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# THE ROLE OF DIGITAL TRANSFORMATION AND ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN THE DEVELOPMENT OF FOREIGN LANGUAGE EDUCATION IN THE MILITARY SPHERE

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**Abstract:** This article examines the role of **digital transformation** and **artificial intelligence (AI)** technologies in the development of foreign language education in the military sphere. The study is based on a narrative review of recent research and international policy materials related to Military English, AI-assisted language learning, and the digital transformation of education. The reviewed literature shows that digital technologies improve the accessibility, flexibility, and continuity of military language training, while AI-based tools enhance personalization, automated feedback, pronunciation support, writing assistance, and learner engagement. These benefits are especially important in military education, where foreign language instruction must be efficient, adaptive, and closely connected to professional communication demands. The analysis also indicates that the successful use of digital transformation and AI in military foreign language education depends on more than technological availability. Their effectiveness is strongest when digital systems and AI applications are aligned with military-specific discourse, operational vocabulary, intercultural communication, and scenario-based instruction. At the same time, the literature highlights several challenges, including teacher preparedness, data privacy, ethical regulation, infrastructure quality, and the need to preserve human-centered pedagogy. Overall, the article concludes that digital transformation and AI have strong potential to modernize military foreign language education, but their long-term value depends on responsible implementation, pedagogical quality, and strategic institutional support.

**Keywords:** Digital transformation; artificial intelligence; foreign language education; military education; Military English; AI-assisted language learning; digital learning; language teaching; military communication; educational technology

## Introduction

In the context of rapid technological change, foreign language education in the military sector is undergoing a major transformation. Modern armed forces increasingly require personnel who can communicate effectively in multilingual operational environments, participate in international cooperation, interpret specialized information, and respond quickly in complex situations. For this reason, the development of foreign language education in military institutions is no longer limited to traditional classroom instruction; it is now closely connected with **digital transformation** and the use of **artificial intelligence (AI)** technologies. These innovations are reshaping both the content and the methods of military language training. Digital transformation in education refers to the systematic integration of digital tools, platforms, data-driven systems, and networked learning models into the teaching and learning process. In military foreign language education, this includes online learning environments, adaptive platforms, virtual simulations, mobile applications, digital assessment systems, and blended learning models. Such tools are especially relevant in military settings because they support

flexibility, continuity of training, individualized pacing, and access to authentic communication scenarios that may be difficult to reproduce in conventional instruction.

At the same time, artificial intelligence has emerged as one of the most influential technologies in language education. Recent research shows that AI-based systems can improve language learning through personalized feedback, automated assessment, pronunciation support, intelligent tutoring, conversational agents, and real-time correction. In foreign language instruction, AI tools are increasingly used to develop speaking, writing, listening, and vocabulary skills, while also reducing learner anxiety and increasing engagement. These advantages are particularly significant for military learners, who often need intensive, goal-oriented, and context-specific language preparation [6]. The relevance of these technologies becomes even greater in the military sphere, where foreign language competence is linked to operational interoperability, access to international doctrine, participation in joint exercises, peacekeeping missions, intelligence analysis, and diplomatic-military communication. Recent scholarship on **Military English** emphasizes that military language education is a distinct field shaped by professional terminology, high-stakes communication, intercultural competence, and institutional training needs. Therefore, the integration of AI and digital learning tools into military language education should be understood not only as a technical modernization process but also as a strategic response to new defense and security realities. [7]

However, despite the clear promise of digital transformation and AI, their effective use in military foreign language education also raises important pedagogical and ethical questions. Researchers and international organizations point to issues such as data privacy, algorithmic bias, teacher preparedness, unequal access to technologies, overdependence on automated feedback, and the need to preserve human-centered and mission-relevant instruction. UNESCO, in particular, stresses that AI in education should be implemented in ways that strengthen human agency, critical thinking, and ethical responsibility rather than replace the role of the teacher. [3] Therefore, this article examines the role of digital transformation and artificial intelligence technologies in the development of foreign language education in the military sphere. It aims to analyze how these technologies influence language teaching methods, learner outcomes, and institutional training strategies, while also identifying the opportunities and challenges associated with their implementation in military education. [1]

## Methods

This article was prepared as a **narrative literature review** examining the role of digital transformation and artificial intelligence technologies in the development of foreign language education in the military sphere. The purpose of the study was to identify the main pedagogical, technological, and strategic trends discussed in recent academic and institutional literature on military language education, AI-assisted language learning, and digital transformation in education. A narrative review design was chosen because it allows the integration of findings from different but closely related fields into a single analytical framework.[4] The literature analyzed in this article included peer-reviewed journal articles, review studies, and international policy documents related to three main thematic areas: **military foreign language education**, **digital transformation in education**, and **artificial intelligence in language learning**. Priority was given to recent sources that addressed online learning platforms, adaptive systems, intelligent tutoring, automated assessment, Military English, and digital strategies for modern educational institutions. Official materials from UNESCO were also considered because they

provide an important conceptual and ethical framework for the implementation of digital and AI-based educational tools.[8]

The selected materials were examined through a **thematic analysis**. First, the literature was grouped according to its primary focus: studies on military language education formed one category, studies on AI in second or foreign language learning formed another, and documents on digital transformation and policy guidance formed a third category. Second, the findings were interpreted in relation to their reported contribution to foreign language learning outcomes, such as personalization, speaking development, writing support, assessment efficiency, learner engagement, and professional communication readiness. This structure made it possible to compare how digital systems and AI tools contribute to language education in military contexts. In addition, this review considered the **institutional and ethical dimensions** of technology use in military education. Particular attention was given to issues such as teacher preparedness, data privacy, responsible AI use, access to digital infrastructure, and the need to align language training with mission-specific and professional communication demands. These aspects were included because the application of AI and digital transformation in military foreign language education is not only a methodological issue, but also an organizational and strategic one. [9]

Thus, the Methods section is based on the structured review and interpretation of existing literature rather than on direct experimental data collection. This approach is appropriate for an IMRAD-style theoretical article because it provides a research-based foundation for understanding how digital transformation and artificial intelligence are influencing foreign language education in the military sector, while also preparing the basis for the discussion of the main findings and their practical implications.

**Results**

The reviewed literature shows that **digital transformation** and **artificial intelligence** have a clear positive influence on the development of foreign language education in the military sphere. Across the analyzed sources, the most frequently reported benefits were greater flexibility of instruction, more personalized learning, faster feedback, improved access to authentic materials, and stronger alignment between language training and professional military communication needs. In military language education, digital platforms and AI tools were described not simply as supplementary resources, but as mechanisms that can modernize the structure, delivery, and assessment of foreign language training.One major result is that **digital transformation expands the organizational capacity** of military foreign language education. Online platforms, blended learning models, mobile systems, and simulation-based instruction make it possible to continue language training across different locations and schedules, which is especially important in military institutions where training conditions may be dynamic and operationally constrained. UNESCO's recent work on digital transformation also emphasizes that effective digital education depends on system-level elements such as infrastructure, policy, capacity building, and data use, all of which are relevant to military educational institutions seeking scalable and sustainable language programs.

A second major finding is that **AI-supported language learning improves learning outcomes** in measurable ways. Recent meta-analytic evidence indicates that AI interventions have a significant positive effect on second-language learning outcomes, with benefits reported in areas such as speaking, writing, pronunciation, vocabulary development, and feedback quality.

Systematic reviews further show that AI tools such as conversational agents, speech-recognition systems, intelligent tutors, and writing assistants can reduce learner anxiety, provide immediate correction, and support individualized practice. These features are especially valuable for military learners, who often require intensive, accurate, and mission-oriented language preparation within limited timeframes.[5] The literature also indicates that **military foreign language education has specific professional requirements** that make digital and AI tools especially relevant. The recent scoping review of Military English research describes the field as a specialized area shaped by interoperability, professional terminology, high-stakes communication, and institution-specific training needs. This suggests that AI and digital systems are particularly useful when they are adapted to military discourse, scenario-based exercises, operational vocabulary, and international cooperation tasks rather than used in a generic way. In other words, the effectiveness of technology in military language education depends on its alignment with the communication realities of military service. [1]

At the same time, the review reveals several **limitations and implementation challenges**. The positive effects of AI and digital learning are influenced by contextual factors such as learner level, teacher readiness, instructional design, access to infrastructure, and ethical governance. UNESCO materials and recent reviews highlight concerns about privacy, bias, responsible use, and the need to preserve human agency in AI-supported education. Therefore, although the general trend is strongly positive, successful integration in military language education requires not only technological investment but also pedagogical training, ethical safeguards, and institutional planning. [3], [5]

**Table 1. Main results on digital transformation and AI in military foreign language education**

| Factor | Main educational function | Reported outcomes |
|---|---|---|
| Digital transformation | Expands access, flexibility, and continuity of instruction | Blended learning, remote access, scalable training, improved institutional coordination |
| Online and digital platforms | Support delivery of content and assessment | Individual pacing, access to authentic materials, continuous learning |
| AI conversational agents and tutors | Provide interactive language practice | Better speaking practice, immediate feedback, reduced anxiety |
| Speech recognition and writing support | Improve language accuracy | Pronunciation support, writing correction, faster feedback |
| Military-specific digital language training | Aligns learning with operational communication needs | Improved professional terminology, scenario-based readiness, interoperability support |
| Ethical and | Guide responsible | Better teacher preparedness, safer |

| Factor | Main educational function | Reported outcomes |
|---|---|---|
| institutional frameworks | implementation | AI use, stronger policy alignment |

Overall, the results demonstrate that digital transformation and AI technologies have substantial potential to strengthen foreign language education in the military sphere. Digital systems improve the structure and accessibility of training, while AI enhances personalization, efficiency, and learner support. However, the evidence also shows that the success of these tools depends on context-sensitive implementation, professional alignment, and responsible educational governance.

**Discussion**

The findings of this review indicate that digital transformation and artificial intelligence are becoming strategically important in the development of foreign language education in the military sphere. Their significance lies not only in technological modernization, but also in their ability to respond to the specific demands of military communication, including interoperability, rapid information exchange, professional terminology, and participation in multinational operations. In this regard, digital and AI-based tools should be viewed as instruments that support both educational quality and institutional readiness. One of the main implications of the results is that digital transformation improves the organizational and pedagogical structure of military language education. Digital platforms, blended learning systems, and online resources make training more flexible and accessible, which is especially valuable in military institutions where schedules, deployment conditions, and operational priorities may limit conventional classroom instruction. These tools also allow language learning to continue beyond the physical classroom and support more individualized pacing, which can increase learning efficiency for cadets and officers with different language backgrounds and professional needs. [3]

The discussion also shows that artificial intelligence has particular value because it enhances personalization in language learning. AI-based systems can provide immediate feedback, adapt tasks to learner performance, support pronunciation practice, and automate certain aspects of assessment. Such functions are especially important in military language training, where learners often need fast, targeted, and performance-oriented instruction. Meta-analytic and review evidence suggests that AI can positively influence foreign language outcomes, particularly in speaking, writing, and vocabulary learning, while also improving learner engagement and reducing anxiety. [6]

Another important point is that the effectiveness of these technologies in the military sphere depends on their adaptation to military-specific contexts. Military foreign language education differs from general language instruction because it includes mission-related vocabulary, formal command structures, intercultural coordination, and high-stakes professional communication. Therefore, digital tools and AI applications are most useful when they are designed or selected to reflect authentic military scenarios, operational discourse, and the communicative needs of defense personnel. This means that technology alone does not guarantee quality; relevance to military practice is equally essential.At the same time, the review highlights several limitations and concerns. The use of AI and digital technologies in education raises questions about data

privacy, algorithmic bias, teacher preparedness, unequal access to infrastructure, and possible overreliance on automated systems. In military education, these concerns may be even more sensitive because of institutional security requirements and the importance of accurate, ethically responsible communication training. International guidance emphasizes that AI should support, not replace, teacher judgment and human-centered pedagogy. Therefore, successful implementation requires not only technical adoption but also ethical oversight and instructor competence.[9]

The discussion further suggests that teacher training is a decisive factor in the successful integration of digital transformation and AI into military language education. Even highly advanced tools may have limited educational value if instructors are not prepared to use them critically and pedagogically. Teachers need competence not only in operating digital systems, but also in selecting appropriate AI-supported tasks, interpreting automated feedback, and integrating technology into mission-relevant language instruction. As a result, institutional professional development should be considered a core component of digital transformation in military education.Overall, this discussion confirms that digital transformation and artificial intelligence offer substantial opportunities for strengthening foreign language education in the military sector. They improve access, flexibility, personalization, and practical relevance, all of which are highly valuable in professional military training. However, their long-term success depends on careful pedagogical design, ethical regulation, teacher readiness, and close alignment with the communicative realities of military service. Thus, the role of these technologies should be understood as both innovative and strategic in the modernization of military foreign language education. [1]

**Conclusion**

In conclusion, digital transformation and artificial intelligence technologies play an increasingly important role in the development of foreign language education in the military sphere. The reviewed literature shows that digital tools improve the accessibility, flexibility, and continuity of language instruction, while AI-based systems enhance personalization, immediate feedback, and learner engagement. These advantages make technology especially valuable in military education, where language training must be efficient, adaptive, and closely connected to professional communication needs. The findings also indicate that the effectiveness of these technologies depends not only on technical availability but also on their pedagogical and professional relevance. In military foreign language education, digital platforms and AI applications are most useful when they support authentic military discourse, operational terminology, intercultural communication, and scenario-based learning. Therefore, the integration of these technologies should be understood as a strategic educational process rather than as a simple technological upgrade.

At the same time, successful implementation requires careful attention to teacher readiness, ethical standards, data security, and institutional support. The literature emphasizes that AI should strengthen, not replace, human-centered teaching and mission-oriented instruction. Overall, digital transformation and artificial intelligence have strong potential to modernize military foreign language education, but their long-term success will depend on responsible use, pedagogical quality, and alignment with the real communicative demands of the military profession.

**References**

[1] Sirocka M, Bieswanger M, Kic-Drgas J, Kocianova N, Tykvová T. **Military English language education: a scoping review of 30 years of research.** *The Language Learning Journal.* 2024.

[2] UNESCO. **Digital learning and transformation of education.** 2025.

[3] UNESCO. **Artificial intelligence in education.** 2026.

[4] Wang X, Zhang Y, Wang Y. **Artificial Intelligence in L2 learning: A meta-analysis of contextual and instructional factors.** *System.* 2024.

[5] Alkhaldi A, Aljohani N, Alshehri A, et al. **Artificial Intelligence in Language Education: A Systematic Review of Research from 2015 to 2024.** 2025.

[6] **Effectiveness of Artificial Intelligence (AI) in language teaching.** *System.* 2025.

[7] **Investigating the integration of artificial intelligence in English as a foreign language in higher education.** *Heliyon.* 2024.

[8] UNESCO. **Artificial Intelligence and the Futures of Learning.** Updated 2024.

[9] UNESCO. **Artificial intelligence in education: UNESCO advances key competencies for teachers and learners.** 2026.