

BRIDGING TECHNOLOGY AND PEDAGOGY: AI INTEGRATION IN ESP TEACHING AND LECTURER READINESS IN HIGHER EDUCATION INSTITUTIONS

¹*Fitria Nur Hamidah; ²Veri Hardinansyah Dja'far

^{1,2}English Lecturer, Accounting Department, Politeknik Negeri Malang PSDKU Kediri, Politeknik Negeri Malang, Jalan Soekarno Hatta 9 Malang, East Java, Indonesia

¹English Education, Faculty of Letters, Universitas Negeri Malang, Jalan Semarang 5 Malang, East Java, Indonesia

*Corresponding Author Email: fitria.nur@polinema.ac.id

Article Info

Article History

Received: December 2025

Revised: January 2026

Accepted: March 2026

Published: April 2026

Keywords

Artificial intelligence;

English for specific purposes;

Digital pedagogy;

Teacher readiness;

AI integration;

Abstract

Although the integration of Artificial Intelligence (AI) in higher education is increasingly developing, research that simultaneously examines student perceptions, classroom practices, and lecturer readiness in the ESP context in developing countries remains limited. This study aims to analyze the effect of AI integration on ESP learning effectiveness, identify implementation challenges, and evaluate lecturers' pedagogical and ethical readiness. Using an explanatory sequential mixed-method design, this study involved 57 non-English major students in the quantitative phase, followed by interviews with 6 ESP lecturers and learning observations. The results show a strong and significant positive correlation between perceptions of AI use and ESP learning effectiveness ($r = 0.712$; $p < 0.01$). AI has the most impact on reading comprehension ($M = 4.00$) and ease of access to materials ($M = 3.98$). Qualitative findings identified four main themes: low critical digital literacy among students, minimal ethical awareness, suboptimal pedagogical readiness of lecturers, and limitations in institutional policies and infrastructure. These findings confirm the importance of institutional AI policies, ethics-based lecturer training, and strengthening digital literacy to support effective and responsible AI integration in ESP learning.

How to cite: Hamidah, F.N., & Dja'far, V.H. (2026). Bridging Technology and Pedagogy: AI Integration in ESP Teaching and Lecturer Readiness in Higher Education Institutions. *JOLLT Journal of Languages and Language Teaching*, 14(2), 405-420. Doi: <https://doi.org/10.33394/jollt.v14i2.18761>

Copyright© 2026, Hamidah et al

This is an open-access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) License.



INTRODUCTION

In the era of digital globalization, English language proficiency has become an essential skill in the professional world across sectors, from business and engineering to healthcare. This has driven the development of the English for Specific Purposes (ESP) approach, a model of English language learning tailored to communication needs in specific professional contexts (Saragih, 2022). ESP not only teaches language structure but also focuses on language use relevant to real work situations, making it a strategic solution to bridge the needs of industry and language education. However, the effectiveness of ESP implementation still faces various challenges. The limitation of competent educators in the ESP field, especially in non-English speaking regions like France, shows a gap between demand and availability of human resources (Van der Yeught, 2016). Additionally, inadequate pedagogical training makes many teachers struggle to adapt teaching materials to the professional context of learners, impacting low learner engagement (Salmani-Nodoushan, 2020). Non-contextual learning materials also

become obstacles in achieving practical ESP goals (Eva, 2016). Therefore, more adaptive approaches are needed such as needs analysis, development of work-context-based materials, and implementation of methodologies aligned with professional practices to improve ESP learning effectiveness (Ananyina et al., 2021; Zechia, 2017). Thus, innovation in ESP teaching becomes a strategic key in addressing 21st-century professional communication demands.

Advances in Artificial Intelligence (AI) technology offer transformative opportunities in improving ESP teaching quality (Kurnia et al., 2025). Technologies such as Natural Language Processing (NLP), AI-based chatbots, and adaptive learning platforms enable personalization of teaching materials, automation of feedback, and increased interactivity in the learning process (Chen et al., 2020; Zawacki-Richter et al., 2019). With the ability to adapt content according to specific learner needs, AI technology is considered to have high compatibility with the basic principles of ESP teaching that emphasize relevance and specificity (Septiyandini et al., 2024).

However, although discourse about AI in higher education is beginning to develop, studies on AI implementation specifically in ESP teaching are still limited. Zawacki-Richter et al. (2019) highlight the use of AI in higher education generally, but do not specifically discuss the ESP context. Similarly, Chen et al. (2020) reveal a gap between AI technology innovation and its application in classrooms, but without discussing contextual pedagogical aspects needed in ESP learning. In Indonesia, Butarbutar (2024) found that students show enthusiasm for using AI technology in English language learning, but AI utilization in ESP learning is still not optimal due to lack of training and AI not being systematically integrated into the curriculum. This is reinforced by findings from Lenard & Šokčević (2024) showing that although ESP students show positive attitudes toward AI-based tools like digital dictionaries and ChatGPT, there is no systematic pedagogical model available for sustained integration of this technology in ESP curricula.

This literature gap indicates the need for deeper studies on (1) how AI integration can be effectively applied in ESP teaching at higher education and vocational levels, (2) the extent of readiness and pedagogical experience of ESP lecturers in adopting AI technology, and (3) how to design adaptive, contextual, and technology-based pedagogical approaches to support ESP learning processes more relevant to learner needs, especially in developing countries like Indonesia.

Several recent empirical literatures found that the integration of artificial intelligence (AI) technology in language learning has significant pedagogical impacts, but still faces practical and conceptual challenges. Torres & Kahveci (2025) found that AI has moderate to strong positive effects on language learning, particularly in vocabulary, reading, writing, listening, and speaking skills in EFL environments, although its effectiveness is influenced by implementation context and instructional settings. Moorhouse (2024) revealed that language teachers' readiness toward the use of generative AI tools shows that many novice and beginner-level teachers have positive perceptions of AI's pedagogical potential, but their interpretation and professional readiness vary depending on experience and professional training they have received.

Further, Nguyen et al. (2025) highlight how AI integration in informal English learning can simultaneously influence teacher perceptions and student learning strategies, indicating that students' strategies in using AI are influenced by teachers' perceptions of the technology and how teachers integrate it in learning activities. Research by Peña-Acuña & Corga Fernandes Durão (2024) shows that AI has the potential to enhance language learning outcomes and influence teacher perceptions and student strategies, while ethical issues, professional readiness, and technical challenges still need to be addressed more deeply in higher education contexts. Dou et al. (2025) also demonstrate that although AI technology can create more personalized and adaptive learning environments, the results are not always consistent and show

variations in learning outcomes across many studies, thus emphasizing the need for a comprehensive and holistic research approach in evaluating AI integration in language classrooms. Additionally, research by Aghaziarati et al. (2023); Martin et al. (2024); Tan et al. (2024) indicates that pedagogical readiness of teaching staff, AI literacy, and ethical integration in teaching practices have not been extensively examined comprehensively in the context of specific needs-based language learning.

Recent studies show that AI technology integration such as ChatGPT and Grammarly can improve learning outcomes in ESP learning contexts. In Malaysia, Luaran et al. (2025) reported that 90% of pre-university students at UiTM Dengkil felt increased confidence in writing after using ChatGPT, and 77% stated their ability to generate ideas and compose structured texts improved. Meanwhile, research conducted by Utami & Winarni (2023) noted that ChatGPT provides real-time feedback like a virtual learning partner, increasing motivation and engagement in EFL student writing as also noted by Song & Song (2023).

Besides ChatGPT, other AI-based tools like Grammarly also show high effectiveness in improving accuracy and writing organization. Experimental research on EFL graduate students shows that groups using Grammarly experienced significant improvements in language accuracy, writing structure, and increased confidence in revision. However, several challenges remain. A study published in Cambridge ReCALL journal by Zare et al. (2025) warns about the “novelty effect” - high initial enthusiasm for AI use can decline over time if not accompanied by metacognitive strategies and continuous guidance. These findings underscore the importance of developing theoretical frameworks and pedagogical strategies that support systematic AI integration in ESP learning. In this framework, lecturers are not only required to be able to use AI-based tools but also to reflectively evaluate, adapt, and contextualize their use according to learner needs and their socio-cultural reality. AI-based ESP learning must move from mere tool use toward a reflective approach integrated in curricula and educator professional development, especially in developing country contexts that have diverse challenges in infrastructure, digital literacy, and pedagogical support.

Based on this background, this research aims to explore how AI can be effectively integrated in ESP learning practices, while examining perceptions, readiness, and pedagogical needs of lecturers and students in the process. Results from this research are expected to formulate an instructional design that is adaptive, contextual, and relevant to support more meaningful ESP learning achievements in the digital era. Based on the identified research gaps, this study is designed to answer the following research questions: What is the statistical relationship between student perceptions of AI use and ESP learning effectiveness? How is AI implemented in ESP classroom learning practices, and what pedagogical and ethical barriers emerge in the process? and To what extent are lecturers pedagogically and ethically ready to integrate AI into ESP teaching?

RESEARCH METHOD

Research Design

This research uses a mixed-method design with a sequential exploratory approach. The initial stage conducted surveys of University X students who had taken ESP courses to identify their perceptions of AI effectiveness in reading and writing skills. Survey results then became the basis for the qualitative stage, consisting of in-depth interviews with lecturers and curriculum developers, and non-participatory observations of AI-based ESP learning. This approach enables deeper and more contextual understanding regarding AI integration in ESP teaching.

The explanatory sequential design (quantitative → qualitative) was chosen because this study aims to first identify statistical relationship patterns between student perceptions of AI use and ESP learning effectiveness, then deepen and explain these findings through qualitative exploration. The results of the quantitative phase were used as a basis for developing the

interview protocol, particularly to explore more deeply the findings regarding the strong correlation, ethical challenges, and lecturers' readiness in integrating AI. Data integration was conducted through connecting strategies (linking survey results with interview informant selection), building (developing interview questions based on quantitative results), and merging (combining and interpreting quantitative and qualitative findings in the final analysis stage). This research focuses on the application of Artificial Intelligence (AI) technology in English for Specific Purposes (ESP) teaching at University X. The research population includes ESP course lecturers and non-English major students taking ESP courses at University X.

Participants

The research population includes ESP course lecturers and non-English major students taking ESP courses at University X. Sampling was conducted using purposive sampling method, with criteria: (1) active lecturers currently or previously teaching ESP, (2) having experience or knowledge about using AI-based technology in ESP learning activities, and (3) willing to complete online surveys and/or participate in in-depth interviews. According to Creswell (2015), in exploratory sequential design, initial quantitative stage can use moderate numbers (around 30-60) to explore and build frameworks for subsequent qualitative data. This research involved 57 students from various non-English major programs at University X who had completed ESP courses. Additionally, this research involved ESP lecturers and curriculum developers at University X who have direct experience in ESP teaching and involvement in learning technology integration.

Students were recruited through classroom announcements and online survey link distribution. The response rate reached approximately 78% of the total invited students. Participants came from various non-English major study programs such as engineering, management, and health, with academic levels from semesters 3 to 5. In terms of digital access, all students owned smartphones, 82% had personal laptops, and 76% reported having relatively stable internet access. Five ESP lecturers and one curriculum developer were purposively selected based on active involvement in ESP teaching and experience using AI technology in learning. Their teaching experience ranged from 3 to 15 years to ensure diversity of pedagogical perspectives.

Research Instruments

Research instruments used in this study through student surveys used online questionnaires based on Likert scales structurally designed to measure perceptions of the effectiveness of using Artificial Intelligence (AI) based technology in ESP learning, especially in reading and writing skills. This questionnaire was developed based on technology-assisted learning effectiveness indicators and has undergone content validation by ESP and educational technology experts. For qualitative data collection, instruments used were semi-structured interview guides designed to deeply explore lecturer and curriculum developer views on AI integration, pedagogical readiness, and implementation barriers. Additionally, non-participatory observation sheets were also compiled to record key aspects in AI-based ESP learning practices, including lecturer-student interactions, AI application use in learning processes, and student responses to the technology. This combination of instruments enables data triangulation to improve research result validity.

In addition to reliability testing using Cronbach's alpha, the construct validity of the quantitative instrument was also tested through Exploratory Factor Analysis (EFA). The analysis results showed a Kaiser-Meyer-Olkin (KMO) value of 0.81 which falls in the good category, and Bartlett's Test of Sphericity was significant at $p < 0.001$. These findings indicate that the data meets the feasibility for factor analysis and the factor structure of the instrument aligns with the theoretical constructs being measured.

The semi-structured interview protocol included questions related to lecturers' experiences in using AI, perceptions of AI's pedagogical impact, ethics and plagiarism issues, and institutional readiness in supporting the integration of such technology. This protocol was reviewed by experts and revised based on pilot interview results to ensure clarity and relevance of questions. The observation sheet was designed in the form of a structured checklist that included indicators such as the frequency of AI use in the classroom, the level of students' independent editing of AI results, classroom interaction patterns, and ethical awareness in acknowledging AI use.

Data Analysis Techniques

This research uses a combination of several data collection techniques. First, online surveys were distributed to students from various applied non-English major programs at University X who had completed ESP courses. This survey aimed to identify their perceptions of the effectiveness of using AI-based technology such as ChatGPT, Grammarly, and Quillbot in improving academic reading and writing skills. Second, in-depth interviews were conducted with ESP lecturers and curriculum developers to gain deeper understanding of their views on AI utilization in learning processes, implementation challenges, and levels of pedagogical readiness in integrating the technology. Third, non-participatory observations of AI-based ESP learning practices were conducted both through direct classroom observation and through online session recordings. This observation aimed to complement and validate findings from surveys and interviews, and provide factual descriptions of ongoing learning dynamics.

Before conducting the Pearson correlation test, normality assumption testing was performed using the Kolmogorov-Smirnov test and linearity testing of inter-variable relationships, which showed that the data met parametric analysis assumptions. Descriptive statistics in the form of mean values and standard deviations were calculated for each dimension. In addition to correlation values and significance, this study also reports effect sizes and 95% confidence intervals to strengthen result interpretation. To enhance the strength of analysis, linear regression analysis was conducted by controlling for semester level, frequency of AI use, and internet access as potential confounding variables. Sensitivity testing was performed to ensure result consistency. This study does not claim causal relationships, but rather associative relationships between variables.

Data collection was conducted from February to April 2025. Online surveys were distributed through the Google Forms platform. Interviews were conducted online via Zoom and recorded with participants' consent. All interviews were transcribed verbatim. Data were anonymized using identity codes to maintain participant confidentiality. This study obtained ethical approval from the Research Ethics Committee. All participants signed informed consent forms before participating in the study. Data were stored securely in password-protected institutional storage. Qualitative data were analyzed through three coding stages: open coding, axial coding, and selective coding. Two researchers conducted the coding process independently to enhance reliability. Inter-coder agreement was measured using Cohen's Kappa with a value of 0.82, indicating high reliability. To ensure credibility of findings, member checking was conducted with several participants as well as peer debriefing among researchers. Thematic saturation was declared achieved when no new categories were found in the final interviews.

RESEARCH FINDINGS AND DISCUSSION

Effects of AI Technology Application on ESP Learning Effectiveness

Based on survey results from 57 students from various non-English major programs who had taken ESP courses at University X, it was found that the majority of respondents showed positive perceptions toward AI technology application, especially applications such as ChatGPT, Grammarly, and Quillbot. Overall, the quantitative results show three main patterns.

First, students have positive perceptions toward the use of AI in ESP learning, especially in aspects of reading comprehension and ease of access to materials. Second, there is a strong and significant relationship between positive perceptions of AI and perceptions of ESP learning effectiveness. Third, despite very high levels of AI usage, limitations are still found in aspects of students' critical digital literacy and ethical awareness. These findings directly answer the research question regarding the effect of AI implementation on ESP learning effectiveness.

Table 1
Average Student Perceptions of AI Utilization in ESP

Dimension	Indicator	Mean
General Perception of AI	I understand basic AI functions in ESP learning	3.93
	I feel AI improves my overall learning experience	3.96
	I believe AI can help improve learning effectiveness	3.95
Mean		3,95
Impact of AI on Reading	AI helps me understand ESP texts faster	4.00
	I am helped in finding technical word meanings through AI	4.02
	AI makes me more confident when reading ESP technical materials	3.98
Mean		4,00
Impact of AI on Writing	AI helps me compose correct academic sentences	3.95
	I am helped by AI in enriching my ESP vocabulary	3.92
	AI provides quick feedback on my writing	3.95
Mean		3,94
Ease and Accessibility	I can access AI whenever I need it	4.00
	Using AI in ESP class is easy to learn	3.95
	AI platforms used are easy to use and not complicated	3.98
Mean		3,98
AI Challenges or Weaknesses	Sometimes AI provides irrelevant information	3.85
	I still need lecturer guidance despite using AI	3.92
	AI is not always suitable for cultural or local ESP material contexts	3.89
Mean		3,89

Generally, student perceptions are in the positive category with average scores between dimensions above 3.80 on a scale of 5. The dimension with the highest score is AI Impact on reading skills at 4.00, showing that students feel there is improvement in ESP text understanding thanks to AI technology assistance. This is followed by ESP understanding improvement dimension (3.98) and Material access ease through AI (3.95), indicating that AI contributes to presenting relevant, easily accessible materials suitable to student needs.

The AI Impact on writing ability dimension scored 3.94, indicating that AI technology also helps students compose ESP sentences or paragraphs suitable to context, though not as high as reading skills. Meanwhile, the AI usage challenges in ESP learning dimension scored 3.89, which despite still being in the high category, shows that students still experience constraints such as dependency, need for critical understanding of AI results, or other technical constraints. These findings reflect that generally, students assess that AI provides real benefits in improving ESP learning effectiveness, especially in receptive skills, access ease, and concept understanding, but still requires adequate pedagogical guidance to overcome usage challenges. Nevertheless, since current study does not use an experimental design, these results cannot be interpreted as evidence that AI use directly causes improvement in language ability, but rather indicates an association based on respondents' perceptions.

Table 2
Pearson Correlation Test Results

		AI Perception	ESP Effectiveness
AI Perception	Pearson Correlation	1	0.712**
	Sig. (2-tailed)	-	0
	N	59	59
ESP Effectiveness	Pearson Correlation	0.712**	1
	Sig. (2-tailed)	0	-
	N	59	59

**Correlation is significant at the 0.01 level (2-tailed).

Pearson correlation test results between student perceptions of Artificial Intelligence (AI) technology usage effectiveness and English for Specific Purposes (ESP) learning effectiveness show a correlation coefficient (r) value of 0.712 with significance (p) of 0.000. This value indicates a strong and statistically significant relationship between the two variables. This positive correlation means that the higher students' positive perceptions toward AI application in learning, the higher the ESP learning process effectiveness they experience. Thus, it can be concluded that AI technology has real contribution in supporting more effective ESP teaching-learning processes, both in terms of accessibility, material understanding, and language skill improvement.

However, it must be emphasized that a correlation coefficient of 0.712 indicates a statistically strong relationship between the two variables, but does not prove a causal relationship. In other words, these results confirm that positive perceptions of AI are related to perceptions of ESP learning effectiveness, but cannot ascertain that AI is directly the cause of such improvement.

Table 3
Lecturer Perceptions of AI Impact in ESP Learning

Assessment Aspect	Agree (%)	Neutral (%)	Disagree (%)
AI helps accelerate student assignment assessment	83.30%	16.70%	-
AI expands English learning resources	100%	-	-
AI reduces active participation in discussions	66.70%	16.70%	16.70%
AI increases plagiarism	50%	33.30%	16.70%
Lecturers ready to integrate AI ethically	33.30%	50%	16.70%

The survey and lecturer interview findings reveal an ambivalent perspective toward the integration of artificial intelligence in English for Specific Purposes learning. On the positive side, AI is widely recognized as a valuable tool for improving instructional efficiency and broadening access to learning resources. Most lecturers agreed that AI helps accelerate assignment assessment, with 83.3% acknowledging its contribution to faster evaluation processes. In addition, all respondents, or 100%, stated that AI expands learning resources, indicating that the technology offers broader materials, references, and learning support that can enrich the teaching and learning process. These benefits suggest that AI has strong potential to enhance the effectiveness and flexibility of ESP instruction. However, the findings also highlight several critical concerns. A majority of lecturers, 66.7%, believed that AI may reduce active student participation, potentially making learners more dependent on technology rather than engaging directly in the learning process. Furthermore, 50% of respondents expressed concern about the increased possibility of plagiarism, showing that AI may also create ethical challenges in academic contexts. More importantly, only 33.3% of lecturers reported feeling fully prepared to integrate AI ethically. This indicates a clear need for institutional policies, ethical guidelines, and professional development programs to support responsible AI implementation.

Table 4
AI-Based ESP Learning Process Observation Results

Dimension	Observed Indicator	Percentage (%)	Notes
AI Usage	Students use AI in composing or revising assignments	91%	Majority of students utilize AI, especially for final assignments
	Students access AI tools (ChatGPT, Grammarly, Quillbot, etc.)	87%	Observed using various AI platform types
Learning Independence	Students rely on AI without editing results	62%	Less critical evaluation process of AI answers occurs
	Students edit the AI results	38%	Still a small portion editing AI results independently
Class Participation	Students actively discuss AI-guided materials	42%	Discussion not optimal due to AI utilization dominance
	Students present learning results from AI reflectively	29%	Critical reflection in presentations still limited
Ethical Awareness	Students mention AI sources in assignments	23%	Minimal awareness of attribution importance
	Students show understanding of AI usage ethics	19%	Only small portion understands AI limitations and risks
Lecturer Role	Lecturers provide guidance on wise AI usage	67%	Majority of lecturers provide guidance but not evenly distributed
	Lecturers connect AI usage with learning outcomes	58%	AI integration in curriculum still varies among instructors

Observation data provides an empirical picture of AI usage practices in ESP classrooms. Although the level of AI use is very high, student behavior patterns show that such use is not yet fully accompanied by adequate reflection processes, critical evaluation, and ethical awareness. Observation results show that widespread AI usage by students (91% for final assignments and 87% accessing platforms like ChatGPT) supports quantitative findings, namely a strong and significant relationship between AI perception and ESP learning effectiveness ($r = 0.674$). However, challenges were found such as low critical evaluation (only 38% editing AI output), discussion participation (42%), and ethical awareness (23% citing AI sources). Lecturer role is quite positive (67% providing guidance), showing the importance of guidance to optimize AI impact on learning. Overall, the findings of this study confirm that AI integration in ESP learning is associated with perceptions of higher learning effectiveness as well as increased access and student confidence. However, these results also reveal significant challenges in aspects of critical digital literacy, academic integrity, and lecturers' pedagogical readiness. Thus, the main focus of this study's findings is not only on AI benefits, but on the need to strengthen ethical and pedagogical frameworks in its implementation.

Challenges and Obstacles in AI Implementation in ESP Teaching

Although students have positive perceptions toward AI effectiveness in ESP learning with high average scores on aspects of access ease, learning personalization, and motivation improvement, interview results reveal serious challenges that must be considered in the implementation process. These challenges closely relate to digital literacy aspects, ethical awareness, lecturer readiness, and supporting infrastructure.

One main challenge lies in students' low critical digital literacy. Although they are accustomed to using AI-based applications like ChatGPT, Grammarly, or Quillbot, many of

them cannot evaluate the accuracy and relevance of generated output. A student conveyed: *“I often use ChatGPT for reading and writing assignments, but usually I just copy it directly because I think it’s already good. Don’t know whether it’s correct or not, the important thing is it’s quickly finished.”* (Interview, MHS-3)

This statement aligns with quantitative results showing that most students have high scores on AI ease perception (mean = 4.23), but may not necessarily understand its academic implications critically. Additionally, ethical awareness in using AI is still minimal. Based on interviews with lecturers, many students do not cite AI sources or do not understand plagiarism boundaries. A lecturer stated: *“They [students] can use AI, but don’t understand that AI results also need to be critiqued. Even some assignments I check have very generic results without sources, though I know it’s from AI.”* (Interview, DOS-1)

This shows a gap between technical ability to use AI and reflective and ethical competence, which is important in academic contexts and ESP learning based on authentic communication. Additionally, half of lecturers (50%) assess that AI usage increases plagiarism risk in student assignments, while only 33.3% of lecturers feel ready to integrate AI ethically in learning. A lecturer conveyed in an interview: *“Students now tend to directly copy-paste from ChatGPT or Grammarly without understanding structure or context. This reduces the quality of their discussion and reflection.”* (Interview, DOS-3)

From the teaching side, pedagogical readiness becomes another challenge. Most lecturers (50%) choose neutral toward their readiness to integrate AI ethically, showing the need for clearer institutional training and guidelines. In another interview, a lecturer added: *“We need specific training so we can direct students to use AI properly and not just as task automation tools.”* (Interview, DOS-1). Many lecturers admit to not yet having modules or systematic guidance in integrating AI into learning. A lecturer revealed: *“We’re still groping around on how to utilize AI in class. There’s no specific training or SOP from the institution, so the initiative is still personal.”* (Interview, DOS-2)

This condition shows the importance of institutional support in the form of training and adaptive curriculum development toward technological developments. Infrastructure barriers also become implementation optimization factors. Although most students have personal devices, stable internet connection limitations remain problematic, especially in AI-based online assignments. A student conveyed: *“Sometimes it’s hard to access AI sites because of slow signals or exhausted internet packages. So I just do it manually.”* (Interview, MHS-6)

This is relevant to previous quantitative data on the “AI supports learning flexibility” indicator, which despite having high value (mean = 4.21), still leaves accessibility challenges for some student groups. Overall, it shows that AI implementation in ESP learning is not yet fully inclusive and effective if not accompanied by critical digital literacy improvement, ethical awareness, lecturer readiness, and infrastructure support. Thus, a holistic approach is needed so that AI utilization in ESP not only becomes a technical assistance tool but also capable of supporting communicative competence and academic integrity of students sustainably.

Teacher Experience and Readiness in Utilizing AI in ESP Contexts

Research results show that lecturer experience and readiness in utilizing Artificial Intelligence (AI) in ESP teaching contexts are diverse, influenced by age factors, pedagogical background, and frequency of technology use in learning processes. From five lecturers interviewed, most stated they have positive experiences using AI as teaching assistance tools, but still face challenges in ethical implementation, student usage supervision, and curriculum adaptation.

DOS-1 revealed that AI greatly helps in administrative aspects, especially in initial assessment and student assignment revision: *“AI like Grammarly and ChatGPT makes it easier for me to check structure and content of student assignments, so I can focus on deeper learning aspects.”*

This aligns with quantitative survey results showing 83.3% of lecturers agree that AI accelerates student assignment assessment processes. However, DOS-2 highlights decreased active student participation in class discussions after AI usage: *“Students tend to become passive, because they feel they already got answers from AI. This makes them less critical in expressing opinions.”* This statement corresponds with findings that 66.7% of lecturers agree that AI reduces active participation in discussions. DOS-3 conveyed concerns about increasing plagiarism potential: *“I once found student assignments entirely generated by AI without editing. This creates new problems about work authenticity.”* As many as 50% of lecturers in the survey also confirm that AI increases plagiarism risk. On the other hand, lecturer readiness to integrate AI ethically is still limited. DOS-4 admits to not yet having comprehensive understanding of AI usage ethics guidelines in learning: *“I know AI can help, but I’m still confused about its boundaries. Is it okay for students to use ChatGPT for all assignments? Doesn’t that violate academic integrity?”*

This aligns with quantitative data, where only 33.3% of lecturers feel ready to integrate AI ethically. Nevertheless, some lecturers show initiative to adapt curricula and develop more relevant evaluation models. DOS-5 stated: *“We’re starting to include digital literacy and AI ethics sessions at the beginning of lectures. Students are given understanding that AI is just an assistance tool, not a substitute for thinking processes.”* Furthermore, institutional support also plays an important role in shaping lecturer readiness. DOS-6 highlights the importance of training and campus policies: *“If there’s no official training or guidelines from the institution, lecturers will be confused on their own. There must be clear standards so AI usage doesn’t go wild.”*

Discussion

In the last decade, AI integration in higher education has experienced exponential growth, including in ESP teaching domains. AI is considered capable of bridging the gap between specific learning needs and adaptive, personal, and efficient pedagogical approaches. However, AI implementation in ESP teaching contexts in developing countries like Indonesia is inseparable from lecturer readiness challenges, both technologically and pedagogically. Lecturer readiness encompasses competence in using technology, understanding AI-driven pedagogical principles, and attitudes toward digital innovation in learning (Zaki & Ulya, 2025). Studies by Wulandari & Purnamaningwulan (2024) show that pre-service lecturers or teachers in Indonesia are beginning to explore AI-based assistance tools like ChatGPT, Quizizz AI, and Copilot as media for designing more interactive and contextual ESP teaching materials. However, most of them still rely on AI limitedly because adequate technical training and pedagogical guidance are not yet available.

This research results confirm that AI implementation in ESP learning has significant positive influence on student learning effectiveness. Quantitative findings show strong correlation between students’ positive perceptions of AI usage and ESP learning effectiveness ($r = 0.712$; $p < 0.01$), especially in reading, writing, and material access ease aspects. Students feel helped in composing academic sentences, expanding vocabulary, and understanding ESP texts faster through tools like ChatGPT and Grammarly. These findings align with Enamorado (2025) study showing that ChatGPT can strengthen ESP student written communication in tourism contexts through dialogue simulation and contextual training, though still requiring adequate pedagogical guidance. Additionally, Mahapatra (2024) shows that ChatGPT usage as formative feedback tools significantly improves ESL students’ academic writing ability, especially due to real-time responses and usage flexibility in text revision.

However, passive AI usage without critical evaluation remains problematic. Most students tend to directly copy AI output without editing or source attribution, indicating low critical digital literacy and ethical awareness. This problem is also identified by Lenard & Šokčević (2024), showing that ESP students in Europe use AI like digital dictionaries and

ChatGPT without deep understanding of authenticity and academic integrity, and often do not cite information sources correctly. These findings are reinforced by Yusfi & Asmara (2023), who found that although ChatGPT increases motivation and GPA of English Education students, AI dependency can reduce critical reflection and student writing originality.

This research results show that Artificial Intelligence (AI) integration in higher education brings duality between potential benefits and implementation barriers from lecturer perspectives. Most teachers acknowledge that AI can improve efficiency, especially in assessment processes and providing broader learning resources (Kallunki et al., 2024; Mutanga et al., 2024). This technology enables lecturers to save time on administrative tasks, allowing them to focus more on meaningful pedagogical activities. However, there are doubts and unreadiness from ethical and pedagogical aspects in integrating AI into daily teaching practices (Mohamad & Nazlan, 2024). This indicates a gap between technology availability and human resource readiness, especially due to minimal lecturer involvement in policy formulation and limited access to continuous professional training (Reuben & Kabilan, 2024).

This gap becomes a significant challenge because without inclusive policy support and comprehensive training, AI benefits cannot be optimized fairly and sustainably. Some lecturers even show skeptical attitudes toward AI due to concerns about algorithmic bias, data privacy, and potential decrease in educational interaction quality (Pikhart & Al-Obaydi, 2025). Therefore, systematic strategies are needed to actively involve educators in educational technology policy formulation and provide continuous professional development programs, to ensure AI integration that is not only functional but also ethical and oriented toward long-term learning quality improvement. Asadi et al. (2025) even show that integrated AI and teacher feedback simultaneously provides higher learning results compared to teacher-only usage, but emphasizes the importance of teacher training to be able to guide strategic AI usage and not let students become overly dependent.

Observation results reinforce this - although 91% of students use AI for final assignments, only 38% do independent editing, and only 23% cite AI sources in their assignments. This shows that lecturer roles are very important in forming critical literacy, academic ethics, and responsible AI usage. This phenomenon reflects what is called in literature as “automated dependency” which is a dependency on technology without reflective involvement (Culp Jr, 2023). In systematic studies by Zhai et al. (2024), it is explained that students tend to accept output from generative AI without verification processes, leading to decreased analytical ability, loss of originality, and potential academic ethics violations.

This situation confirms the importance of lecturer roles as responsible AI literacy facilitators. According to Sanchez-Mateo et al. (2024), ethical learning with AI assistance must be based on three main principles: understanding AI capability boundaries, critical evaluation of its output, and applying transparency in reporting technology usage. Without this preparation, students' risk being trapped in manipulative practices such as usage without citation or claiming AI results as original work. Research by Chan (2023) even introduces the term *AIgiarism* as a new form of artificial intelligence-based plagiarism, demanding adaptive and proactive pedagogical approaches from educators. Therefore, AI integration in higher education requires not only clear institutional policies but also lecturer role transformation in forming ethical awareness and student digital literacy so that this technology utilization truly supports legitimate and quality academic achievements.

The findings of this study also have broader implications for the transformation of ESP pedagogy. Artificial Intelligence should not be positioned merely as a productivity enhancement tool, but as a medium for cognitive and communicative scaffolding that supports language learning based on authentic professional contexts. This demands a redesign of ESP curriculum that integrates AI-assisted language learning literacy, including the ability to

evaluate AI output, conduct independent critical editing, and understand responsible AI use in academic contexts.

Theoretically, this study contributes to the development of the concept of Human–AI pedagogical interaction by confirming that AI effectiveness in ESP learning is mediated by lecturer readiness and quality of pedagogical guidance. The results of this study reinforce the view that AI is not a replacement for the teacher's role, but rather a layer of learning augmentation that still requires human pedagogical control, ethical framing, and contextual adaptation. These findings expand the framework of AI in education by positioning lecturers as primary actors in shaping responsible AI-based learning environments oriented toward students' long-term competency development.

This phenomenon is reinforced by Chemaya & Martin (2024), study, revealing that many students use AI intensively in academic projects but do not explicitly include AI contribution statements. This indicates that understanding the importance of AI usage declaration is still low. Additionally, experimental study by Pitts et al. (2025) show that students tend to be reluctant to reveal AI usage due to concerns about affecting reader perceptions of their academic writing quality. Such fears worsen academic openness practices and instead encourage students to hide AI involvement in writing processes. This ethical and critical gap is increasingly emerging, showing that students tend to experience over-reliance on AI when not equipped with adequate digital literacy and evaluative capabilities (Al Zaidy, 2024; Hwang et al., 2023). Students prefer accepting AI output directly without editing or validation processes, risking weakening academic quality and thought originality.

In this context, lecturer roles become very crucial. Research by Petricini et al. (2025) emphasizes that lecturer intervention through policies and explicit guidance regarding AI usage can shape student understanding of academic integrity. Lecturers who actively provide direction on how to use AI ethically - including the importance of independent editing and source citation - can encourage formation of responsible academic culture (Acosta-Enriquez et al., 2025; Ateeq et al., 2024). Thus, AI integration in ESP learning requires approaches that not only focus on technology access but also lecturer professional development, adaptive curriculum design, and formation of reflective and ethical learning culture to ensure that technology becomes a strengthener, not replacement, of meaningful teaching-learning processes. Despite making important contributions, this study has several limitations. First, the research sample size is relatively limited, so generalization of research results to broader institutional contexts needs to be done carefully. Second, this study partially uses self-report data which potentially contains perception bias and social desirability bias. Third, the cross-sectional research design has not been able to capture changes in AI usage behavior in the long term. Fourth, there is a possibility of novelty effect, namely students' positive perceptions of AI influenced by the technology's newness factor, rather than solely long-term pedagogical effectiveness.

Future research is recommended to focus on several main agendas. First, longitudinal research is needed to observe the long-term impact of AI use on the development of ESP competencies and students' academic integrity behavior. Second, intervention-based research needs to be conducted to test the effectiveness of lecturer training programs in improving AI-based pedagogical readiness and the ability to integrate AI ethics in learning. Third, experimental research comparing the effectiveness of AI-based ESP learning, conventional learning, and Human–AI collaborative learning models is needed to produce stronger causal evidence. Fourth, cross-institutional comparative research is important to understand the influence of institutional policies, infrastructure readiness, and lecturers' professional development on successful AI implementation in higher education.

CONCLUSION

Based on the research findings, the integration of Artificial Intelligence (AI) in English for Specific Purposes (ESP) learning is proven to provide positive impacts on students' learning effectiveness. Empirically, there is a strong correlation between students' positive perceptions of AI use and improvement in English language skills, particularly in academic reading and writing abilities. The use of AI-based applications helps students in composing academic sentences, enriching vocabulary, and enhancing comprehension of ESP texts. However, this study also found important challenges, namely low critical digital literacy, ethical awareness of AI use, and tendencies toward excessive dependence on AI without reflective processes. From the lecturers' side, although AI is acknowledged as capable of improving assessment efficiency and access to learning resources, pedagogical and ethical readiness in integrating AI is still limited due to limited training, absence of clear institutional guidelines, and infrastructure gaps.

This study contributes theoretically by strengthening understanding of AI's role in improving the effectiveness of specific needs-based ESP learning. Practically, this study provides a picture of the actual readiness of students and lecturers in adopting AI in language learning. Nevertheless, this study has limitations in terms of generalization due to the limited sample size in a specific institutional context, as well as measurement limitations that still focus on perceptions and quantitative data. Based on the research results, it is recommended that educational institutions develop clear and ethical AI usage policies in learning. In addition, continuous professional development programs are needed for lecturers focusing on pedagogical AI literacy, reflective AI-based learning design, and strengthening of digital ethics. Educational administrators also need to ensure equitable digital infrastructure so that AI implementation in ESP learning can run optimally and sustainably.

INFORMED CONSENT STATEMENT

Participation in this study was entirely voluntary. Before taking part, all participants received clear information regarding the study's purpose, procedures, possible risks, and expected benefits. They were informed that their identities would remain confidential and that the information collected would be used solely for academic research purposes. Participants also understood that they could withdraw from the study at any stage without penalty or disadvantage. Their continued participation indicated informed consent.

DATA AVAILABILITY STATEMENT

The data generated and analyzed in this study are not publicly available because they contain information that could compromise participant privacy and confidentiality. Restricting public access ensures compliance with ethical research principles and relevant data protection requirements. Nevertheless, the dataset may be made available to qualified researchers upon reasonable request for verification or further analysis. Any such request will be reviewed individually and will require prior approval from the appropriate institutional ethics authority.

REFERENCES

- Acosta-Enriquez, B. G., Ballesteros, M. A., Pérez, C. R. V., Jordan, O. H., Vergara, J. A. M., Acosta, R. M., Vargas, C. G. A. P., & Castillo, J. C. A. (2025). AI in academia: How do social influence, self-efficacy, and integrity influence researchers' use of AI models? *Social Sciences & Humanities Open*, *11*, 101274. <https://doi.org/10.1016/j.ssaho.2025.101274>
- Aghaziarati, A., Nejatifar, S., & Abedi, A. (2023). Artificial intelligence in education: Investigating teacher attitudes. *AI and Tech in Behavioral and Social Sciences*, *1*(1), 35–42. <https://doi.org/10.61838/kman.aitech.1.1.6>
- Al Zaidy, A. (2024). The impact of generative AI on student engagement and ethics in higher

- education. *Journal of Information Technology, Cybersecurity, and Artificial Intelligence*, 1(1), 30–38. <https://doi.org/10.70715/jitcai.2024.v1.i1.004>
- Ananyina, A., Abramova, I., Shishmolina, E., & Yessengaliyeva, A. (2021). A New Pedagogical Model for Teaching English for Specific Purposes: Collaborative Educational Project. *SHS Web of Conferences*, 97, 1002. <https://doi.org/10.1051/SHSCONF/20219701002>
- Asadi, M., Ebadi, S., & Mohammadi, L. (2025). The impact of integrating ChatGPT with teachers' feedback on EFL writing skills. *Thinking Skills and Creativity*, 56, 101766. <https://doi.org/10.1016/j.tsc.2025.101766>
- Ateeq, A., Alzoraiki, M., Milhem, M., & Ateeq, R. A. (2024). Artificial intelligence in education: implications for academic integrity and the shift toward holistic assessment. *Frontiers in Education*, 9, 1470979. <https://doi.org/10.3389/feduc.2024.1470979>
- Butarbutar, R. (2024). Artificial intelligence for language learning and teaching: A narrative literature study. *Englisia: Journal of Language, Education, and Humanities*, 12(1), 147–163. <https://doi.org/10.22373/ej.v12i1.23211>
- Chemaya, N., & Martin, D. (2024). Perceptions and detection of AI use in manuscript preparation for academic journals. *PLoS One*, 19(7), e0304807. <https://doi.org/10.1371/journal.pone.0304807>
- Chen, X., Xie, H., Zou, D., & Hwang, G.-J. (2020). Application and theory gaps during the rise of artificial intelligence in education. *Computers and Education: Artificial Intelligence*, 1, 100002. <https://doi.org/10.1016/j.caeai.2020.100002>
- Culp Jr, W. C. (2023). Artificial intelligence and ChatGPT: bane or boon for academic writing. *The Journal of Education in Perioperative Medicine: JEPM*, 25(2), E702. https://doi.org/10.46374/volxxv_issue2_Culp
- Dou, A., Xu, W., Li, X., Zhang, S., & Zhang, J. (2025). Artificial Intelligence in Language Learning. *International Journal of Distance Education Technologies*, 23(1). <https://doi.org/10.4018/IJDET.385045>
- Enamorado, M. Á. J. (2025). Development of Linguistic Competence in English for Specific Purposes Through ChatGPT: A Case Study. *Journal of Language and Education*, 11(1 (41)), 85–100. <https://doi.org/10.17323/jle.2025.23745>
- Eva, M. (2016). Devising subject-specific materials for ESP courses. *Проблемы Современной Науки и Образования*, 30(72), 84–86. <https://doi.org/10.20861/2304-2338-2016-72-001>
- Hwang, H. S., Zhu, L. C., & Cui, Q. (2023). Development and validation of a digital literacy scale in the artificial intelligence era for college students. *KSII Transactions on Internet and Information Systems (TIIS)*, 17(8), 2241–2258. <https://doi.org/10.3837/tiis.2023.08.016>
- Kallunki, V., Kinnunen, P., Pyörälä, E., Haarala-Muhonen, A., Katajavuori, N., & Myyry, L. (2024). Navigating the evolving landscape of teaching and learning: University faculty and staff perceptions of the artificial intelligence-altered terrain. *Education Sciences*, 14(7), 727. <https://doi.org/10.3390/educsci14070727>
- Kurnia, L. I., Setyawan, B., Khoirunisa, R., Mustofa, A., Dja'far, V. H., & Purnomo, S. H. (2025). AI-Based English Module for Accounting Students. *Transformational Language, Literature, and Technology Overview in Learning*, 5(1), 1–10. <https://doi.org/10.55047/transtool.v5i1.1983>
- Lenard, D. B., & Šokčević, K. (2024). ESP students' attitudes towards using digital dictionaries and AI-based tools in language learning. *E-Mentor*, 107(5), 10–19. <https://doi.org/10.15219/em107.1684>
- Luaran, J., Isham, M. A. N. B. M., & Jain, J. (2025). Leveraging Chatgpt for Pre-University Academic Writing: Opportunities, challenges, and implications for Instructional Technology. *International Journal of Research and Innovation in Social Science*, 9(4),

- 5291–5307. <https://doi.org/10.47772/IJRISS.2025.90400380>
- Mahapatra, S. (2024). Impact of ChatGPT on ESL students' academic writing skills: A mixed methods intervention study. *Smart Learning Environments*, 11(1), 9. <https://doi.org/10.1186/s40561-024-00295-9>
- Martin, F., Zhuang, M., & Schaefer, D. (2024). Systematic review of research on artificial intelligence in K-12 education (2017–2022). *Computers and Education: Artificial Intelligence*, 6, 100195. <https://doi.org/10.1016/j.caeai.2023.100195>
- Mohamad, S. N. A., & Nazlan, N. H. (2024). The educator's dilemma: balancing AI advancements with ethical concerns in assessments for higher education. *International Journal of E-Learning and Higher Education (IJELHE)*, 19(2), 73–91. <https://doi.org/10.24191/ijelhe.v19n2.1925>
- Moorhouse, B. L. (2024). Beginning and first-year language teachers' readiness for the generative AI age. *Computers and Education: Artificial Intelligence*, 6, 100201. <https://doi.org/10.1016/j.caeai.2024.100201>
- Mutanga, M. B., Jugoo, V., & Adefemi, K. O. (2024). Lecturers' Perceptions on the Integration of Artificial Intelligence Tools into Teaching Practice. *Trends in Higher Education*, 3(4), 1121–1133. <https://doi.org/10.3390/higheredu3040066>
- Nguyen, L. T. H., Dinh, H., Dao, T. B. N., & Tran, N. G. (2025). Teachers' Perceptions and Students' Strategies in Using AI-Mediated Informal Digital Learning for Career ESL Writing. *Education Sciences*, 15(10), 1414. <https://doi.org/10.3390/educsci15101414>
- Peña-Acuña, B., & Corga Fernandes Durão, R. (2024). Learning English as a second language with artificial intelligence for prospective teachers: a systematic review. *Frontiers in Education*, 9, 1490067. <https://doi.org/10.3389/educ.2024.1490067>
- Petricini, T., Zipf, S., & Wu, C. (2025). AI: Communicating academic honesty: teacher messages and student perceptions about generative AI. *Frontiers in Communication*, 10, 1544430. <https://doi.org/10.3389/fcomm.2025.1544430>
- Pikhart, M., & Al-Obaydi, L. H. (2025). Reporting the potential risk of using AI in higher Education: Subjective perspectives of educators. *Computers in Human Behavior Reports*, 18, 100693. <https://doi.org/10.1016/j.chbr.2025.100693>
- Pitts, G., Rani, N., Mildort, W., & Cook, E.-M. (2025). Students' Reliance on AI in Higher Education: Identifying Contributing Factors. *ArXiv Preprint ArXiv:2506.13845*, 1–11. <https://doi.org/10.48550/arXiv.2506.13845>
- Reuben, B., & Kabilan, M. K. (2024). Assessment of university lecturers' readiness to adopt artificial intelligence (AI) technology in North-East of Nigeria. *International Journal of Advanced Research in Education and Society*, 6(2), 482–490. <https://doi.org/10.55057/ijares.2024.6.2.41>
- Salmani-Nodoushan, M. A. (2020). English for Specific Purposes: Traditions, Trends, Directions. *Online Submission*, 7(1), 247–268. <https://doi.org/10.24815/SIELE.V7I1.16342>
- Sanchez-Mateo, S., Abril-Jiménez, P., Alonso, L. G., Rodriguez-Ortiz, A., Lopez, R. C. O., & Gigoso, C. (2024). Co-Creating Ethical Responsibility Educational Materials For Using Generative Artificial Intelligence Tools In Engineering Students. *EDULEARN24 Proceedings*, 8963–8967. <https://doi.org/10.21125/edulearn.2024.2162>
- Saragih, D. (2022). The use of dictation strategy to teach listening skill. *Transformational Language, Literature, and Technology Overview in Learning (Transtool)*, 1(2), 1–10. <https://doi.org/10.55047/transtool.v1i2.125>
- Septiyandini, W., Muriman, C., & Mayastinasari, V. (2024). The Impact of Artificial Intelligence (AI) on Human Resources: A Case Study of the Indonesian Police Institution. *Policy, Law, Notary and Regulatory Issues*, 4(1), 64–74. <https://doi.org/10.55047/polri.v4i1.1540>

- Song, C., & Song, Y. (2023). Enhancing academic writing skills and motivation: assessing the efficacy of ChatGPT in AI-assisted language learning for EFL students. *Frontiers in Psychology, 14*, 1260843.
- Tan, X., Cheng, G., & Ling, M. H. (2024). Artificial intelligence in teaching and teacher professional development: A systematic review. *Computers and Education: Artificial Intelligence, 100355*. <https://doi.org/10.1016/j.caeai.2024.100355>
- Torres, P. J., & Kahveci, Y. E. (2025). Effectiveness of Artificial Intelligence (AI) in language teaching. *Computers and Education: Artificial Intelligence, 9*, 100522. <https://doi.org/10.1016/j.caeai.2025.100522>
- Utami, S. P. T., & Winarni, R. (2023). Utilization of Artificial Intelligence Technology in an Academic Writing Class: How do Indonesian Students Perceive?. *Contemporary Educational Technology, 15*(4), 1–13. <https://doi.org/10.30935/cedtech/13419>
- Van der Yeught, M. (2016). Developing English for Specific Purposes (ESP) in Europe: mainstream approaches and complementary advances. *13th ESSE Conference*.
- Wulandari, M., & Purnamaningwulan, R. A. (2024). Exploring Indonesian Efl Pre-Service Teachers' experiences In Ai-Assisted Teaching Practicum: Benefits And Drawbacks. *LLT Journal: A Journal on Language and Language Teaching, 27*(2), 878–894. <https://doi.org/10.24071/llt.v27i2.8690>
- Yusfi, M., & Asmara, C. H. (2023). Exploring the impact of ChatGPT on English education department student's motivation and performance. *Journal of Teaching of English, 8*(4), 383–392. <https://doi.org/10.36709/jte.v8i4.380>
- Zaki, A. R. M., & Ulya, I. A. (2025). Analisis Kesiapan Pedagogis Dan Teknologis Guru Dalam Mengadopsi Ai Sebagai Sarana Pembelajaran Adaptif. *Jurnal Pendidikan Indonesia, 6*(7), 3220–3228. <https://doi.org/10.59141/japendi.v6i7.8434>
- Zare, J., Al-Issa, A., & Madiseh, F. R. (2025). Interacting with ChatGPT in essay writing: A study of L2 learners' task motivation. *ReCALL, 1*–18. <https://doi.org/10.1017/S0958344025000035>
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—where are the educators? *International Journal of Educational Technology in Higher Education, 16*(1), 1–27. <https://doi.org/10.1186/s41239-019-0171-0>
- Zechia, D. C. (2017). Professional Communication Skills and Esp Teaching in the Digital World. *Scientific Bulletin of Naval Academy XX (1)*, 2–4. <https://doi.org/10.21279/1454-864X-17-I1-088>
- Zhai, C., Wibowo, S., & Li, L. D. (2024). The effects of over-reliance on AI dialogue systems on students' cognitive abilities: a systematic review. *Smart Learning Environments, 11*(1), 28. <https://doi.org/10.1186/s40561-024-00316-7>