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ARTIFICIAL INTELLIGENCE IN SHAPING PROFESSIONAL VOCABULARY SKILLS OF STUDENTS IN NON-LANGUAGE MAJORS

ШТУЧНИЙ ІНТЕЛЕКТ У ФОРМУВАННІ ПРОФЕСІЙНОЇ ЛЕКСИЧНОЇ КОМПЕТЕНТНОСТІ СТУДЕНТІВ НЕФІЛОЛОГІЧНИХ СПЕЦІАЛЬНОСТЕЙ

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ABSTRACT

Purpose. *This study examines how artificial intelligence (AI) tools can be integrated into English for Specific Purposes (ESP) instruction to support the development of*

Мета. *У дослідженні проаналізовано інтеграцію інструментів штучного інтелекту (ШІ) у викладанні англійської мови за професійним спрямуванням (ESP) з метою формування*

professional lexical competence in students of non-language majors, including psychology, journalism, automotive engineering, and finance. It responds to the need for personalized and context-driven language learning in a digitalized professional environment.

Methodology. *A qualitative, descriptive study was conducted using a multi-case design. Four ESP courses from two Ukrainian higher education institutions were selected, each representing a different professional domain. Data collection involved classroom observations, analysis of teaching materials, and written feedback from 208 students and 2 instructors. A cross-case analysis was performed to identify AI tools used, including ChatGPT, Gemini, DeepL, Grammarly, Diffit.me, YouGlish, MagicSchool.ai, Anki, Quizlet, Duolingo, Quillbot, and RemNote, AI-based glossaries and simulations, as well as to evaluate students' responses to them.*

Results. *AI-supported activities were associated with improved vocabulary retention, more accurate use of domain-specific terms, and increased learner motivation. Students demonstrated increased confidence in using professional vocabulary during role-plays, discussions, and written assignments. Educators emphasized the value of clear instructional support and opportunities for reflective application. Reflections revealed both the benefits of AI-driven personalization and concerns about overreliance. Implementation varied by field: simulations were widely used in automotive ESP, while conversational agents and writing assistants were more prominent in psychological and journalistic contexts.*

Conclusions. *AI tools can enhance vocabulary acquisition and learner autonomy when embedded in meaningful, pedagogically guided tasks. The instructor's role remains essential in selecting appropriate tools, contextualizing content, and promoting critical engagement. The study suggests the importance of ethical integration, domain-specific customization, and further empirical research on AI in ESP teaching.*

Keywords: *AI integration, adaptive feedback, domain-specific vocabulary, educational technology, ESP instruction, interdisciplinary approach, vocabulary acquisition.*

професійної лексичної компетентності у студентів нефілологічних спеціальностей (психологія, журналістика, автомобільна справа, фінанси). Робота відповідає потребі персоналізованого, контекстно орієнтованого навчання мови в умовах цифровізації професійного середовища.

Методологія. *Проведено якісне описове дослідження із використанням мультикейсового підходу. Було відібрано чотири ESP-курси з двох українських закладів вищої освіти, кожен з яких представляв окрему професійну галузь. Збір даних включав спостереження за заняттями, аналіз навчальних матеріалів та письмовий зворотний зв'язок від 208 студентів і 2 викладачів. Проведено міжкейсову аналітику щодо використання інструментів ШІ, зокрема ChatGPT, Gemini, DeepL, Grammarly, Diffit.me, YouGlish, MagicSchool.ai, Anki, Quizlet, Duolingo, Quillbot, RemNote, а також спеціалізованих ШІ-глосаріїв і симуляцій, з метою оцінити їхнє сприйняття студентами.*

Результати. *Завдання з використанням ШІ сприяли кращому запам'ятовуванню лексики, більш точному вживанню термінів за фахом та зростанню мотивації до навчання. Студенти продемонстрували вищу впевненість у використанні професійної лексики під час рольових ігор, дискусій та письмових завдань. Викладачі відзначили важливість чітких інструкцій та рефлексивного застосування. У рефлексіях студентів простежувалися як переваги персоналізованого навчання на основі ШІ, так і занепокоєння щодо можливої надмірної залежності від технологій. Реалізація ШІ частково залежала і від галузі: симуляції активно використовувались у технічних ESP-курсах, тоді як чат-боти та асистенти письма були більш актуальними в психологічному й журналістському контекстах.*

Висновки. *Інструменти ШІ ефективно підтримують засвоєння лексики й автономність студентів за умови їх педагогічно обґрунтованого використання. Ключову роль відіграє викладач, який обирає відповідні інструменти, адаптує контент і стимулює критичне мислення. Необхідні подальші дослідження щодо етичної інтеграції ШІ, міждисциплінарної адаптації та ефективних практик ESP-викладання.*

Ключові слова: *інтеграція ШІ, адаптивний зворотний зв'язок, фахова лексика, освітні технології, ESP-навчання, міждисциплінарний підхід, засвоєння лексики.*

INTRODUCTION

The rapid development of artificial intelligence (AI) technologies is transforming higher education, including foreign language instruction. One of the key applications of AI lies in enhancing professional lexical competence among students of non-linguistic majors such as psychology, journalism, engineering, and finance. Within the Common European Framework of Reference for Languages (CEFR) (Verhelst et al., 2009), lexical competence is considered central to communicative language proficiency. However, students outside philological faculties often struggle with mastering professional vocabulary due to time constraints, limited exposure, and lower intrinsic motivation (Diachok, 2023; Sergieieva, 2023).

Educational systems are progressively adopting digitalization and adaptive learning tools while AI introduces a range of possibilities for transforming vocabulary acquisition (Judijanto, 2025). It provides personalized instruction, instant feedback, automated assessment, and content tailored to students' needs and professional contexts (Moorhouse et al., 2024; Khan, 2025; Chetveryk & Veretiuk, 2025). Tools such as ChatGPT, Grammarly, and domain-specific simulations can support vocabulary learning across disciplines, including engineering, social sciences, and finance (Golub et al., 2025; He et al., 2025; Almegren et al., 2025). These challenges are further exacerbated by the ongoing full-scale war in Ukraine, which has disrupted traditional learning environments and highlighted the urgent need for flexible, technology-enhanced approaches to language education.

Recent scholarship has highlighted the integration of AI into English for Specific Purposes (ESP) (Asrifan et al., 2025). Systematic reviews (Doğan & Talan, 2024) indicate a growing shift from traditional methods to intelligent systems that can address diverse student needs (Roozafzai, 2024). Research also notes that while AI supports individualized learning, it raises concerns regarding academic integrity and student dependence on automation (Asrifan et al., 2025; Avsheniuk et al., 2025; Yurchenko & Nalyvaiko, 2025).

In practical terms, students in non-linguistic fields must acquire discipline-specific vocabulary to function effectively in professional settings (Golub et al., 2025; Tran, 2025; Qiao & Zhao, 2023). In our case, engineering students need terminology for vehicle diagnostics; finance students must understand terms such as "asset-backed securities"; psychology students require language for describing emotions and cognitive processes; journalism students need fluency in media discourse and ethical communication.

However, integrating AI into ESP teaching presents challenges. These include unequal access to technology, ethical concerns regarding AI-generated content, and variability in digital skills among educators (Almegren et al., 2025; Shevchenko & Ogurtsova, 2023; Özçelik, 2025). In Ukraine, despite increased digitalization due to external factors such as the pandemic and war, AI adoption remains inconsistent across institutions (Honcharenko-Zakrevska & Diukanova, 2022).

At the same time, national reforms increasingly emphasize the importance of ICT integration into non-linguistic curricula (Kontseptsiia, 2020; Osvitni prohramy (bakalavry), 2025; Osvitni prohramy | NTU, 2025). Pilot ESP courses in technical and economic universities are testing AI-based instruction, showing promising results in vocabulary development and communicative competence (Diachok, 2023; Sergieieva, 2023; Kramar et al., 2024). Collaboration with psychology and engineering faculties has demonstrated AI's potential to support motivation, metacognitive skills, and professional identity (Qiao & Zhao, 2023; Neupane et al., 2025).

The **purpose** of this study is to examine how artificial intelligence (AI) can enhance the development of professional lexical competence among students of non-linguistic disciplines. It explores AI tools used in ESP instruction, identifies pedagogical strategies, compares outcomes across disciplines (psychology, journalism, automotive engineering, and finance), and outlines both benefits and limitations of AI-assisted vocabulary learning. The research offers evidence-based recommendations for educators, curriculum designers, and policy-makers.

By analyzing diverse learner profiles and instructional models, the study contributes a framework for integrating AI into ESP teaching in both Ukrainian and international educational contexts.

METHODOLOGY

Research Design and Scope

This study adopted a qualitative, descriptive, and comparative case study design to explore the integration of artificial intelligence (AI) tools into English for Specific Purposes (ESP) instruction for non-linguistic university students. Our focus was on strategies for vocabulary acquisition, the use of AI-based tools, and our pedagogical practices.

We did not have any experimental interventions or conduct any direct involvement of human subjects, consequently, the study did not require statistical analysis or formal ethical clearance.

Case Selection

We selected four academic disciplines as case studies: ESP for Psychology students, ESP for Journalism students, ESP for Automotive Engineering students, and ESP for Finance students. Our selection was based on the following criteria: 1) active implementation of ESP programs at Ukrainian higher education institutions; 2) documented or observable use of AI tools in ESP instruction; 3) availability of syllabi, teaching materials, and instructor reflections; 4) relevance to the interdisciplinary focus on domain-specific vocabulary acquisition supported by AI.

Procedure

We conducted our research in three sequential phases: 1) identification and classification of AI-integrated ESP practices within the selected disciplines based on available course content and AI tools in use (e.g., ChatGPT, Grammarly, DeepL); 2) data collection from ESP syllabi, course guidelines, AI-enhanced tasks and materials, reflective teaching notes (compiled by the authors), and a curated set of peer-reviewed publications (n = 22); 3) cross-case comparative analysis, focusing on the types and functions of AI tools applied, targeted lexical domains (e.g., emotional terminology, financial jargon, engineering terms), pedagogical strategies and observed learner engagement and reported benefits, risks, and role of the teacher in facilitating AI-mediated learning.

Materials and Instruments

We analyzed a data corpus that comprised open-access ESP course syllabi from Ukrainian universities, AI-supported educational tools such as vocabulary quizzes, glossaries, and feedback prompts, instructor-generated narrative reflections and observational logs, as well as a selected body of scholarly literature (2021–2025) on the integration of AI in ESP education. We analyzed all materials solely for research purposes, and no data was collected directly from students.

Ethical Considerations

We based the study exclusively on publicly available documents, anonymized instructor reflections, and secondary sources. We did not use any personal data or engage in direct interaction with teachers or students. Consequently, we did not require informed consent or institutional ethics approval. The research fully complies with international ethical standards for conducting qualitative educational studies.

RESULTS

Our analysis of AI-integrated English for Specific Purposes (ESP) instruction across four non-linguistic academic domains revealed both commonalities and discipline-specific adaptations in teaching vocabulary. Our students generally responded positively to AI-enhanced instruction, particularly when tools were aligned with professional communication tasks. We analyzed the integration of AI tools into ESP instruction across four professional domains to highlight differences in tool selection, pedagogical functions, and lexical learning outcomes (see Table 1).

Table 1

Integration of AI Tools in ESP Teaching Across Different Areas

Area	AI tools used	Functions	Observed outcomes
Psychology	ChatGPT, Gemini, Diffit.me, AI-based role-play bots, Anki, YouGlish, DeepL	Helping with emotional vocabulary, acting as therapy sessions, creating conversation prompts	Students became more precise with their word choice, understood different writing styles better, and did better in professional interviews
Journalism	Grammarly, Quillbot, ChatGPT, AI interview simulators, DeepL MagicSchool.ai	Editing writing style, rewriting text, making scripts, learning ethical language	Enhanced lexical precision and stylistic awareness; improved oral fluency in professional interview tasks
Automotive Engineering	ChatGPT, Quizlet, Duolingo, RemNote, DeepL, MagicSchool.ai, Google translate	Translating technical terms, practicing glossaries, practicing pronunciation	Students remembered technical words better and could describe mechanical systems more clearly when speaking
Finance	ChatGPT, AI-based glossaries, Gemini, Duolingo, DeepL, MagicSchool.ai	Learning financial terms, getting briefings, practicing scenarios	Students used finance terms more accurately and felt more confident in speaking and writing about financial topics

– **Psychology**

In ESP courses for psychology students, tools such as *ChatGPT* and *YouGlish* (for training English pronunciation naturally) and vocabulary platforms (such as *Diffit.me* and *Anki*) were used to practice emotion-related and clinical terminology (e.g., “self-regulation,” “cognitive bias,” “emotional intelligence”). When students asked *ChatGPT* to generate a therapy conversation between a psychologist and a client discussing trauma, it not only

contextualized key terms like “coping mechanism,” but also encouraged them to reflect on tone and appropriateness.

Students appreciated dynamic glossaries created with *Gemini* and *ChatGPT* that provided definitions, usage examples, and synonyms. One psychology student reflected: “I was impressed how AI explained and gave me a wide range of synonyms of the same psychological term. I never expected to find the shades of the meanings”. We noticed that students became more aware of how to use language correctly and spoke more confidently during mock interviews and discussions.

Reported benefits: increased learner motivation, emotional engagement, improved understanding of conversation tone, contextualized use of discipline-specific vocabulary and stronger performance in professional speaking situations.

– **Journalism**

In journalism-focused ESP classes, students used AI writing tools (like *Grammarly, Quillbot, DeepL, ChatGPT,* and *MagicSchool.ai*) to improve the way they structure and write news reports. Activities like writing interviews, rewriting news stories, and practicing specific vocabulary helped them understand the language and style of journalism. These AI tools also offered suggestions for clearer and more accurate writing that fits the standards of the news industry. They were also used to help students think through ethical choices in reporting. A student noted that using AI-powered tools helped them develop a better feel for tone and terminology, especially when revising quotations or headlines.

Observed gains: better use of precise words, register control, more flexible writing styles, improved speaking skills for journalistic work and confidence in media communication.

– **Automotive Engineering**

For future automotive engineers, AI-supported tools such like *ChatGPT, MagicSchool.ai, Quizlet, Duolingo* and *Google Translate* were used to introduce and reinforce technical terms (e.g., “crankshaft,” “fuel injection system”). They worked on translating manuals, explaining how car parts work, and practicing how to pronounce technical terms like “gear ratio” or “exhaust manifold”. Some students made bilingual word lists or acted out repair conversations. Voice recording features helped them check their speaking skills, and visual aids made it easier to remember the words. Students recorded voice explanations of automotive systems, using *ChatGPT* to clarify unfamiliar words. One student used “transmission assembly” correctly after interacting with a bot simulating a car mechanic’s explanation. Students reported that visual quizzes and term-definition matchups created by AI enhanced memorization.

Observed outcomes: stronger recall of technical terms, clearer explanations of car systems, and better pronunciation when speaking in front of others.

– **Finance**

Finance students used *ChatGPT, Gemini, DeepL* and finance-specific word lists to learn financial terms and improve their communication skills. They practiced by summarizing economic news, role-playing investment meetings, and interpreting financial charts with AI-generated notes. These tools helped them understand terms like “asset allocation” and “fiscal stimulus”. Class discussions were also enriched by funny or thought-provoking quotes from AI tools. Assignments included summarizing market reports, interpreting graphs, and preparing oral briefings. They then compared the AI versions to their own, and discussed differences in terminology like “cost-push inflation”

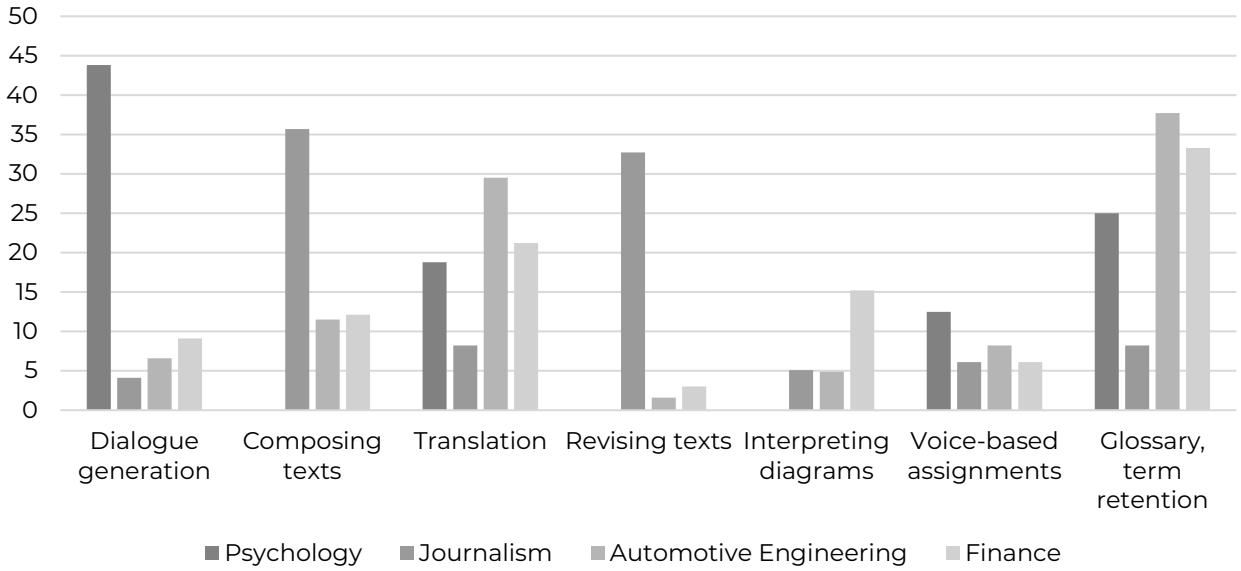
and “monetary tightening”. Students also engaged with Gemini’s quote generator, which sparked class discussions using controversial or humorous statements on budgeting and taxation.

Reported benefits: more accurate use of financial language, better connection between reading and speaking skills, and greater confidence when presenting financial information.

Additionally, students’ preferences for AI-assisted assignments were analyzed across specialties. The visual representation below (Figure 1) illustrates the distribution of task types commonly supported by AI tools, with percentages indicating their relative frequency across disciplines.

Figure 1

Task-Specific Use of AI Across Non-Linguistic Majors



While Figure 1 captures the range and prevalence of AI-facilitated activities, a more comprehensive evaluation of their pedagogical impact is necessary. Table 2 synthesizes the cross-disciplinary findings by outlining the core benefits and potential risks of AI integration in ESP lexical training, as observed in our study and corroborated by existing research (e.g., Almegren et al., 2025; Sayici & Aydın, 2025; Khan, 2025).

Table 2

Key Benefits and Risks of AI Use in ESP Lexical Training

Benefits	Risks
– Personalized learning & feedback	– AI overreliance
– Instant error correction	– Weaker critical thinking
– Domain-specific vocabulary	– Plagiarism risks
– Higher motivation & engagement	– Loss of human nuance
– Support for low-proficiency learners	– Passive learning
– Time & resource efficiency	– Unequal tech access
– Real-world language simulations	– Inconsistent output
– Improved retention via spaced repetition	– Language bias reinforcement

As is evident from the table, AI offers several advantages such as personalization and vocabulary modelling, but also presents challenges that require pedagogical awareness and critical engagement from both learners and instructors.

Together, Table 2 and Figure 1 highlight both the pedagogical potential and practical challenges of AI-supported lexical training, which we now examine in greater depth.

DISCUSSION

Based on our observations, AI tools proved to be valuable in supporting the development of lexical competence among students from non-linguistic fields, particularly through their ability to personalize learning, provide context-rich input, and encourage active vocabulary use. These results align with current research emphasizing the transformative potential of AI in English language teaching (Almegren et al., 2025; Neupane et al., 2025; Sayici & Aydın, 2025).

We found that, regardless of the discipline, AI tools allowed instructors to align lexical training with authentic professional tasks, whether in psychology, journalism, engineering, or finance. This supports Asrifan et al. (2025), who highlight the capacity of AI to personalize ESP instruction through learner modeling and adaptive response generation. For instance, AI-generated therapy dialogues helped psychology students internalize terms such as “self-regulation,” and “emotional intelligence”, etc., consistent with Qiao and Zhao’s (2023) findings on learner-driven vocabulary use.

In journalism, AI-enhanced writing tools such as Grammarly and Quillbot promoted accuracy and stylistic control. These tools facilitated revision and paraphrasing tasks, confirming Avsheniuk et al.’s (2025) conclusion that AI feedback fosters lexical sensitivity and genre awareness.

In technical fields, learners benefited from translation engines and multimodal simulations to connect abstract concepts with real-world applications (He et al., 2025; Khan, 2025). These tools supported terminology retention and enhanced oral fluency, especially in flipped and voice-based tasks.

From the teacher’s perspective, AI platforms such as Gemini, Diffit, and MagicSchool.ai were used to diversify task types, adapt texts to learners’ levels, and generate role-play simulations aligned with disciplinary discourse. MagicSchool’s tools (e.g., Tutor Me with AI, Translate It, Quiz Me!) allowed instructors to scaffold complex vocabulary tasks and provide targeted feedback. Scenario generation for mechanic-client dialogues or finance briefings helped students situate terminology in authentic communication.

From the student perspective, AI tools supported independent vocabulary work. Learners constructed evolving glossaries using Gemini and ChatGPT (Kostikova et al., 2024), combining definitions with examples, collocations, and contrastive pairs. Students also used spaced repetition systems (SRS) like Quizlet and Anki to reinforce terminology. Quote generators and mini-case prompts in Gemini were used to initiate critical discussions, especially in journalism and finance classes.

Nevertheless, the study also highlighted risks of AI overuse, such as passive reliance on translation or auto-completion tools, which may undermine autonomous learning (Avsheniuk et al., 2025; Chetveryk, 2025). We also noted instances where students used AI without critically evaluating the output. This finding aligns with concerns about superficial vocabulary acquisition and academic integrity (Özçelik, 2025).

As practitioners, we found that AI tools were most effective when embedded within well-designed pedagogical tasks. Activities like argument revision, interview simulation, and oral briefing preparation elicited deeper learner involvement and more meaningful language use. These observations align with Moorhouse et al. (2024) and Vashishth et al., 2025, who advocate for teacher training in AI-supported task design.

Finally, our findings align with Khan's (2025) view of AI as a transformative tool for reshaping domain-specific language education. Beyond vocabulary acquisition, AI tools contributed to students' emerging professional identity by aligning language with real-world disciplinary discourse.

We have to admit that our study has several limitations because it relies on qualitative data from selected case studies, which limits generalizability. As noted in Doğan and Talan (2024), more large-scale, empirical investigations are needed to evaluate the long-term effectiveness of AI in ESP instruction.

Future research should explore how AI affects learner autonomy, motivation, and vocabulary retention over time. Cross-institutional comparisons may also yield insights into best practices for aligning AI integration with ESP curricula across diverse professional fields.

CONCLUSIONS

This study examined how artificial intelligence (AI) tools can enhance the development of professional lexical competence in English for Specific Purposes (ESP) courses for non-linguistic students in psychology, journalism, automotive engineering, and finance. The findings indicate that AI supports vocabulary acquisition by providing contextualized input, adaptive feedback, and interactive tasks tailored to professional communication needs.

AI-enhanced learning environments enabled students to engage with specialized terminology in authentic scenarios, such as therapy dialogues, editorial writing, mechanic-client simulations, and financial briefings. Across all disciplines, learners demonstrated improved retention, lexical accuracy, and motivation. AI also supported metacognitive awareness by offering alternative wordings, usage contexts, and discipline-specific registers.

Importantly, the role of the teacher remained central in curating AI content, designing meaningful tasks, and fostering reflective practice. When used intentionally and pedagogically, tools like ChatGPT, Grammarly, Gemini, and MagicSchool.ai strengthened vocabulary instruction by combining automation with human guidance. Instructors adapted content and task types to learners' cognitive profiles, professional needs, and language levels.

Nevertheless, challenges persist. Overreliance on AI, lack of digital competence, and concerns about academic integrity were noted. Learners must be guided to use AI critically, not passively. Further research is required to assess the long-term impact of AI on lexical competence and to develop evidence-based strategies for responsible integration.

In conclusion, AI offers valuable opportunities for enhancing ESP instruction, but its effectiveness depends on ethical use, interdisciplinary adaptation, and human-centered design. When carefully implemented, AI can help bridge the gap between academic vocabulary learning and professional language use, thus contributing to students' communicative readiness and identity formation in their respective fields.

CONFLICTS OF INTEREST

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