeria.

Data Analysis and Interpretation

This part is dedicated the analysis and the interpretation of the data gathered.

- **Question One: Do you regularly use AI tools (e.g., translators, grammar checkers, ChatGPT) to support your English learning?**

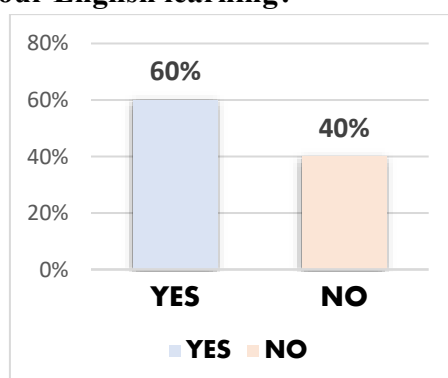


Figure 01: Regular Use of AI

According to the following graph, 60% of students reported the frequent use of AI tools in their English class, explaining that it has become one of the primordial routines among ESP learners; while only

20% hardly use it. This prevalent usage could be illustrated due to the direct alignment between AI and ESP needs for the reason that the tasks such as writing reports, learning technical vocabulary, and refining grammar are straightly linked and supported by tools like ChatGPT or Grammarly. More to the point, students justify their answers saying that AI provides instant, accessible feedback that compensates the gap left by limited classroom interaction. Hitherto, its ease use and availability on mobile devices make it an attractive and the best option. Contrarily, the 20% of students who hardly use it could be impacted by the fact of the over-reliance, or a preference for traditional learning methods. Overall, this result suggests that while AI is increasingly normalized as part of ESP learning, it remains largely student-driven rather than institutionally guided, highlighting both opportunities for structured integration and the need for clear support and training.

- **Question 02: Does the use of AI in class help you increase your vocabulary acquisition and technical terminology in your field?**

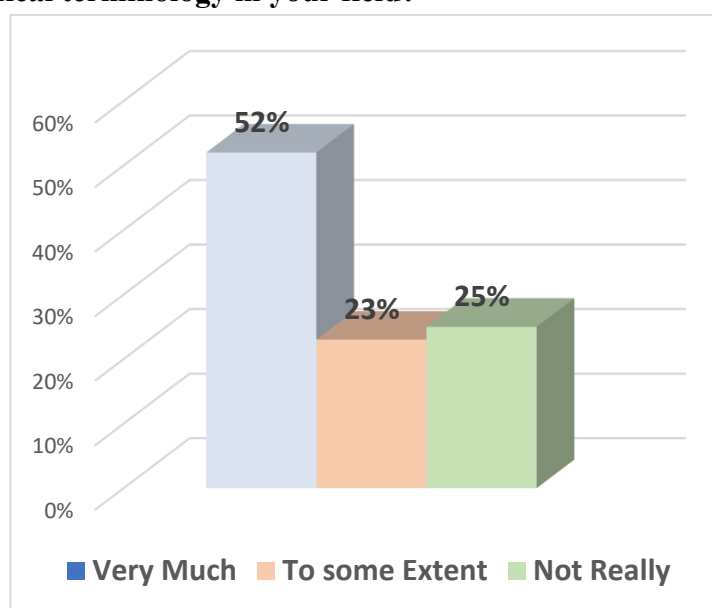


Figure 02: A

Vocabulary Acquisition

According to the graph, 52% of students responded “very much,” 23% “to some extent,” and 25% “not really.” The findings indicate that the vast majority of ESP learners perceive AI as a highly effective tool for expanding their vocabulary and mastering technical terminology. At the mean time, nearly a quarter of students reported only moderate benefits, implying that while AI is useful, it does not always provide the necessary depth or precision for specialized contexts. The last portion 23% of students stated that AI is not that helpful, which could reflect limitations or difficulties in adapting AI tools to technical content. Overall, these results suggest that AI has strong potential in supporting vocabulary growth and technical terminology acquisition, but its effectiveness largely depends on how it is integrated into classroom practices and complemented with traditional pedagogical approaches.

- **Question 03: What kind of AI you use most Grammarly, Duolingo, or Chatgpt?**

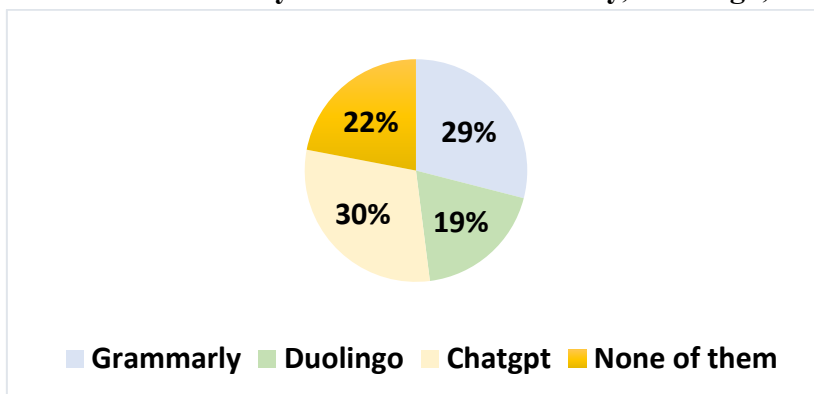


Figure 03: AI Tool Most Used by ESP Students

The above graph reveals that 47% of respondents use **Grammarly**, while 30% of them prefer Chatgpt, and only 23 % of students rely on Duolingo, while 22% never use any one of the previously mentioned tools. These results prove that Grammarly is the AI tool mostly used by ESP students. It’s possible due to its functionality and practicality in correcting grammar, improving writing style and offering instant feedback that directly supports academic and professional communication. The fact of favouring ChatGPT with 30% implies the students’ desire for interaction and communication, the versatile AI tools that are able to provide explanations, and guidance, generating ideas, and stimulating human like interactions; making them valuable for broader language learning and content creation. While choosing Duolingo is a reference for the students who prefer general language practice, yet; it may not fully meet the academic or technical needs of learners in specialized fields. Overall, the findings show that students’ AI preferences vary according to their learning objectives: Grammarly dominates in writing accuracy, ChatGPT in interactive learning and knowledge expansion, and Duolingo in foundational language practice. This suggests that while Grammarly is currently the most impactful tool, the complementary use of different AI platforms could maximize learning outcomes.

- **Question 04 : Are AI tools a means for you to be autonomous and ready for professional world and workplace communication?**

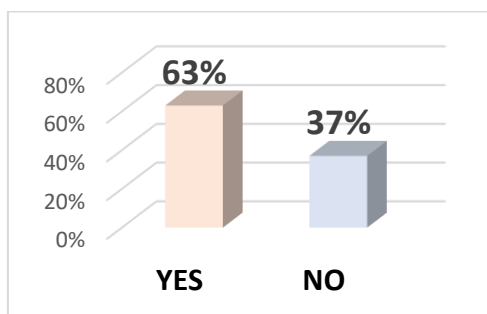


Figure 04: AI Tool Vs Communication and Workplace

The above results demonstrate that 63% of students believe that AI tools aid them in becoming more autonomous and prepare for the professional world and workplace communication. This suggests that AI tools are perceived as a supportive tool that bridge the gap between academic learning and real-world application. However, 37% of students who refused using it feel like AI does neither give them the feeling of being autonomous nor provide them with readiness to the real world. This proves that

such students are able to enhance their ability to handle tasks without constant guidance, and improving their readiness for professional contexts where effective communication is their own responsibility. This contrast underscores the importance of guiding students in using AI not just as a shortcut, but as a means of developing genuine skills that prepare them for real-world professional demands.

- **Question 05 : Does your institution provide adequate guidance and support for using AI in language learning?**

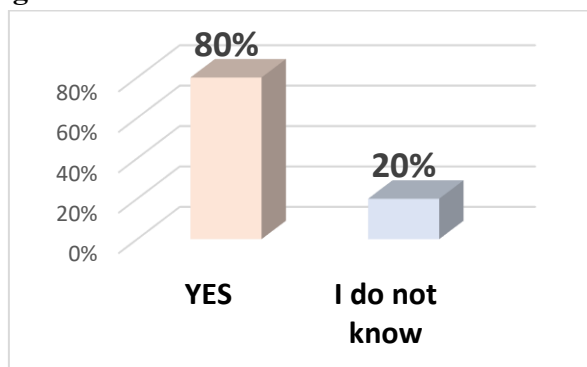


Figure 05: AI Tools vs Administration Support

The graph demonstrates that 80% are aware of their institutions efforts to provide guidance and support for AI tools usage in language learning. While 20% believe otherwise. This means that these later are not on track of what progress their institution is making regarding the AI tools usage, neither they use it themselves. This strong majority 80 % indicates that most learners benefit from structured assistance, training, or resources that help them integrate AI tools effectively into their studies, which likely enhances their confidence and learning outcomes. The presence of institutional support reflects a growing awareness of the role AI plays in modern education and suggests that many institutions are actively embracing technological innovation. However, the 20% who reported insufficient support point to a gap that still exists, possibly due to uneven access to resources, lack of specialized training, or insufficient awareness campaigns. This minority response highlights the need for institutions to ensure inclusivity and consistency in the integration of AI, so that all learners can fully benefit from its potential in language learning.

- **Question 06 : What recommendations would you provide for an appropriate usage of AI in class and at the personal level ?**

As a response to this question, some students recommend that AI be integrated as a supportive tool rather than a replacement for critical thinking, ensuring it enhances language learning without fostering dependency. In the classroom, suggestions point to guided usage under teacher supervision, clear training on effective tools, and alignment with learning objectives. At the personal level, students emphasize using AI for practice, feedback, and vocabulary enrichment while maintaining self-reliance and ethical use. Overall, the recommendations stress moderation, awareness, and purposeful integration to maximize AI's benefits in language learning.

General Summary of the Results

The survey's overall results demonstrate that AI tools have become an integral part of ESP students' learning practices, with a significant majority leveraging them for grammar checks, vocabulary expansion, and interactive learning. A notable 60% of students report frequent AI use, primarily

attributing this to its accessibility, immediate feedback, and relevance to their academic and professional needs. A minority, however, still gravitates toward traditional methods.

In terms of language acquisition, over half of the respondents consider AI highly effective for both vocabulary and technical terminology, though some point out its limitations in more specialized contexts. Grammarly is the most popular tool at 47%, followed by ChatGPT at 30% and Duolingo at 23%, which reflects varied learning preferences—from writing support to interactive knowledge building and general practice.

Additionally, a majority (63%) believe AI fosters autonomy and prepares them for workplace communication. However, a considerable 37% remain sceptical, suggesting that real-world readiness still relies heavily on individual effort. On an institutional level, 80% of students view support for AI integration positively, but a fifth of respondents still see shortcomings in training and accessibility.

Ultimately, students recommend using AI as a supportive aid, not a replacement for critical thinking. They emphasize the need for guided classroom integration, responsible personal use, and a crucial balance between technology and self-reliance. Collectively, these findings confirm that while AI is widely adopted and beneficial, its true effectiveness depends on structured guidance, thoughtful integration, and the learner's active engagement.

Conclusion:

In a nutshell, the findings of this study clearly demonstrate that AI tools are fundamentally reshaping the learning practices of ESP students. Their widespread adoption for tasks like grammar checking, vocabulary enrichment, and interactive learning is a testament to their utility. The popularity of specific tools Grammarly for writing accuracy, ChatGPT for interactive knowledge, and Duolingo for general practice; shows how learners are strategically using technology to meet their diverse linguistic and professional needs. While a majority of students acknowledge AI's contribution to their readiness for workplace communication, a notable minority remains cautious, emphasizing that authentic skill development must go beyond technological assistance. The effectiveness of this integration is also heavily tied to institutional support. Most students benefit from the guidance and resources provided by their universities, yet a clear disparity in access and awareness still exists. Ultimately, the students themselves advocate for a balanced approach: AI should complement, not replace, traditional learning methods. Their recommendations stress the importance of using AI as a tool to promote critical thinking, self-reliance, and responsible usage. Collectively, these results highlight that while AI has powerful potential to transform ESP learning, its true impact hinges on its thoughtful integration and the learner's active engagement.

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