Integrating Artificial Intelligence into Military English for Specific Purposes Education: A Case Study at a Military University in Vietnam

To Thi Lien Ha*

Faculty of Foreign Languages, Vietnam ADAFA, Hanoi, Vietnam

***Corresponding author**

DOI: https://dx.doi.org/10.47772/IJRISS.2025.910000804

Received: 01 November 2025; Accepted: 07 November 2025; Published: 24 November 2025

ABSTRACT

This study investigates how Artificial Intelligence (AI) can enhance two mission-critical linguistic competencies in military English for Specific Purposes (ESP): (1) technical vocabulary accuracy and (2) spoken command performance under time-pressured operational conditions. A mixed-method case study was adopted to address the limited digital access and strict security requirements at the ADAFA in Vietnam. The quantitative component involved administering a 20-item questionnaire to 60 cadets, while qualitative insights were collected through semi-structured interviews with five ESP instructors. The instruments were adapted from validated AI-in-education scales and designed to capture four dimensions relevant to defense education: usefulness, motivation, linguistic performance, and technological readiness. Findings reveal that intranet-based AI tools significantly improve cadets' accuracy in domain-specific terminology and increase confidence in delivering English command phrases. AI-generated feedback reduces speaking anxiety, while adaptive modules provide targeted practice aligned with operational tasks such as radar coordination and artillery command. However, implementation remains constrained by teachers' limited AI literacy, security restrictions, and insufficient infrastructural support. To address these issues, the study proposes a three-layer model combining pedagogical adaptation, secure technological mediation, and institutional capacity building. The results provide a contextualized framework for integrating AI into ESP instruction in high-security military environments.

Keywords: Artificial Intelligence, English for Specific Purposes, Military English, Adaptive Learning, Defense Education

INTRODUCTION

Artificial Intelligence (AI) has rapidly transformed global education by enabling adaptive learning, intelligent feedback, and data-driven instruction (Edmett et al., 2023; He, Zhang, & Huang, 2025). In English for Specific Purposes (ESP), AI supports personalized content delivery, enhances motivation, and simulates authentic communication tasks. These capabilities are particularly relevant in military education, where officers must master precise technical terminology and operational English to ensure mission clarity, multinational coordination, and technological command readiness (Dudley-Evans & St John, 1998).

At the ADAFA in Vietnam, English training plays a vital role in preparing cadets for air defense operations. However, instruction remains largely teacher-centered and focused on grammar translation, with limited opportunities for communicative practice or exposure to authentic operational discourse (Xuan Mai & Thanh Thao, 2022). Security restrictions also limit cadets' access to online learning resources and real-time language support (Xu, 2024). These structural constraints hinder the development of two mission-critical linguistic competencies in military English: (1) technical vocabulary accuracy and (2) spoken command performance under time pressure. These competencies were selected as the focus of the present study because they directly influence operational clarity during radar coordination, command issuing, and joint-force communication.

AI-based systems have the potential to address these barriers by offering immediate corrective feedback, personalized vocabulary modules, and simulated operational scenarios tailored to military communication (Akhter, 2022). Yet, despite increasing global adoption of AI in education, research on AI integration in military ESP contexts remains scarce. Most existing studies focus on civilian universities, where learners have open internet access and fewer institutional constraints (He et al., 2025). As a result, there is a lack of empirical understanding of how AI can be implemented safely, effectively, and ethically within high-security defense academies.

This study addresses this gap by examining how AI can enhance military ESP instruction at ADAFA, with a specific focus on improving cadets' mastery of technical terminology and spoken command performance. It explores instructors' and cadets' perceptions of AI-based learning, evaluates its effects on motivation and linguistic accuracy, and considers the institutional conditions needed to support secure implementation. By contextualizing AI integration within the discipline, hierarchy, and digital restrictions of a military academy, this research contributes both theoretical insights and practical implications for AI-enhanced ESP education in defense environments.

LITERATURE REVIEW

AI has become a transformative force in language education, thanks to its ability to process learner data at scale, deliver adaptive feedback, and simulate communicative contexts with high accuracy (Edmett et al., 2023). AI-driven applications, such as intelligent tutoring systems, natural language processing (NLP) tools, automated assessment engines, and speech recognition programs, provide fine-grained diagnostics that help learners identify linguistic weaknesses and track progress over time. Akhter (2022) highlights that large language models and AI-powered feedback systems strengthen both accuracy and fluency by offering immediate, individualized correction, while Mizumoto (2023) emphasizes that AI enhances metacognitive awareness by enabling learners to regulate strategies based on real-time performance data. Collectively, these functions align with learner-centered pedagogy, where technology supports autonomy, reflection, and differentiated instruction.

Within English for Specific Purposes (ESP), scholars have documented the potential of AI in creating domainspecific learning pathways. He, Zhang, and Huang (2025) argue that AI platforms generate customized tasks targeting specialized terminology and communicative situations, allowing learners to engage with language forms directly connected to their professional fields. Adaptive learning engines can detect varying proficiency levels within the same class, delivering individualized tasks that prevent advanced learners from being held back while supporting those who require remediation. Edmett et al. (2023) further note that automated writing evaluation, speech analytics, and AI-assisted vocabulary trainers enable teachers to devote instructional time to developing strategic communication skills rather than correcting mechanical errors. Such capabilities are particularly relevant for ESP domains that demand high levels of precision, clarity, and discipline-specific terminology.

However, the majority of AI-related ESP research is conducted in civilian educational settings, where learners enjoy unrestricted access to digital infrastructure, flexible institutional governance, and open internet connectivity. These contexts differ significantly from military ESP environments, in which communication demands not only linguistic proficiency but also technical accuracy, operational clarity, and rapid decisionmaking under pressure (Dudley-Evans & St John, 1998). Military English is recognized as a high-stakes form of ESP due to its direct connection to mission execution, command coordination, and international defense engagement. Studies on military ESP highlight that learners must master specialized lexical sets, such as airdefense terminology, artillery commands, radar reporting structures, and perform spoken communication tasks in real or simulated operational contexts, often under time pressure (Xuan Mai & Thanh Thao, 2022). These linguistic demands go beyond general English or civilian ESP, as miscommunication may compromise operational safety.

Despite the clear pedagogical relevance of AI for supporting accuracy and real-time performance, the technological integration of AI in military ESP remains limited. In global defense systems, AI has been primarily applied to tactical simulations, unmanned systems, and strategic decision-support algorithms (Rashid et al.,

2023). In contrast, applications focusing on linguistic competence, especially those aimed at improving spoken commands, pronunciation of mission-critical terminology, or vocabulary precision, are seldom documented. Chen (2024) notes that while AI-based communicative approaches have gained traction in higher education, military institutions often maintain traditional, instructor-centered pedagogies due to concerns regarding discipline, operational security, and the reliability of external technologies. Xu (2024) similarly observes that digital transformation in education is constrained by limited access to secure networks and by institutional hesitation in adopting AI tools that require data exchange with external servers.

These structural, cultural, and security constraints generate a unique research gap: AI has rarely been examined as a tool for enhancing technical vocabulary acquisition and spoken command performance in high-security military language classrooms. The existing literature provides valuable insights into AI-driven personalization and feedback; however, it does not address how these features can be adapted to environments where internet connectivity is restricted, device use is regulated, and instructional innovation must align with defense protocols. Furthermore, studies have not explored how AI might mitigate common learning challenges among military cadets, such as anxiety when delivering spoken commands, difficulty recalling complex terminology, or lack of exposure to authentic operational communication.

Thus, while the broader literature demonstrates AI's potential to individualize instruction, enhance performance analytics, and support specialized vocabulary learning, little is known about its pedagogical, technological, and institutional integration within military ESP contexts. The present study extends existing research by focusing on the ADAFA in Vietnam and examining how AI can address two mission-critical linguistic competencies: (1) technical air-defense vocabulary accuracy, and (2) spoken command performance under time-pressured conditions. By situating AI within the constraints of a secure military environment, this study offers a contextualized understanding of how adaptive technologies can support operationally relevant language learning while adhering to institutional discipline and security requirements.

RESEARCH METHODOLOGY

Research Design

This study employed a mixed-method case study design to investigate how AI can enhance two missioncritical linguistic competencies in military English: technical air-defense vocabulary and spoken command performance. A mixed-method approach was selected because it enables both the measurement of perceptual patterns and the interpretation of contextualized experiences, an essential consideration in tightly regulated military environments where quantitative data alone may not fully reflect institutional barriers or pedagogical constraints. As Creswell and Plano Clark (2018) argue, combining quantitative and qualitative strands enables researchers to triangulate findings, enhance validity, and gain a more comprehensive understanding of complex educational phenomena.

The case study design was chosen because ADAFA represents a unique instructional setting characterized by restricted internet access, strict confidentiality protocols, and a highly structured learning culture. These features require closer contextual examination than survey-based or experimental designs typically allow. The integration of AI technologies within such constraints necessitates analyzing both learner responses and institutional dynamics, justifying a context-embedded case study approach.

Participants

Participants included 60 cadets and five ESP instructors from the Faculty of Foreign Languages at ADAFA. The sample of 60 cadets was selected because it represents two whole training cohorts, reflecting the Academy's typical class size and ensuring an adequate level of representativeness while remaining feasible under military scheduling restrictions. Cadets were second- and third-year students majoring in air-defense command and radar operations, with self-reported English proficiency levels ranging from A2 to B1 on the CEFR scale.

The five instructors constituted the entire pool of teachers with a minimum of five years' experience in military ESP instruction. Their inclusion ensured maximum coverage of expert perspectives on both pedagogical

challenges and institutional constraints. Participation was voluntary for both groups, and anonymity was maintained through the use of pseudonyms.

Instruments

To capture multiple dimensions of AI-assisted learning in the military context, the study employed two complementary instruments: a structured questionnaire for cadets and a semi-structured interview guide for instructors.

Cadet Questionnaire

A 20-item Likert-scale questionnaire (1 = Strongly Disagree; 5 = Strongly Agree) was administered offline to comply with the Academy's security regulations. The questionnaire items were adapted from validated scales used in previous AI-in-education research (Edmett et al., 2023; Mizumoto, 2023). The decision to use 20 items was intentional: fewer than 20 would not adequately cover the constructs relevant to military ESP, while more items would extend testing time and disrupt cadets' tightly scheduled training duties. The items measured four constructs aligned with the study's conceptual framework: perceived usefulness of AI tools, learning motivation and psychological responses, linguistic performance in technical vocabulary and command speaking, and technological readiness and ease of use

Likert scaling was chosen because it allows efficient capture of attitudes and perceptions from groups operating under strict time constraints. Reliability analysis generated a Cronbach's α of 0.89, indicating high internal consistency.

Instructor Interview Guide

A semi-structured interview protocol was developed to elicit deeper insights into instructional practices, perceived benefits, institutional barriers, and security considerations. Semi-structured interviews were chosen because they strike a balance between consistency, provided by guiding questions, and flexibility to probe emergent themes unique to a military setting. Each interview lasted 30–40 minutes and was conducted privately in faculty offices to ensure confidentiality and privacy. The guiding questions addressed uses of AI, observed changes in cadet performance, constraints arising from restricted digital access, and recommendations for secure AI implementation.

The rationale for including instructors was to complement cadets' perceptions with expert interpretations grounded in operational and pedagogical experience. This dual-instrument strategy strengthened data triangulation, enabling a richer analysis of contextual factors that cannot be captured through surveys alone.

Data Collection Procedure and Data Analysis

Data collection took place over six weeks in May and June 2025. Due to security requirements, all survey activities were conducted offline using printed forms distributed through the Academy's internal channels. The offline format ensured adherence to the "no external device" regulation applied to cadets during training periods. Completed questionnaires were collected and manually anonymized before data entry.

Interviews were scheduled individually and recorded with consent using secure, offline recording devices approved by the Academy. Ethical approval was granted by the ADAFA Research Ethics Committee (Ref. No. ADAFA-EDU-AI-2025-04). Participants were informed that all data would be stored on the Academy's internal servers and would not involve any personal or operationally sensitive information.

Quantitative data were coded and analyzed using SPSS 26.0. Descriptive statistics (means, standard deviations) were used to identify overall trends, while Pearson's correlation tests explored relationships among key variables, such as the link between AI usefulness and motivation. These analyses were selected because they offer interpretable patterns that are well-suited to medium-sized samples, which are typical of military cohorts.

Qualitative data from interviews were transcribed and analyzed using Braun and Clarke's (2023) six-phase thematic analysis framework. This approach allowed inductive identification of themes reflecting instructors' lived experiences, institutional obstacles, and pedagogical needs. Two independent coders reviewed the transcripts to enhance inter-coder reliability, and discrepancies were resolved through discussion.

Research Validity, Reliability, and Ethical Considerations

Methodological rigor was ensured through data triangulation, member checking, and peer debriefing. Cadets' survey responses were compared with instructors' qualitative accounts to cross-validate interpretations. Member checking involved providing each interviewee with a summary of their transcript for confirmation and verification. Peer debriefing sessions among faculty researchers further reduced the risk of interpretive bias.

Given the sensitivity of the military environment, all data were stored on password-protected internal devices. No external cloud services, mobile applications, or internet-connected AI tools were used at any stage of the research process. Participation was voluntary, and cadets were informed that no academic or disciplinary consequences would result from declining or withdrawing from involvement.

FINDINGS AND DISCUSSION

Findings

Analysis of the survey and interview data revealed four significant findings related to the effects of AI integration on military ESP learning at ADAFA. These findings focus on (1) technical vocabulary development, (2) spoken command performance, (3) learner engagement and perceived operational relevance, và (4) constraints in technological and institutional conditions.

Enhanced Acquisition of Technical Military Vocabulary

Survey results indicate that AI substantially supported cadets' mastery of air-defense terminology. A large majority (83%) reported that AI exercises helped them identify and repeatedly review discipline-specific lexical items such as bearing, altitude, acquisition, and terms related to radar or artillery operations. Errortracking functions within the AI platform highlighted words frequently misused or mispronounced, enabling learners to focus on items central to operational communication.

Interview data further confirm that AI modules provided differentiated practice opportunities. Instructor 2 noted that weaker cadets benefited from the adaptive difficulty, which "allowed them to review essential terms multiple times without slowing down those with higher proficiency." This pattern suggests that the adaptive mechanisms described in He, Zhang, and Huang (2025) translated effectively into the controlled conditions of a military language classroom.

Improvement in Spoken Command Performance

Findings also show that AI contributed to measurable gains in cadets' spoken output, particularly in command-giving tasks. Approximately 78% of cadets agreed that automated pronunciation and fluency feedback helped them refine command phrases and improve clarity. Several cadets described feeling "less anxious" practicing with AI before speaking in front of peers, which mirrors Mizumoto's (2023) observation that AI can strengthen metacognitive control and reduce performance pressure.

Instructors likewise noted improvements in accuracy and automaticity when cadets issued English commands during drills. Instructor 4 reported that AI analytics revealed patterns of recurrent errors, such as consonant clusters in artillery or altitude, which enabled more targeted follow-up practice. These observations suggest that AI supported the development of both linguistic accuracy and procedural fluency, competencies central to military communication.

Increased Engagement and Perceived Operational Relevance

AI-enabled simulations emerged as one of the most engaging components of the learning process, receiving the highest average rating across the questionnaire (mean 4.28/5). Cadets described these tasks as "realistic" and "motivating" because they replicated radar alerts, tracking sequences, and rapid-response coordination. Such scenarios required cadets to apply vocabulary and command structures under time-pressured conditions similar to real operations.

Instructors emphasized that cadets retained terminology more effectively when it appeared in simulation-based tasks rather than in isolated drills. Instructor 1 stated that "students remembered terms better when they encountered them inside realistic mission settings." This perception aligns with the view that ESP learning is most effective when embedded in authentic task environments (Dudley-Evans & St John, 1998).

Structural, Technological, and Cultural Constraints

Despite positive learning outcomes, several constraints limited the depth of AI use. The most significant barrier involved restricted internet access, which prevented the use of many cloud-based AI tools and compelled reliance on limited intranet-based applications. Cadets frequently commented that external platforms were inaccessible due to security regulations. At the same time, instructors expressed concerns regarding confidentiality and data handling, a pattern consistent with security-related limitations noted by Rashid et al. (2023).

Additionally, instructors' varying levels of AI literacy influenced the consistency of implementation. Only two instructors reported prior experience with AI-based tools, and others felt uncertain about integrating analytics into lesson planning. Cultural factors also influenced initial reactions: some cadets were hesitant to rely on automated feedback, as they viewed teacher-led correction as more familiar within the hierarchical military environment. Over time, however, most cadets reported increasing comfort as they became accustomed to AIsupported practice.

DISCUSSION

The findings of this study show that AI can significantly enhance military ESP instruction at ADAFA by strengthening cadets' mastery of technical vocabulary, improving spoken command performance, and increasing engagement through simulation-based tasks. These outcomes support existing claims that AI enables adaptive, feedback-driven, and context-specific learning (Edmett et al., 2023; He, Zhang, & Huang, 2025), while extending the literature by demonstrating how these affordances operate within a tightly regulated military environment.

A key contribution of the study is the apparent improvement in the acquisition of discipline-specific terminology. Air-defense communication relies on a narrow, high-precision lexicon, and errors in this domain can directly compromise operational clarity. The adaptive vocabulary reinforcement enabled by AI confirms He, Zhang, and Huang's (2025) argument that AI can personalize domain-specific input; however, the present findings show that personalization is not merely pedagogically beneficial but also operationally necessary. AI's ability to highlight recurring lexical errors and provide targeted review proved especially valuable in classes with wide proficiency gaps, where traditional instruction struggles to differentiate effectively.

Improvements in spoken command performance further illustrate the role of AI in supporting high-stakes communicative tasks. Military English relies on short, formulaic utterances delivered under time pressure; thus, the opportunity to rehearse commands with immediate, private feedback was highly valued by cadets. This finding aligns with Mizumoto's (2023) notion of AI as a facilitator of metacognitive regulation: cadets monitored their pronunciation accuracy, tracked progress, and self-corrected before speaking publicly. The psychological effect is noteworthy. In a hierarchical, error-sensitive environment, AI provided a low-pressure space that helped learners gain confidence, a factor rarely highlighted in civilian ESP literature but central to military communication training.

The strong engagement generated by AI-supported simulations demonstrates the importance of embedding English practice within operationally authentic contexts. While earlier studies emphasize AI's motivational benefits (Edmett et al., 2023), this study underscores the particular relevance of simulation-based learning for military tasks. By replicating radar alerts and rapid-response sequences, simulations blurred the boundary between language practice and tactical training, enabling cadets to transfer terminology and command structures more effectively. This aligns with Dudley-Evans and St John (1998), who argue that ESP is most effective when anchored in authentic communicative demands.

However, the findings also reveal institutional and technological constraints that shape AI adoption. Restricted internet access, essential for military security, limits the use of commercial AI tools, mirroring concerns raised by Rashid et al. (2023). Instructors' apprehension about data handling shows that AI solutions must be pedagogically effective while conforming to defense confidentiality standards. These requirements differentiate military ESP from civilian contexts and highlight the need for local hosting, data sovereignty, and system transparency.

Instructor readiness emerged as another mediating factor. Although instructors recognized the value of AI, uneven levels of AI literacy led to inconsistent implementation. This confirms Edmett et al.'s (2023) observation that teachers play a central role in AI-enhanced pedagogy; however, the military context amplifies this issue, as instructional practices must be standardized across cohorts. Professional development is therefore not optional but essential for sustainable integration.

Cultural expectations within military training further influenced perceptions of AI. Initial discomfort with automated feedback reflected the hierarchical norms of the institution, where instructors traditionally hold evaluative authority. Yet cadets' increasing comfort over time suggests that these reservations can be mitigated through guided exposure rather than posing a permanent barrier. This dynamic reinforces the importance of institutional alignment, a key element of the study's conceptual framework.

Overall, the findings reaffirm the pedagogical potential of AI while demonstrating that the unique demands of military contexts mediate its effectiveness. AI clearly supports more precise vocabulary learning, more confident spoken command performance, and more authentic engagement with operational tasks. Yet these benefits depend on secure infrastructures, teacher readiness, and policy-level coordination to ensure that integration is both pedagogically meaningful and institutionally feasible.

Pedagogical, Technological, and Institutional Implications

The findings offer several implications for military ESP instruction. Pedagogically, the improvements in vocabulary mastery and spoken command performance suggest that AI should be deliberately integrated into existing curricula rather than treated as optional support. Adaptive exercises can reinforce foundational competencies before cadets engage in higher-stakes communicative tasks, while AI feedback can serve as a preparatory tool to reduce anxiety in command-delivery contexts.

Technologically, the constraints identified underscore the need for secure, intranet-based AI systems tailored to defense requirements. Although external platforms are inaccessible, the positive outcomes observed with limited tools show that local systems, if equipped with adaptive feedback, vocabulary analytics, and simulation capabilities, can still yield meaningful gains. Collaboration between ESP instructors, Academy IT units, and system developers is crucial to ensure that AI platforms meet both pedagogical and security standards.

Institutionally, the variation in instructor readiness underscores the need for targeted professional development.

Training should focus on interpreting AI analytics, integrating feedback into lesson design, and managing learner interactions with AI. Additionally, clear institutional messaging is needed so cadets and instructors understand AI as a supportive tool rather than a replacement for human authority. Establishing policies on acceptable use, data protection, and instructional expectations will help ensure consistent and responsible implementation.

Together, these implications show that effective AI adoption in military ESP requires strategic pedagogical integration, robust technological safeguards, and sustained institutional support. When these conditions align, AI can meaningfully enhance linguistic readiness and contribute to more mission-oriented language training.

Proposed Framework

Building on the patterns identified in the findings and the interpretive insights presented in the discussion, this study proposes a three-layer framework for integrating AI into military ESP instruction at ADAFA. The framework is designed to respond simultaneously to the pedagogical opportunities revealed by the data and the institutional constraints inherent to a high-security military environment. Rather than treating these dimensions as separate considerations, the model conceptualizes them as interdependent layers that must operate in alignment to ensure both effectiveness and feasibility.

The first layer, pedagogical adaptation, addresses the core instructional needs identified in the findings: strengthening technical vocabulary mastery and improving spoken command performance. AI demonstrated clear advantages in these areas by providing adaptive reinforcement, individualized feedback, and simulationbased practice. Accordingly, this layer positions AI as an integrated component of the curriculum rather than a supplementary tool. Instructors can sequence AI modules in ways that mirror the communicative demands of air-defense operations: diagnostic vocabulary analytics at the beginning of instructional cycles, targeted pronunciation and command practice during the controlled practice phase, and simulation-based tasks at the application stage. Such a structure ensures that AI is embedded meaningfully within ESP pedagogy, enabling cadets to rehearse high-stakes communicative functions in a manner aligned with the authentic, task-based principles described by Dudley-Evans and St John (1998). Importantly, the framework views instructors as essential mediators, consistent with Edmett et al. (2023), who interpret AI-generated data, guide students through feedback, and contextualize machine recommendations within operational communication norms.

The second layer, technological security and infrastructure, emerges directly from the institutional and technological constraints identified in both the findings and the discussion. Given that ADAFA operates in a restricted digital ecosystem, the framework emphasizes the development of locally hosted, intranet-based AI systems capable of delivering adaptive learning without relying on external cloud services. This layer integrates military security requirements with pedagogical needs by outlining a secure architecture involving encrypted data storage, role-based access permissions, and stable offline functionality. Rather than limiting innovation, these constraints shape a technology ecosystem purpose-built for military education, one that protects sensitive information while still enabling features that cadets and instructors found most beneficial, such as pronunciation analytics, vocabulary error tracking, and scenario-based simulation. This orientation reflects Rashid et al.'s (2023) observation that effective AI integration in defense contexts requires striking a balance between functionality and confidentiality, a balance that this framework formalizes.

The third layer, institutional capacity building, responds to the cultural and organizational patterns highlighted in the discussion. Instructors' uneven AI literacy, cadets' initial hesitation, and the lack of clear institutional guidance all indicate that technological solutions alone cannot sustain long-term integration. This layer, therefore, prioritizes structured professional development, focusing on interpreting AI analytics, designing AIsupported lessons, and guiding learners' interaction with automated feedback. It also calls for the Academy to articulate explicit policies on acceptable use, data handling, and pedagogical expectations so that AI adoption does not depend on individual instructor initiative. Clear communication regarding the supportive, not evaluative, role of AI can help mitigate cultural reservations associated with hierarchical military learning environments. Finally, periodic pilot testing and iterative revisions ensure that AI tools evolve in tandem with curricular demands and institutional priorities.

In short, these three layers form a cohesive framework that aligns pedagogical practice, technological design, and institutional governance. AI integration at ADAFA will be most effective when these layers operate in concert: when adaptive learning is embedded within instruction, when secure infrastructures enable reliable use, and when institutional support fosters the confidence and competence needed for sustained innovation. The

framework, therefore, provides a structured pathway for adopting AI in a manner that is pedagogically meaningful, technologically secure, and operationally compatible with the realities of military education.

CONCLUSION

This study examined the integration of AI into English for Specific Purposes (ESP) instruction at the ADAFA in Vietnam, with a targeted focus on enhancing cadets' mastery of technical military vocabulary and improving spoken command performance. Through a mixed-method case study involving cadets and ESP instructors, the research demonstrated that AI-supported learning can meaningfully strengthen linguistic readiness in a highly regulated military environment.

The findings highlight three key outcomes. First, adaptive AI tools effectively reinforced discipline-specific terminology, enabling cadets to review and internalize core lexical items essential for operational communication. Second, AI-driven pronunciation and fluency feedback contributed to greater accuracy and confidence in spoken command delivery, helping cadets rehearse mission-critical utterances in a low-pressure environment before applying them in classroom drills. Third, simulation-based tasks increased engagement by embedding language practice within realistic operational scenarios, thereby narrowing the longstanding gap between classroom instruction and field communication.

Beyond reporting these outcomes, the study contributes to current scholarship by demonstrating how pedagogical affordances associated with AI, such as personalization, real-time feedback, and task authenticity, operate under the constraints of a military institution. The proposed three-layer framework further offers a structured model for aligning instructional design, secure technological infrastructure, and institutional policy, emphasizing that sustainable innovation depends on the interaction of these interconnected domains.

Despite its contributions, the study has certain limitations. The research was conducted within a single military academy, and the AI tools available were restricted to intranet-based systems with limited functionalities. The findings, therefore, reflect a specific institutional context and may not fully capture the potential of more advanced or cloud-based AI applications. Future studies could expand the sample across multiple military branches, examine long-term proficiency development, or explore how AI can support additional ESP competencies such as listening comprehension, written reporting, and cross-cultural communication in multinational operations. Experimental or longitudinal designs may also yield more profound insights into the developmental trajectory of AI-assisted learning over time.

In conclusion, the study affirms that AI represents a promising and feasible pathway for modernizing language training in defense settings. When guided by secure infrastructure, informed pedagogical practice, and institutional alignment, AI can play a strategic role in preparing cadets for the linguistic demands of contemporary military cooperation and technological operations.

REFERENCES

1. Akhter, E. (2022). The role of large language models (LLMs) in personalized English language instruction. International Journal of Scientific Interdisciplinary Research, 1(1), 97–128. https://doi.org/10.63125/86jf4136
2. Braun, V., & Clarke, V. (2023). Thematic analysis. In H. Cooper, M. N. Coutanche, L. M. McMullen, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), APA handbook of research methods in psychology: Research designs: Quantitative, qualitative, neuropsychological, and biological (2nd ed., pp. 65–81).
3. American Psychological Association. https://doi.org/10.1037/0000319-004
4. Chen, H. (2024). Innovative approaches in English language teaching: Integrating communicative methods and technology for enhanced proficiency. Communications in Humanities Research, 32, 214–220. https://doi.org/10.54254/2753-7064/32/20240075
5. Creswell, J. W., & Plano Clark, V. L. (2018). Designing and conducting mixed methods research (3rd ed.). SAGE Publications.

6. Dudley-Evans, T., & St John, M. J. (1998). Developments in English for specific purposes. Cambridge University Press.
7. Edmett, A., Ichaporia, N., Crompton, H., & Crichton, R. (2023). Artificial intelligence and English language teaching: Preparing for the future. British Council.
8. He, L., Zhang, X., & Huang, Y. (2025). Integration of Artificial Intelligence in English for Specific Purposes Education. Atlantis Press. https://doi.org/10.2991/978-2-38476-400-6_68
9. Mizumoto, A. (2023). Data-Driven Learning Meets Generative AI: Introducing the Framework of Metacognitive Resource Use. Applied Corpus Linguistics, 3(3), 100074. https://doi.org/10.1016/j.acorp.2023.100074
10. Rashid, A. B., Kausik, A. K., Sunny, A. A. H., & Bappy, M. H. (2023). Artificial intelligence in the military: An overview of the capabilities, applications, and challenges. International Journal of Intelligent Systems, 2023(1), Article 8676366. https://doi.org/10.1155/2023/8676366
11. Xu, H. (2024). Innovative research on college English teaching model based on artificial intelligence. Education Reform and Development, 6(9), 273–277. https://doi.org/10.26689/erd.v6i9.8313
12. Xuan Mai, L., & Thanh Thao, L. (2022). English language teaching pedagogical reforms in Vietnam: External factors in light of teachers' backgrounds. Cogent Education, 9(1). https://doi.org/10.1080/2331186X.2022.2087457

APPENDICES

Appendix A. Survey Questionnaire for Cadets Purpose:

This survey aims to explore cadets' perceptions of AI in ESP learning at the AD–AFA.
All responses are confidential and will be used solely for academic research purposes.

Instructions:

Please indicate your level of agreement with each statement below (1 = Strongly Disagree, 5 = Strongly Agree).

No.	Statement	1	2	3	4	5
1	AI-assisted exercises help me improve my English proficiency.	☐	☐	☐	☐	☐
2	AI feedback helps me correct my pronunciation and grammar effectively.	☐	☐	☐	☐	☐
3	Learning through AI makes ESP lessons more interesting and engaging.	☐	☐	☐	☐	☐
4	AI learning modules provide materials relevant to my military specialty.	☐	☐	☐	☐	☐
5	I can study English more independently with the help of AI tools.	☐	☐	☐	☐	☐
6	My motivation to learn English increases when using AI systems.	☐	☐	☐	☐	☐
7	I am confident using AI platforms for English learning.	☐	☐	☐	☐	☐
8	AI helps me apply English to professional (military) communication tasks.	☐	☐	☐	☐	☐

9	The Academy provides sufficient access to technology for AI learning.	☐	☐	☐	☐	☐
10	I want to continue learning English through AIbased systems.	☐	☐	☐	☐	☐

Demographics:

1. Year of study: ☐ 1 ☐ 2 ☐ 3 ☐ 4
2. Major: ☐ Anti-aircraft Command ☐ Radar ☐ Communications
3. English level (self-assessed): ☐ A1 ☐ A2 ☐ B1 ☐ B2

Appendix B. Interview Protocol for ESP Instructors Objective:

To collect qualitative insights into instructors' experiences, perceptions, and challenges in integrating AI into ESP teaching at ADAFA.
Interview Duration: 30–40 minutes
Format: Semi-structured, recorded with consent

Guiding Questions:

1. How do you currently use technology or AI tools in your ESP classes?
2. In your opinion, what are the main benefits of AI for ESP instruction?
3. What difficulties or institutional barriers have you encountered when applying AI in the Academy?
4. How do cadets respond to AI-assisted learning activities?
5. What kind of training or institutional support do teachers need to use AI effectively?
6. What recommendations would you make for developing a secure, military-specific AI platform?
7. How do you see the role of teachers changing in an AI-enhanced classroom?

Follow-up prompts:

- Could you give an example?
- How did you manage that situation?
- What outcomes did you notice in students' performance?

Appendix C. Ethical Approval Statement

Approval for this study was obtained from the Research Ethics Committee, ADAFA (Ref. No. ADAFAEDU-AI-2025-04).

Participation was voluntary, and all respondents provided written informed consent.

No personal or sensitive military information was collected or disclosed.