ALTRALANG Journal
e-ISSN: 2710-8619 p-ISSN: 2710-7922
Volume 8 Issue 2 / October 2026 pp. 219-233

AI-Assisted Professional Writing: Implications for Specialized English Pedagogy in the Era of Digital Entrepreneurship

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Received: 26/06/2026, **Accepted:** 11/10/2026, **Published:** 31/10/2026

ABSTRACT: The emergence of digital entrepreneurship has completely transformed professional communication practices in English. In this context, generative AI tools, such as ChatGPT, Gemini, and Copilot, have become increasingly important assistants in producing specialized documents, including business plans, pitch decks, professional emails, and web content. This study aims to identify the actual uses of AI in professional English writing among digital entrepreneurship trainees, examine the linguistic competencies mobilized within this hybrid environment, and propose a renewed ESP pedagogical framework integrating AI tools. A mixed-methods approach is adopted, combining a questionnaire administered to 60 participants and semi-structured interviews with 10 trainee entrepreneurs. Quantitative data were analysed using descriptive statistics, while qualitative data were examined through thematic coding. The findings show that AI is shifting ESP requirements from basic text production towards critical evaluation, stylistic adaptation, and English prompting skills. Participants demonstrate increasing reliance on AI tools while highlighting the need for training in critically assessing AI-generated texts and developing an authentic professional voice. This study argues for a repositioning of ESP pedagogy around an evaluative and adaptive paradigm, where learner-entrepreneurs are trained not only to produce texts but also to critically evaluate, personalize, and ethically take responsibility for texts co-created with AI. It also proposes concrete curricular directions for ESP teachers in higher education contexts. Keywords: English for Specific Purposes (ESP), professional writing, generative artificial intelligence, digital entrepreneurship, prompting.

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Introduction

English for Specific Purposes (ESP) is one of the most dynamic fields in Language education. Emerging in the 1960s alongside global economic expansion and the rise of English as the international language of science, commerce, and technology, ESP has gradually established itself as an autonomous disciplinary field with its own theoretical, methodological, and pedagogical paradigms (Dudley-Evans & St John, 1998). ESP differs fundamentally from general English teaching; it is primarily due to its rigorous reliance on needs analysis. Initially formalized by Munby (1977) in his Communicative Needs Processor model, needs analysis aims to precisely identify target situations in which learners will use the language, in order to derive the linguistic and discourse competencies that should be prioritized. Although Munby's model was later criticized for being too static and insufficiently attentive to social and institutional contexts (Hutchinson & Waters, 1987), it established the conceptual foundations of a learner-centered approach.

Genre represents one of the most significant theoretical contributions to ESP over the past thirty years. Introduced by Swales (1990) in Genre Analysis, this approach regards professional and academic communication as organized into genres; i.e., conventionalized communicative events recognized by a discourse community, sharing communicative purposes and displaying regular rhetorical, stylistic, and textual patterns. For Swales (1990), communicative purpose is the primary criterion defining genre, distinguishing this approach from purely formal or thematic text typologies. Bhatia (1993) extended Swales' framework by introducing the concept of rhetorical moves; recurring functional units that structure professional genres and enable writers to achieve communicative goals. His analysis of genres such as sales letters, job application letters, and research articles demonstrated the pedagogical usefulness of genre analysis in teaching professional discourse conventions.

The last decade has been marked by a profound transformation of global economic structures, driven particularly by the rapid growth of digital entrepreneurship. Defined as the creation and management of businesses that exploit digital technologies as a central means of value creation, digital entrepreneurship has emerged as a major driver of economic growth on an international scale (Davidson & Vaast, 2010). Within this context of accelerated globalization, English has established itself as the indispensable lingua-franca of startup ecosystems, investment platforms, and cross-border digital markets. As emphasized by Kankaanranta and Planken (2010), proficiency in professional English is no longer merely a competitive advantage but rather a prerequisite for accessing international entrepreneurial networks.

Within this demanding communicative environment, professional writing in English occupies a strategically significant position. Digital entrepreneurs are indeed constantly required to produce specialized documents with specific rhetorical functions: the business plan, which structures the vision and economic viability of a project; the pitch deck, which aims to persuade investors within a limited timeframe; professional emails, which maintain business relationshipsand content designed for social media and websites, which builds brand identity and the entrepreneur's digital credibility (Bhatia, 1993; Swales, 1990). Mastering these specialized genres requires not only strong linguistic abilities but also a deep understanding of the rhetorical, cultural, and pragmatic conventions specific to each professional communication context (Dudley-Evans & St John, 1998).

It is precisely within this context of increasing demand for specialized writing skills that a major technological shift emerged from 2022 onwards: the rise and rapid democratization of generative artificial intelligence tools. Systems such as ChatGPT (OpenAI), Gemini (Google), and Copilot

(Microsoft) have demonstrated a remarkable ability to generate, within seconds, structured professional texts that are stylistically coherent and adapted to diverse communicative contexts (Noy & Zhang, 2023). These tools have been widely adopted in professional and entrepreneurial environments, transforming writing practices and raising fundamental questions about the nature and value of human writing skills in a world where machines can now produce texts on behalf of their authors (Gero et al., 2022).

The study at hand examines how generative AI tools are reshaping professional English writing practices among non-native digital entrepreneurs and challenging traditional English for Specific Purposes (ESP) pedagogy. While AI systems such as ChatGPT enable users to quickly produce high-quality business documents and help compensate for linguistic limitations, their widespread and often exclusive use raises concerns about the actual language skills entrepreneurs develop and need. This situation creates a tension within ESP, which is traditionally based on training learners to independently produce specialized texts, a goal now questioned by AI's ability to generate such texts instantly. The study therefore investigates how AI integration redefines language needs and pedagogical approaches, arguing that future ESP instruction must shift toward developing learners' critical, creative, and ethical control over AI-generated texts within the broader context of applied linguistics, education, and digital entrepreneurship. Therefore, the study attempts to answer the following question: **To what extent does the integration of generative AI into professional writing reshape language needs and pedagogical practices in English for Specific Purposes for non-native digital entrepreneurs?**

1. Literature Review

Since 2022, studies have shown widespread adoption of generative AI in professional and academic writing. Noy and Zhang (2023) found that ChatGPT reduces writing time by 40% and improves output quality, particularly benefiting lower-skilled writers. They investigated the productivity effects of ChatGPT, in the context of mid-level professional writing tasks. In a preregistered online experiment, 453 college-educated professionals were assigned occupation-specific, incentivized writing tasks, with half of the participants randomly exposed to ChatGPT. The intervention also contributed to a reduction in performance inequality among workers and led to a temporary increase in both concern and enthusiasm regarding AI. Furthermore, participants exposed to ChatGPT were twice as likely to report using it in their actual work two weeks after the experiment and 1.6 times more likely to do so two months later.

Liashuk (2024) examines the role of Artificial Intelligence in developing business writing skills within ESP, focusing specifically on how generative AI tools support learners' writing development in professional contexts. Based on literature drawn from databases such as Web of Science and Scopus, the study synthesizes existing research on the pedagogical use of AI tools, including text generation systems and conversational agents, in ESP writing instruction. The findings indicate that generative AI can significantly enhance business writing competence by providing personalized, context-sensitive support, real-time feedback, and opportunities for practice that simulate authentic business communication. These tools assist learners in drafting, editing, and refining professional texts by offering stylistically appropriate models and adaptive linguistic suggestions. However, the review also highlights several challenges, including issues of contextual accuracy, the reliability of language output in specific professional situations, and ethical concerns related to the integration of AI in educational settings. Overall, the study underscores both the pedagogical potential and the limitations of AI in ESP writing instruction, while calling for further research to optimize its effective and responsible use.

Wang, Deng and Liu (2025) use a quasi-experimental study to investigate whether generative AI challenges the continued relevance of corpus-assisted data-driven learning in language teaching, particularly in the context of business academic writing. Conducted with 238 first-year business majors from six classes at a large university in China, they compare three instructional conditions: corpus-driven learning, AI-assisted learning, and a blended approach combining both corpus and AI tools. Using a pretest/post-test design and mixed-design repeated measures ANOVA, the results show that all three approaches significantly improved students' writing performance across five dimensions (grammar/vocabulary, cohesion, business knowledge, task response, and overall writing quality). However, the combined corpus–AI approach produced significantly greater gains, especially in vocabulary development and business knowledge. Further analysis using Partial Least Squares Structural Equation Modelling (PLS-SEM) revealed that learner motivation significantly influenced the effectiveness of the instructional approaches. Qualitative data from reflection essays also highlighted students perceived benefits and challenges of using these technologies. Overall, the study concludes that corpus-based learning remains valuable, but integrating AI with corpus tools leads to more effective outcomes in ESP writing instruction.

Hu and Hsu (2025) explore the use of artificial intelligence (AI) in enhancing English language proficiency among English as a Foreign Language (EFL) students through a startup product development curriculum. The instructional design involves exposing students to authentic business scenarios in which they analyzed English communication used in crowdfunding platforms and product promotional videos. Students worked collaboratively in teams to develop and present their own product videos, while their peers acted as potential investors, creating an authentic entrepreneurial simulation. A pre-test and post-test design was used to measure the impact of AI-assisted learning on students' English listening and reading skills. The results revealed significant improvements in both areas, suggesting that AI-supported, entrepreneurship-based learning environments can effectively enhance EFL learners' receptive language skills while fostering engagement through real-world communicative tasks.

AI tools can serve as models and feedback partners but require pedagogical redesign focusing on evaluation, prompting, and adaptation skills rather than only text production (Kessler, 2018; Huang et al., 2022). Critical AI literacy involves understanding AI systems, evaluating outputs, and making ethical decisions about their use (Long & Magerko, 2020), including technical, genre-based, stylistic, and ethical dimensions. Despite extensive research across ESP, entrepreneurship, and AI writing, there is limited integration of these fields. This study addresses this gap by proposing an interdisciplinary framework linking ESP pedagogy, digital entrepreneurship, and generative AI.

2. Research Methods

This study is grounded in a pragmatist paradigm (Creswell & Plano Clark, 2018), which argues that the choice of methods should be guided by the nature of the research question rather than by strict adherence to a single paradigm. In line with this stance, we adopted a sequential explanatory mixed-methods design, in which an initial quantitative exploratory phase precedes and informs a subsequent in-depth qualitative phase (Tashakkori & Teddlie, 2010). This design is particularly suited to our research problem, which requires both a statistical mapping of AI use in professional writing and a fine-grained, contextual understanding of the language skills actually mobilized by digital entrepreneurs in this hybrid context. The approach is descriptive-explanatory with an applied purpose: it aims not only to describe and explain observed practices, but also to derive concrete pedagogical implications for the redesign of ESP.

2.1. Participants

The target population of this study consists of digital entrepreneurs in training enrolled in university entrepreneurship programs in the University of Oran 2 - Mohammed Ben Ahmed and participating in university incubators in Algeria. These participants are engaged in different stages of training and operate within digitally mediated environments where English is used as a key language for professional communication, including writing tasks such as business proposals, promotional content, emails, and pitch materials. More importantly, their use of English occurs both with and without the assistance of generative AI tools, reflecting the hybrid nature of contemporary entrepreneurial communication practices.

A two-level sampling strategy is employed to ensure both depth and breadth of data. For the qualitative phase, purposive sampling is adopted to ensure maximum variation among participants in terms of linguistic proficiency, entrepreneurial sector (e.g., technology startups, e-commerce, digital services), and degree of familiarity and reliance on AI-based writing tools. This strategy allowed for the selection of participants with diverse experiential profiles, thereby enabling a richer exploration of how AI reshapes writing practices across different entrepreneurial contexts. For the quantitative phase, a convenience sampling approach was used, with the questionnaire distributed through university incubator networks, entrepreneurship support centers, and partner academic departments, allowing access to a broader pool of eligible participants.

The final sample comprises 60 participants for the quantitative component and 10 participants for in-depth qualitative interviews. The qualitative sample size was determined in accordance with the principle of theoretical saturation (Guest et al., 2006), ensuring that data collection continued until no new meaningful insights or emergent themes were identified. This balance between sample size and saturation was intended to maximize analytical depth while maintaining methodological rigor.

To ensure relevance to the research objectives, clear inclusion criteria were established. Participants were required to: (1) be actively engaged in digital entrepreneurial activity; (2) use English in at least one aspect of their professional written communication, regardless of proficiency level; and (3) have prior experience using at least one generative AI tool (such as ChatGPT or similar systems) for professional writing purposes. These criteria ensured that all participants had direct exposure to the intersection of English language use, entrepreneurial communication, and AI-assisted writing practices, which is central to the focus of the study.

2.2 Data Collection Instruments

2.2.1 Online Questionnaire

The questionnaire is designed following the principles recommended by Dörnyei (2010) for survey instruments in applied linguistics. It is structured into five sections:

Section A: Sociolinguistic profile; native language(s), self-reported English proficiency (CEFR scale), professional experience

Section B: English writing practices; frequency, types of texts produced, perceived difficulties

Section C: Generative AI use; tools used, frequency of use, genres delegated to AI

Section D: Competencies mobilized; perceptions of skills before/after AI use (5-point Likert scale)

Section E: ESP training needs; expectations regarding an ESP course integrating AI

2.2.2 Semi-Structured Interviews

The interviews are conducted in Arabic and French since they are the interviewees' dominant language. The interviews are later translated into English to better explain our data findings. The ten individual semi-structured interviews were conducted using an interview guide organized around four main themes:

I. Description of English writing practices in the entrepreneurial context
II. Concrete modalities of AI use (prompting, revision, personalization processes)
III. Perceptions of AI's impact on English language skills
IV. Unmet needs of traditional ESP training

2.3 Data Analysis Methods

2.3.1 Quantitative Analysis

Questionnaire data were analyzed using SPSS (version 26). The analysis involved descriptive statistics, including frequencies, means, and standard deviations for each variable, in order to provide an overview of the data distribution. In addition, Pearson's correlation coefficient (r) was used to examine relationships between self-reported English proficiency, frequency of AI use, and perceived competencies. Cross-tabulation analyses using Pearson's chi-square test were also conducted to explore associations between categorical variables, such as field of activity, level of education, and type of AI tools used. The threshold for statistical significance was set at $p < 0.05$, in accordance with established standards in social sciences research (Field, 2018).

2.3.2 Qualitative Analysis

Interview transcripts were analyzed using thematic analysis following the six-step procedure proposed by Braun and Clarke (2006): familiarization with the data, initial code generation, theme searching, theme review, theme definition and naming, and report production. Coding was conducted manually using thematic categorization tables, without qualitative analysis software, in accordance with Braun and Clarke's recommendations for small datasets.A double independent coding procedure was used by two researchers to ensure inter-coder reliability, measured using Cohen's Kappa coefficient (Cohen, 1960), with a target value of $\kappa \geq 0.70$ (Landis & Koch, 1977).

3. Results and Findings

3.1 Participant Profiles and AI Usage

3.1.1 Sociolinguistic Profile of the Participants

The descriptive analysis of the questionnaire data reveals a heterogeneous sociolinguistic profile within the sample. The majority of participants (n = 60) are male (68.3%) while the female sample is 31.7%, aged between 22 and 35, enrolled in university programs related to entrepreneurship.

CEFR Level	Frequency	Percentage (%)
A1-A2 (Beginner)	8	13,3
B1-B2 (Intermediate)	34	56,7
C1-C2 (Advanced)	18	30,0
Total	**60**	**100**

Table 1. Distribution of participants according to English proficiency level

The table above shows that more than half of the participants are at an intermediate level (B1-B2), which corresponds precisely to the learner profile most likely to develop dependence on generative AI tools. This is because they possess a sufficient level of linguistic competence to superficially evaluate AI-generated texts, without necessarily having the meta-discursive resources required to detect deeper rhetorical weaknesses (Noy & Zhang, 2023).

3.1.2 Types of AI Tools Used and Frequency of Use

AI tool	Frequency (n)	Percentage (%)
ChatGPT (OpenAI)	52	86,7
Gemini (Google)	28	46,7
Copilot (Microsoft)	19	31,7
DeepL Write	14	23,3
Grammarly	22	36,7
Other	7	11,7

Table 2. Generative AI tools used for professional English writing

ChatGPT emerges as the dominant tool used (86.7%), a finding consistent with global adoption patterns reported by Noy and Zhang (2023). The combined use of multiple tools is also common, with 43.3% of participants reporting the use of two or more AI systems, suggesting the emergence of hybrid writing workflows in which different tools are employed at different stages of the text production process.

Regarding usage frequency, the results are presented in the following figure:

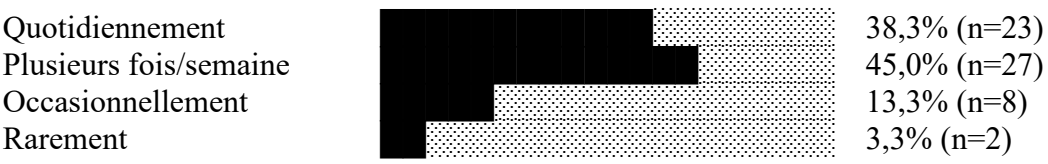


Figure 1. Frequency of AI tool use for professional writing

The results indicate that a large majority of participants (83.3%) use AI tools on a regular basis; either daily or several times per week, confirming the hypothesis of a deep and routinized integration of these tools into the professional writing practices of digital entrepreneurs in training (Gero et al., 2022).

3.1.3 Textual Genres Delegated to AI

Textual genres	Very Often (%)	Often (%)	Sometimes (%)	Rarely (%)
ProfessionnelEmails	61,7	25,0	10,0	3,3
Posts LinkedIn / Social Media	53,3	30,0	13,3	3,3
Business plans	48,3	28,3	16,7	6,7
Pitch decks	41,7	31,7	18,3	8,3
***Landing pages* / web content**	38,3	26,7	21,7	13,3
Executive summaries	35,0	28,3	23,3	13,3
Investor updates	28,3	25,0	28,3	18,3

Table 3. Professional genres written with AI assistance (by frequency order)

Professional emails and social media posts are the most frequently delegated genres to AI, which can be explained by their routine production and highly formulaic nature. The significant delegation of business plans and pitch decks, which are genres with high rhetorical value and major professional stakes, is a particularly striking finding, confirming the relevance of the research problem addressed in this study (Bhatia, 1993; Dudley-Evans & St John, 1998).

3.2 Linguistic Competencies Mobilized in AI-Assisted Writing

3.2.1 Competencies Perceived as Externalized to AI

Externally delegated competence	Mean (M)	Standard deviation (SD)
Syntactic and grammatical formulation	4,42	0,61
Rhetorical structuring of the document	4,28	0,74
Selection of specialized vocabulary	4,15	0,83
Writing of introductions and conclusions	3,97	0,91
Coherence of argumentation	3,78	0,98

Table 4. Writing competencies perceived as outsourced to AI

The high scores obtained for syntactic formulation (M = 4.42) and rhetorical structuring (M = 4.28) confirm that AI takes over the most formal and conventional dimensions of professional writing, theoretically freeing the writer to focus on higher-order tasks (Gero et al., 2022).

3.2.2 Competencies Perceived as Irreducibly Human

Irreducibly human competence	Mean (M)	Standard Deviation (SD)
Adaptation to local cultural context	4,53	0,58
Expression of personal entrepreneurial vision	4,47	0,63
Ethical judgment on generated content	4,38	0,69
Formulation of effective English prompts	4,21	0,77
Stylistic revision and personalization	4,08	0,84

Table 5. Competencies perceived as non-substitutable by AI

These results highlight that participants recognize the persistence of an irreducible human competence space, centered on cultural adaptation, the expression of personal vision, and ethical judgment. Prompting in English (M = 4.21) emerges as a new and strategic competence.

3.3 Perceptions of ESP Training Needs
3.3.1 Sense of Writing Competence Before and After AI Use

Competence dimension	Before IA (M)	After IA (M)	Δ	Signification
Formal quality of produced texts	2,83	4,31	+1,48	$p < 0,001$
Confidence in professional communication	2,97	4,18	+1,21	$p < 0,001$
Mastery of genre conventions	2,61	3,74	+1,13	$p < 0,001$
Authenticity and professional voice	3,42	2,87	−0,55	$p < 0,01$
Writing autonomy in English	3,18	2,43	−0,75	$p < 0,001$

Table 6. Comparison of perceived writing competence before and after AI use

Table 6 reveals a paradoxical and theoretically significant result: while AI use significantly improves perceived formal quality and communicative confidence, it is associated with a significant decrease in perceived authenticity ($\Delta = -0.55$) and writing autonomy ($\Delta = -0.75$). This paradoxconstitutes a central pedagogical issue that ESP reform must urgently address (Risko and Gilbert, 2016; Warschauer, 2022).

3.3.2 Training Needs in AI-Integrated ESP

Identified Training Need	Very important (%)	Important (%)
Learning to critically evaluate AI-generated texts	78,3	18,3
Developing an authentic professional English voice	75,0	20,0
Mastering professional prompting in English	71,7	21,7
Understanding entrepreneurial genre conventions	68,3	25,0
Integrating ethics in AI-assisted writing	65,0	26,7
Acquiring specialized digital entrepreneurship vocabulary	61,7	30,0

Table 7. ESP training needs reported by participants

Critical evaluation of AI-generated texts (96.6% rated as very important or important) and the development of an authentic professional voice (95%) emerge as the most salient needs, supporting a repositioning of ESP toward an evaluative-adaptive paradigm (Hyland, 2004; Long and Magerko, 2020).

3.4 Results of Semi-Structured Interviews

3.4.1 Main Emerging Themes

The thematic analysis of the ten interviews enabled the identification of four major recurring themes.

Theme	Coding Frequency	Concerned Participants
T1 – Perceived dependence and linguistic anxiety	47 occurrences	9/10
T2 , Prompting strategies in English	38 occurrences	8/10
T3 , Tension between efficiency and authenticity	35 occurrences	10/10
T4 , Needs not covered by traditional ESP	29 occurrences	7/10

Table 8. Themes derived from the thematic analysis of interviews

The T3 theme tension between efficiency and authenticity is the only one mentioned by all participants making it the most salient qualitative finding of the study. Participants unanimously describe a form of identity related discomfort linked to AI use while they acknowledge the efficiency gains, they consistently express concern in regards to the loss of their own voice in the produced texts echoing on the stylistic standardization induced by Large Language Models (LLMs).

3.4.2 Illustration through representative excerpts

The following excerpts from the interviews illustrate the identified themes. The interviews were conducted in Arabic and French and later translated into English.

T1 Dependence "I realize that when I don't have access to ChatGPT I feel blocked even when writing a simple email in English It has become a reflex Participant 4 B2 level"

T2 Prompting "I've learned to give very precise instructions tone type of text target audience It has almost become a skill in itself Participant 7 C1 level"

T3 Authenticity "The text is formally perfect but it is not me an investor who knows me would immediately see that this is not how I speak Participant 2 B1 level"

T4 ESP needs "Our English course teaches us how to write formal letters But no one teaches us how to check whether what ChatGPT wrote is actually correct for our industry Participant 9 B2 level"

These verbatim excerpts precisely illustrate the reconfiguration of ESP needs documented quantitatively and confirm the relevance of the critical AI literacy framework proposed by Long and Magerko (2020) as a pedagogical response to these emerging needs.

4. Discussion

As the results of this research shows, Al integration in profesional writing brings a shift into ESP needs. The data in Table 4 show that the competencies most extensively externalized to AI are precisely those traditionally central to ESP pedagogy: syntactic formulation (M = 4.42), rhetorical structuring (M = 4.28), and lexical selection (M = 4.15). This result aligns with Noy and Zhang (2023), who document a profound redistribution of cognitive tasks in AI-assisted professional writing, and confirms that the productive paradigm of ESP, centered on the ability to generate specialized texts, is now partially obsolete in contexts where AI is available. In contrast, competencies related to critical evaluation, stylistic revision, and ethical judgment (Table 5) remain irreducibly human, supporting a pedagogical shift toward these higher-order dimensions (Hyland, 2004; Long & Magerko, 2020).

Moreover, professional English prompting emerges as a new and strategic competence (M = 4.21, Table 5), while interviews reveal that the most effective participants in AI use are precisely those who have developed the ability to formulate precise, contextualized, and stylistically appropriate instructions (Participant 7: "I've learned to give very precise instructions"). This hybrid competence, combining English language proficiency and strategic prompting intelligence, corresponds to what Lankshear and Knobel (2006) describe as an emerging new literacy and constitutes a legitimate and urgent object of instruction in contemporary ESP.

In addition, while participants express the need to understand entrepreneurial genre conventions (Table 7: 93.3% consider this important), interviews reveal that this understanding is no longer sought for autonomous production, but rather for the evaluation and personalization of AI-generated texts. Swales' (1990) and Bhatia's (1993) genre-based approach therefore remains relevant but must be reoriented from teaching production toward teaching expert reading and critical evaluation of professional genres, using AI-generated texts as pedagogical objects of analysis.

4.1. A New Profile of ESP Needs in the AI Era

The findings of this study call for a fundamental reformulation of ESP goals for digital entrepreneurs. The traditional paradigm, centered on learners' ability to produce professional texts in English (Hutchinson & Waters, 1987; Dudley-Evans & St John, 1998), is gradually giving way to an evaluative-adaptive paradigm in which the core competence is no longer writing per se, but rather reading, evaluating, revising, and authenticating AI co-produced texts. This paradigmatic shift does not invalidate the foundations of ESP; needs analysis, genre awareness, and discourse community sensitivity, but reorients them toward new pedagogical objects and purposes (Hyland, 2004; Warschauer, 2022).

Within this new paradigm, the central figure is no longer the producing author but the critical editor who supervises, evaluates, and assumes responsibility for AI-assisted texts. This critical editor role mobilizes advanced meta-discursive competencies; such as genre awareness, stylistic sensitivity, and pragmatic and cultural judgment, which can be identified as the strongest predictors of writing effectiveness in Human-AI collaborative writing contexts. Training learners to adopt this editorial stance therefore constitutes the central pedagogical challenge for ESP in the AI era.

4.2. Toward a Revised Taxonomy of ESP Writing Competencies

Based on the empirical findings, we propose a revised taxonomy of ESP writing competencies organized into three hierarchical levels:

Level	Competence	Description
Level 1 – Basic competencies	Linguistic competence	Mastery of the grammatical and lexical code of professional English
	Genre competence	Knowledge of the rhetorical conventions of entrepreneurial genres
Level 2 – AI interaction competencies	Prompting competence	Ability to formulate precise and context-sensitive instructions in English
	Evaluative competence	Ability to assess the rhetorical and generic quality of AI-generated texts
Level 3 – Higher-order competencies	Adaptive competence	Ability to personalize and authenticate generated texts
	Ethical competence	Ability to make responsible decisions regarding the use of AI

Table 9. Revised taxonomy of ESP professional writing skills in the AI era

This taxonomy proposes an articulation between traditional ESP competencies (Level 1) and new competencies made necessary by AI integration (Levels 2 and 3), thereby offering an operational reference framework for designing renewed ESP curricula.

4.3 Pedagogical Implications: Toward AI-Enhanced ESP

Based on the proposed taxonomy and the identified needs (Table 7), we outline a pedagogical framework structured around four complementary axes designed for university ESP instructors.

Axis 1: Critical analysis of AI-generated texts

The first axis involves integrating activities that focus on the critical analysis of AI-generated texts within ESP courses, using Swales' (1990) and Bhatia's (1993) genre approach as an evaluative framework. Practically, learners are asked to generate a professional text (e.g., a pitch deck or business plan) using an AI tool and then systematically analyze it: Are the rhetorical moves present and appropriately sequenced? Is the register suitable for the target audience? Are the cultural conventions of the discourse community respected? This activity simultaneously develops genre awareness and evaluative competence while positioning AI as a learning tool rather than a substitute for learning (Hyland, 2004; Kessler, 2018).

Axis 2: Training in professional English prompting

The second axis aims to make professional prompting in English an explicit and structured learning objective. Prompt engineering activities; such as, formulating, testing, comparing, and refining instructions in English to guide AI output toward target genres and registers, help develop both prompting competence and English for Specific Purposes proficiency (Long & Magerko, 2020). For example, comparing outputs generated by vague prompts "Write a business plan" and precise prompts "Write the executive summary of a SaaS startup targeting SMEs in North Africa, in a formal yet engaging tone, for a seed-stage investor" demonstrates the relationship between linguistic precision, genre knowledge, and rhetorical quality.

Axis 3: Developing an authentic entrepreneurial voice and style

The third axis addresses the assisted competence paradox identified in the results (Table 6): while AI improves formal text quality, it tends to erode perceived authenticity and writing autonomy. Activities focused on developing a professional voice; through reflective writing, building a portfolio of personal reference texts, and revising AI-generated drafts, enable learners-entrepreneurs to construct and assert a distinctive discursive identity, which is essential for credible and persuasive entrepreneurial communication (Ivanič, 1998; Hyland, 2004).

Axis 4: Ethics of AI-assisted writing and professional integrity

The fourth axis introduces an ethical and deontological dimension that has so far been largely absent from ESP curricula. It involves training learners to make transparent and responsible decisions regarding AI use in professional writing: In which contexts is AI use acceptable or even expected? When does it constitute deception toward clients, partners, or investors? How should AI assistance be properly disclosed in professional documents? These questions, both ethical and pragmatic, fall within the communicative competence that ESP aims to develop (Bender et al., 2021; Long & Magerko, 2020).

4.4. Limitations of the Study

Three main limitations should be acknowledged in order to properly contextualize the scope of the findings.The first limitation concerns sample size and representativeness. With 60 participants in the

quantitative phase and 10 in the qualitative phase, the study does not claim statistical generalizability to all non-native digital entrepreneurs using English. The findings should be interpreted as exploratory tendencies that require confirmation through larger-scale studies (Creswell & Plano Clark, 2018; Patton, 2002).

The second limitation relates to the geographical and cultural context. Conducted in Algeria within a multilingual university environment (Arabic, English, and French) and a developing entrepreneurial ecosystem, the findings cannot be directly generalized to other national or cultural contexts without adaptation. Comparative studies across the Maghreb, Sub-Saharan Africa, or the Middle East would help refine and contextualize the proposed framework (Flowerdew & Peacock, 2001).

The third and perhaps most structural limitation is the rapid evolution of generative AI systems. LLM capabilities are advancing at an exponential pace: limitations identified today; hallucinations, stylistic standardization, lack of contextual knowledge, may be partially overcome in future versions, significantly reshaping the language needs of digital entrepreneurs and requiring continuous revision of the pedagogical framework (Bender et al., 2021; Noy & Zhang, 2023).

Conclusions

The empirical findings provide convergent and theoretically coherent answers to our central research question. First, generative AI produces a structural shift in ESP needs: formal text production skills (long central to ESP curricula) are increasingly outsourced to the machine, while higher-order competencies like critical evaluation, stylistic adaptation, professional prompting, and ethical judgment, emerge as the new priority language needs of digital entrepreneurs (Noy & Zhang, 2023; Hyland, 2004). Second, digital entrepreneurs develop an unprecedented hybrid literacy, combining English language competence with prompting skills, which constitutes a new and legitimate pedagogical object for ESP (Lankshear & Knobel, 2006; Long & Magerko, 2020). Third, Swales' (1990) and Bhatia's (1993) genre-based approach remains theoretically robust but must be reoriented from production toward the critical evaluation and personalization of AI-generated texts.

This study makes a dual theoretical and practical contribution to applied linguistics and ESP pedagogy. On the theoretical level, it introduces two original conceptual tools. The first is the notion of the assisted competence paradox, which refers to the empirically documented tension between improved formal quality of AI-assisted texts and the simultaneous decline in learners perceived authenticity and writing autonomy. This paradox represents a novel phenomenon not yet theorized in the existing literature and warrants further investigation in ESP and second language acquisition research (Risko & Gilbert, 2016; Warschauer, 2022). The second is the revised taxonomy of ESP professional writing competencies (Table 9), which integrates traditional ESP skills with new competencies required in the AI era, offering a structured reference framework for future research and curriculum design.

On the practical level, the proposed four-axis pedagogical framework; critical genre analysis, professional prompting, authentic voice development, and ethics of AI-assisted writing, provides ESP instructors with concrete and immediately applicable guidelines for adapting their teaching practices and curricula to the communicative realities of contemporary digital entrepreneurship (Dudley-Evans & St John, 1998; Kessler, 2018). This framework is particularly relevant for higher education contexts in North Africa, where demand for professional English communication training is rapidly increasing and where generative AI tools are being widely adopted by trainee entrepreneurs.

In conclusion, this study advocates for a forward-looking ESP pedagogy capable of anticipating and accompanying technological transformation rather than merely reacting to it, placing at its core the

formation of digital entrepreneurs who can communicate effectively in English with discernment, authenticity, and responsibility; qualities that no artificial intelligence, however powerful, can fully replace.

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