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AI, Entrepreneurship and Digital Transformation in ESP Classrooms: Toward Smart English for Professional Purposes in Algeria

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ABSTRACT: *The rapid advancement of artificial intelligence, digital technologies, and entrepreneurship-driven innovation is transforming higher education worldwide, calling for new pedagogical approaches in English for Specific Purposes. In Algeria, where ESP courses serve diverse disciplines such as engineering, business, medicine, and entrepreneurship, traditional teaching methods often fail to meet learners' professional, entrepreneurial, and communicative needs in the globalized workplace. This article explores how AI and digital transformation can reshape ESP pedagogy in Algerian higher education toward what is proposed here as Smart English for Professional Purposes SEPP, while fostering an entrepreneurial mindset and innovation-oriented competencies. Drawing on recent developments in AI-assisted learning and digital pedagogy, the article examines the integration of intelligent tools such as ChatGPT, Grammarly, and other adaptive platforms into ESP teaching and assessment. It also investigates how these technologies can support entrepreneurship education by enhancing problem-solving, business communication, innovation, collaboration, and project-based learning. Furthermore, the article discusses the opportunities and challenges these technologies present for teachers, learners, and institutions, emphasizing the need for digital literacy, entrepreneurial competencies, ethical awareness, and institutional support. Through a contextual analysis of Algerian classrooms, the article highlights both the potential of AI to enhance learner autonomy, engagement, creativity, and entrepreneurial thinking, and the systemic barriers such as limited infrastructure, insufficient teacher training, and unequal access to digital resources that hinder its effective adoption. The study concludes by proposing a framework for implementing Smart ESP in Algerian universities that integrates AI, digital transformation, and entrepreneurship education, aligning with national goals of digital transformation, innovation, employability, and economic diversification. Ultimately, the article argues that harnessing AI in ESP teaching can bridge the gap between academic instruction, entrepreneurial practice, and real-world professional communication, fostering a new generation of digitally competent, innovative, and entrepreneurial graduates equipped to thrive in both the global labor market and the knowledge-based economy.*

KEYWORDS: ESP, Artificial Intelligence, entrepreneurship education, Digital Transformation, Algerian Higher Education, Smart Learning, Employability

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Introduction

In recent years, higher education across the globe has been undergoing a deliberate and profound digital transformation, driven by rapid advances in artificial intelligence and the growing demand for technology-enhanced learning. English for Specific Purposes, as a dynamic branch of English language teaching, stands at the forefront of this transformation. ESP aims to equip learners with language and communication skills tailored to their academic and professional fields, such as engineering, business, or medicine. In Algeria, the need for competent ESP instruction has become increasingly urgent as universities strive to align curricula with international standards and labour market expectations. However, despite growing awareness of its importance, ESP teaching in Algerian universities remains largely traditional, relying on teacher-centered approaches, limited technological integration, and outdated materials that fail to address learners' real-world professional communication needs.

Artificial intelligence offers a transformative potential to address these gaps by introducing adaptive, data-driven, and personalized learning experiences. Tools such as ChatGPT, Grammarly, and other intelligent writing assistants are reshaping how learners interact with language, providing immediate feedback, modeling authentic discourse, and fostering learner autonomy. Similarly, digital learning platforms such as Moodle, Google Classroom, and ESP-oriented online resources enable flexible and interactive environments where students can engage in simulations, role plays, and project-based tasks that mirror real professional contexts. The integration of such technologies marks a shift from static, text-based instruction to what this chapter conceptualizes as *Smart English for Professional Purposes (SEPP)*: an AI-enhanced, learner-centered approach to ESP that emphasizes adaptability, collaboration, and contextual relevance.

Within the Algerian higher education context, the implementation of AI in ESP teaching remains in its infancy. Many instructors express enthusiasm about the potential of digital tools but face significant barriers, including inadequate infrastructure, limited institutional support, and a lack of formal training in educational technology. Furthermore, ethical concerns—such as plagiarism, overreliance on AI-generated content, and data privacy—pose additional challenges that must be carefully addressed. Despite these constraints, the momentum toward digitalization in Algeria's universities, supported by national policies promoting innovation and digital transformation, provides fertile ground for reimagining ESP pedagogy.

This article seeks to explore the intersection between AI, digital transformation, and ESP in Algerian higher education. It aims to analyze current practices, identify challenges, and propose a practical framework for integrating AI tools into ESP instruction. It problematises the following research questions:

- How is AI influencing ESP pedagogy and assessment?
- What challenges and opportunities do Algerian teachers face in integrating AI tools?
- How can AI enhance learners' professional communication skills?

By examining these questions and highlighting both the opportunities and the limitations of this emerging paradigm, the article argues for the adoption of *Smart ESP* as a pathway to bridge the gap between academic instruction and professional communication. Ultimately, this approach aspires to prepare Algerian graduates who are not only linguistically proficient but also digitally literate, adaptable, and globally competitive.

2. ESP in Algerian Higher Education: Bridging the Divide between Academia and the Workplace

English for Specific Purposes has become an essential component of higher education in Algeria, reflecting the country's growing engagement with global academic and professional communities. As English continues to dominate the fields of science, technology, business, and research, Algerian universities have recognized the need to equip students with the linguistic and communicative competencies required for international participation and employability. ESP, therefore, serves as a bridge between language learning and disciplinary knowledge, enabling students to use English meaningfully within their specific fields of study. However, despite its recognized importance, ESP teaching in Algeria still struggles to bridge the gap between academic instruction and workplace expectations. Many ESP programs remain theoretical, focusing primarily on language forms rather than practical, job-oriented communication. This disconnect often results in graduates who possess general English knowledge but lack the specific language and soft skills required for professional performance in real-world contexts.

Furthermore, the teaching of ESP in Algeria is often hindered by a lack of specialized training among instructors. Most ESP teachers are graduates of English language or literature programs with little exposure to the disciplinary content knowledge necessary to design field-specific materials. In addition, the shortage of locally developed teaching resources leads many instructors to rely on generic or imported materials that are poorly adapted to Algerian learners' professional and cultural contexts. Institutional constraints such as large class sizes, limited contact hours, and insufficient funding, further restrict teachers' ability to implement interactive or project-based pedagogies.

Therefore, bridging this divide calls for a rethinking of ESP pedagogy in Algerian higher education. Effective ESP instruction should be based on needs analysis, authentic materials, and task-based learning that mirror real professional situations.

In a deeper picture, if we consider the current reforms, there was a deliberate decision to internationalise the Algerian higher education, this shift has been reinforced by the gradual introduction of English-Medium Instruction (EMI) in Algerian universities, particularly within science and technology programs. EMI initiatives reflect the national vision to internationalize higher education and enhance graduate employability by integrating English not only as a subject of study, but also as a medium for learning and knowledge production. Together, ESP and EMI play a central role in aligning academic training with the linguistic demands of the global workplace. The government's initiatives to internationalize Algerian higher education and foster digital transformation have created new opportunities for rethinking ESP pedagogy. Several universities have begun to integrate digital platforms such as Moodle, Google Classroom, and MS Teams to facilitate blended learning. Yet, the adoption of artificial intelligence in ESP teaching remains limited and largely experimental. While some educators have begun to explore tools such as Grammarly or ChatGPT for writing and communication tasks, systematic integration into curricula has not yet been achieved.

Within this evolving landscape, the digitalization of ESP represents both a challenge and a promise for Algerian higher education. On one hand, it demands investment in infrastructure, teacher training, and curriculum reform. On the other, it offers an unprecedented opportunity to make ESP more relevant, interactive, and aligned with the communicative demands of global professional environments. The next section will provide a theoretical and pedagogical framework for understanding how AI and digital tools can support this transformation and pave the way toward what this study terms *Smart English for Professional Purposes (SEPP)*.

3. Theoretical and Pedagogical Framework

The integration of artificial intelligence (AI) and digital technologies into English for Specific Purposes (ESP) instruction is grounded in several intersecting pedagogical theories and models that emphasize learner autonomy, interaction, and contextual relevance. Understanding these foundations is essential to conceptualizing how Algerian universities can transition from traditional ESP instruction toward *Smart English for Professional Purposes (SEPP)*, a framework that unites technological innovation with purposeful language learning.

From a **constructivist** perspective, learning is viewed as an active process in which learners construct knowledge through interaction, reflection, and contextual engagement rather than passive reception. In ESP, this means students learn language most effectively when tasks are authentic, discipline-related, and problem-based. AI tools and digital platforms, such as discussion forums, collaborative writing applications, and real-time feedback systems, provide ideal conditions for these interactive learning processes. They allow students to negotiate meaning, co-construct texts, and simulate workplace communication within virtual environments.

In Algerian ESP classrooms, effective implementation of AI tools requires teachers to balance these three dimensions. For example, using ChatGPT to model professional correspondence demands not only technical proficiency but also an understanding of how to guide students in critically evaluating and refining AI-generated outputs.

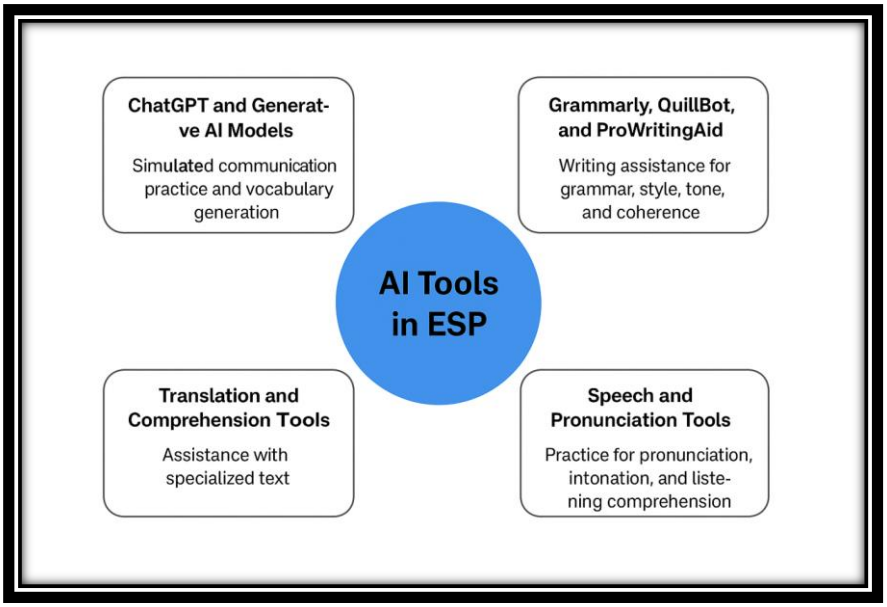
3.1. Artificial Intelligence in Education

Artificial Intelligence in education provides a theoretical lens for understanding how intelligent systems can enhance learning experiences. It focuses on adaptive learning, data analytics, and human–machine interaction to provide personalized pathways for learners. In ESP teaching, AI can assist in diagnostic assessment, adaptive vocabulary training, or automatic feedback on writing quality and discourse appropriateness. Moreover, AI-driven analytics can inform teachers about learners' progress and difficulties, allowing for data-informed pedagogy. However, these benefits must be balanced with ethical considerations, including issues of data privacy, algorithmic bias, and the risk of overreliance on machine-generated language.

3.2. AI Tools and Digital Platforms in ESP

The growing presence of artificial intelligence in language education has generated new opportunities for English for Specific Purposes (ESP) instruction, particularly in contexts where access to authentic materials and expert guidance is limited. In Algerian higher education, AI-based tools and digital learning platforms can serve as catalysts for transforming ESP from a textbook-centered activity into an interactive, learner-driven process. This section examines the main categories of AI-powered applications and digital platforms currently relevant to ESP teaching and explores their pedagogical functions across different professional domains.

Indeed, AI-powered language tools are among the most accessible and effective resources for enhancing ESP instruction. They rely on natural language processing (NLP) to analyze, generate, and correct linguistic input, providing real-time feedback and personalized learning opportunities. The following diagram illustrates the main AI-powered tools that are useful in an ESP teaching context in particular:



Besides, digital platforms provide the infrastructure for delivering AI-enhanced learning experiences. In Algeria, universities increasingly rely on Learning Management Systems (LMS) such as Moodle**,** Google Classroom, and Microsoft Teams**.** These platforms enable blended and asynchronous learning, making them particularly useful in institutions facing limited contact hours or large class sizes.

Through these platforms, ESP teachers can upload course materials, assign AI-assisted tasks, and provide multimedia resources that integrate text, audio, and video. For example, a course on English for Tourism can include interactive videos, automated quizzes, and discussion boards where students practice professional communication scenarios. Moreover, LMS analytics allow teachers to track participation, identify struggling learners, and adapt instruction accordingly a process aligned with the adaptive learning principles of AI pedagogy.

Beyond traditional LMS environments, Massive Open Online Courses (MOOCs) and professional platforms like Coursera**,** edX**,** or LinkedIn Learning offer specialized courses in business communication, scientific writing, and technical English. Integrating such resources into ESP curricula can expose Algerian students to international content and models of professional discourse. Oddly enough, while the potential of AI and digital platforms is considerable, their use requires careful pedagogical design. Overreliance on automated tools may hinder critical thinking, creativity, and linguistic independence. Teachers must therefore guide learners in using AI critically, interpreting feedback, and refining outputs through human judgment. Ethical considerations, such as academic integrity, authorship, and data privacy, should be explicitly discussed in class to cultivate responsible digital citizenship.

4. Case Insights: Algerian Classrooms in Transition

The integration of artificial intelligence and digital technologies in English for Specific Purposes (ESP) teaching is still an emerging practice in Algeria. Although national education reforms emphasize digitalization and the development of 21st-century skills, the practical implementation of these policies in higher education remains uneven. Algerian ESP classrooms today are spaces of transition, where traditional pedagogies coexist with the first signs of technological innovation. Understanding this transitional phase is crucial to identifying both the opportunities and constraints shaping the future of AI-assisted ESP instruction in the country.

Undertaking research on the impact of A-assisted tools into ESP courses at university will lead us to clear out the vision and fill in the existing gaps. The presented research is a case study at Tlemcen university- Faculty of economics. It aims to determine whether the use of AI-supported platforms (ChatGPT, Grammarly, and DeepL Write) could enhance students' writing accuracy, professional communication, and motivation in an ESP context.

The study sought to:

1. Examine the effectiveness of AI tools in improving ESP learners' writing performance.
2. Explore students' perceptions and attitudes toward AI-assisted learning.
3. Identify challenges and pedagogical implications of integrating AI in Algerian higher education.

4.1. Methodology: Research Design

A mixed-methods approach was adopted to triangulate quantitative and qualitative data. The study followed a quasi-experimental design. The sample is 30 students and 4 ESP teachers. The researcher relied on semi-structured interviews with teachers, students' questionnaires and classroom observation focusing on engagement and tool usage.

Results:

Considering learners' answers in the questionnaire, it was found that mostly all students (**92%)** agreed that AI tools made writing tasks more engaging. They (**87%)** reported increased confidence in revising their own work when using any AI tool. Besides, **65%** expressed concern about potential *overdependence* on AI assistance especially that they found it practical, ready at any time to answer all their needs. Students display growing interest in using AI-powered applications for learning English. Many already rely on mobile tools such as Google Translate, Grammarly, and YouGlish to support vocabulary development and writing tasks. Nonetheless, their use of such tools tends to be instrumental rather than strategic, driven by immediate academic needs rather than a deeper understanding of how AI can foster long-term learning autonomy.

Students often show enthusiasm for interactive and multimodal learning activities, especially those involving simulations, role plays, and project-based tasks delivered through digital platforms. However, limited internet access, outdated computer labs, and insufficient exposure to AI tools restrict the consistency of their engagement. Moreover, the lack of institutional policies regulating AI use can lead to uneven practices and ethical ambiguities in academic work.

Students demonstrated higher *participation and collaboration* when using AI tools collaboratively. Thus it seems that AI can offer positive engaging environment in the classroom. Teachers also noted improved time management and deeper reflection on linguistic choices.

Interview excerpts revealed that teachers viewed AI as a "supportive learning partner" rather than a replacement for the teacher. It increased self-correction awareness**.** Infact, all the interviewed ESP teachers recognize the potential of digital tools and AI applications to enhance student engagement and improve language outcomes. Yet, concerns persist regarding reliability, ethical implications, and the risk of plagiarism. Teachers often express a need for targeted training in AI literacy and digital pedagogy to ensure that technology complements rather than replaces their instructional roles.

5.Discussion and Implications for Further Research: Institutional Constraints

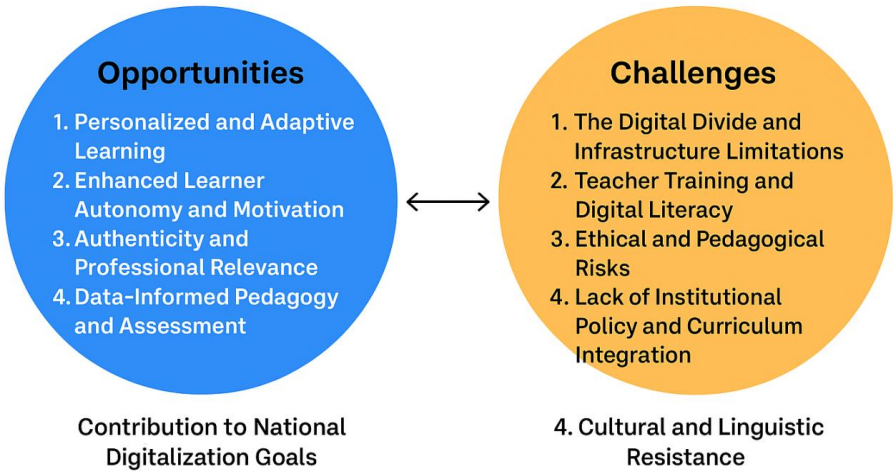
The effectiveness of AI integration in ESP teaching is closely linked to institutional infrastructure and support. Many Algerian universities have introduced e-learning platforms, primarily Moodle or Google Classroom, but their use often remains administrative rather than pedagogical. Technical assistance is limited, and not all teachers receive adequate training in managing online content or integrating AI-based tools.

At the policy level, Algeria's National Digital Strategy and the Ministry of Higher Education's initiatives on digital transformation highlight the importance of technology-enhanced learning. However, the translation of these policies into discipline-specific pedagogical practices is still at an early stage. There is a pressing need for institutional frameworks that promote AI integration in curricula, support teacher development, and ensure ethical and responsible technology use.

Despite these challenges, several promising practices are beginning to emerge. Some ESP teachers have started designing hybrid courses that blend traditional classroom interaction with AI-enhanced learning tasks.

5.1. Opportunities and Challenges

The integration of artificial intelligence (AI) and digital technologies into English for Specific Purposes (ESP) instruction in Algerian higher education offers transformative potential but also presents significant pedagogical, infrastructural, and ethical challenges. The success of this digital shift depends on recognizing both sides of this dynamic. While AI can personalize learning, increase engagement, and align language education with professional realities, it simultaneously raises concerns regarding access, academic integrity, and the preparedness of educators and institutions. The following diagram illustrates the main opportunities and challenges of introducing AI in an ESP course:

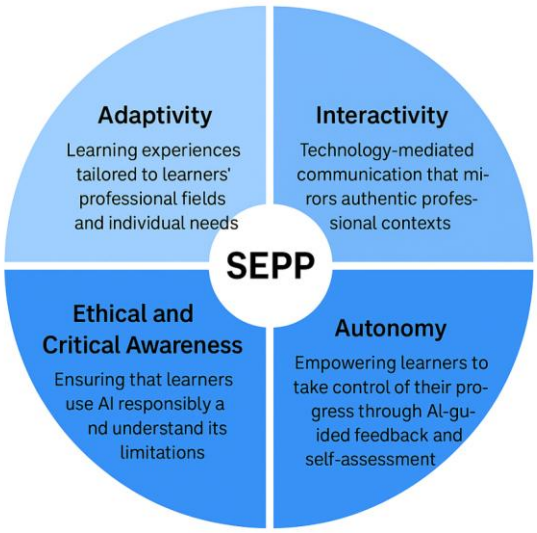


The intersection of these opportunities and challenges suggests that the successful adoption of AI in ESP requires a balanced and strategic approach. Teachers must be trained not only in digital literacy but also in critical pedagogy to ensure that AI supports learning rather than dictates it. Institutions must invest in infrastructure, policy frameworks, and ethical guidelines. Finally, students must be guided to use AI as a tool for empowerment and creativity rather than a shortcut to language production.

In this context, the following section introduces a proposed framework for Smart English for Professional Purposes (SEPP)**,** outlining practical steps for implementing AI-assisted ESP instruction in Algerian universities.

7. Toward Smart English for Professional Purposes (SEPP): A Proposed Model

Building on these theoretical foundations, this article proposes the concept of Smart English for Professional Purposes (SEPP) as an advanced model of ESP that integrates AI technologies with pedagogical innovation. SEPP emphasizes four core principles, they are put as follows:



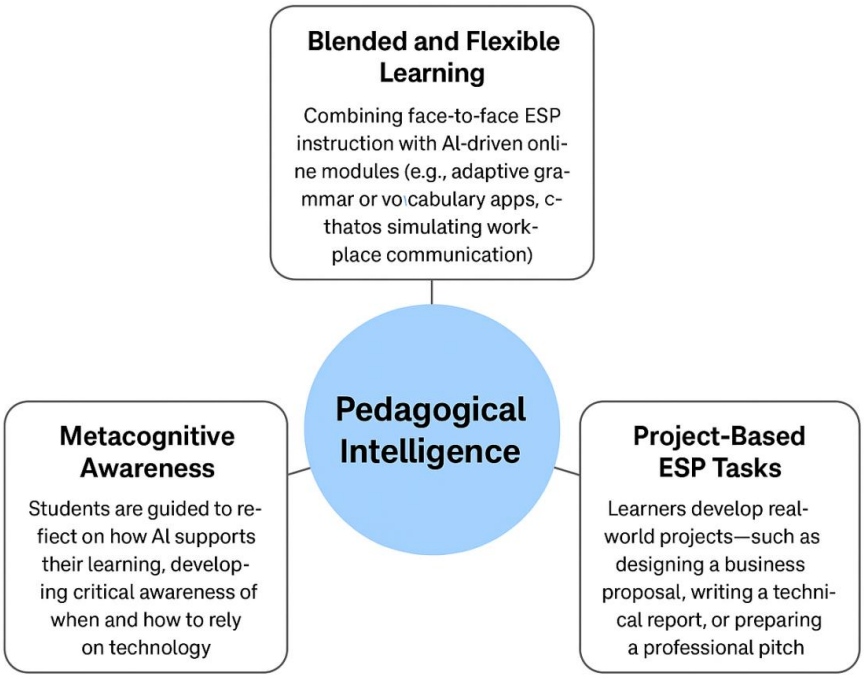
The SEPP model envisions an ecosystem in which teachers act as facilitators and designers of learning experiences, while AI functions as a supportive agent that enhances, rather than replaces, human judgment and creativity.

The notion of Smart English for Professional Purposes (SEPP) represents a forward-looking framework for integrating AI, digital tools, and data-driven pedagogy into ESP instruction within Algerian higher education. It envisions a system where English learning is contextualized, adaptive, and professionally oriented, bridging linguistic competence with the digital and communicative skills required in today's workplaces.

The SEPP model builds upon three pillars: Pedagogical Intelligence, Digital Intelligence, and Professional Intelligence, each contributing to a comprehensive, smart learning ecosystem.

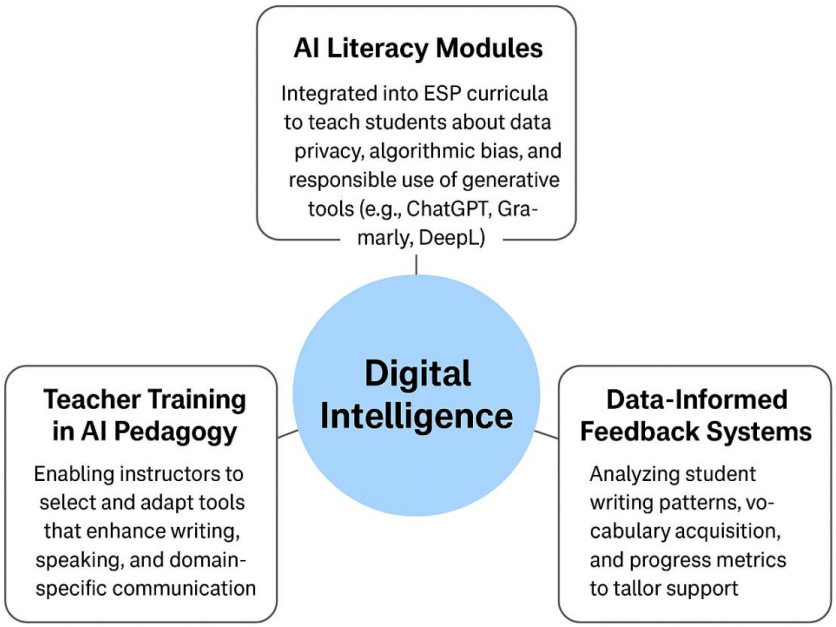
The idea comes from the existing gaps in teaching ESP within the AI revolution, I, indeed, am calling for an urgent shift to rethink the current ESP practices by combiting pedagogical intelligence, digital intelligence and professional intelligence, what i refer to as PDP Intelligences.

Pedagogical Intelligence (PI) refers to the capacity of educators and learners to engage critically with technology and pedagogy simultaneously. In the SEPP framework, teachers act as learning designers, blending AI-assisted resources with human-centered interaction. The main key components include:

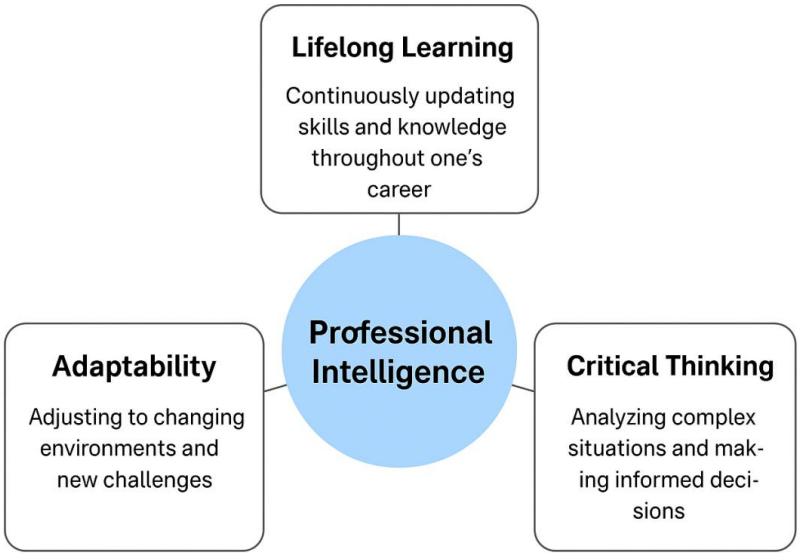


This pillar ensures that AI complements, rather than replaces, teacher expertise and human judgment.

The second pillar of the proposed model is Digital Intelligence (DI), it emphasizes the ability to use AI technologies ethically, effectively, and creatively in language learning. In Algerian ESP classrooms, this means not only using AI tools but understanding their logic and limitations. The main strategies include the following



Eventually, Professional Intelligence (PrI) connects ESP learning to the realities of professional communication, ensuring that language instruction is aligned with employability, innovation, and productivity. Through Professional Intelligence, ESP learners transition from academic proficiency to career-oriented communicative competence.



8. Our Mission: SEPP Implementation Framework in Algerian Universities

The integration of Artificial Intelligence and digital transformation into English for Specific Purposes (ESP) education marks a turning point for higher education in Algeria. However, the success of this shift depends on strategic planning, institutional commitment, and national policy alignment. To ensure

the sustainable implementation of the Smart English for Professional Purposes (SEPP) model, several pedagogical and policy-oriented recommendations are proposed.

The following recommendations are put for successful and realistic integration:

1. Redefine the Role of the ESP Teacher
Teachers should be trained to act as *digital pedagogues*—professionals capable of blending human interaction with intelligent technology. Continuous professional development programs must include modules on AI literacy, instructional design, and ethical digital practices.

2. Encourage a Research-Based Pedagogy
ESP instructors should be supported to engage in classroom research on AI-assisted teaching, publish findings, and share best practices within local and international networks. This creates a reflective teaching culture and informs evidence-based decision-making.

3. Promote Learner Agency and Critical AI Awareness
ESP learners must be educated not only to use AI tools but also to *question and evaluate* them. Courses should include reflective tasks encouraging students to distinguish between genuine learning and technological dependency.

4. Integrate Multimodal and Experiential Learning
AI tools can support creative, multimodal projects such as podcasts, simulations, and video-based case studies. Such experiences enhance communication competence and digital fluency simultaneously.

5. Develop Localized Digital Resources
Rather than relying solely on imported AI platforms, Algerian universities should invest in creating localized ESP materials that reflect local professional contexts (engineering, tourism, medicine, etc.), with multilingual interfaces accessible to students across regions.

6. Establish AI and Digital Learning Units in Universities
Each university should set up a **Digital Language Learning Hub** dedicated to training, innovation, and resource development in AI-enhanced ESP education. These units can serve as catalysts for teacher collaboration and research.

9. Conclusion

Overall, Algerian ESP classrooms can be characterized as transitional ecosystems—spaces where traditional practices are gradually giving way to digital and AI-driven approaches. Teachers and students alike are exploring new tools but often without institutional coherence or pedagogical frameworks. This period of transition, though fragmented, is fertile ground for innovation. If supported by appropriate policy, training, and infrastructure, these emerging practices could evolve into a sustainable model of Smart English for Professional Purposes (SEPP).

The path toward Smart English for Professional Purposes (SEPP) is both ambitious and necessary. It reflects Algeria's readiness to transition from traditional language teaching to AI-empowered, skill-oriented, and future-ready education. By aligning pedagogy, technology, and policy, Algeria can transform its ESP classrooms into hubs of innovation, critical thinking, and professional excellence. Ultimately, SEPP is not merely a pedagogical reform—it is a vision: one that redefines what it means to learn, teach, and

communicate in an age where intelligence, human and artificial, must coexist to serve development and equity.

Acknowledgments

In loving memory of my Father.. Mekki DJEBBARI

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