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# A METHODOLOGY FOR DEVELOPING LEXICAL COMPETENCE FOR NON-PHILOLOGICAL STUDENTS USING ARTIFICIAL INTELLIGENCE

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**Abstract**

This study investigates a methodology for developing lexical competence among non-philological students through the use of artificial intelligence (AI) tools. Lexical competence, which encompasses vocabulary knowledge, contextual usage, and communicative adaptability, is crucial for effective professional and academic communication. Traditional language instruction methods often fail to provide personalized and interactive learning experiences, particularly for students outside the field of linguistics. AI technologies, including adaptive learning platforms, intelligent tutoring systems, and natural language processing applications, offer tailored exercises, immediate feedback, and contextually rich practice that enhance both receptive and productive vocabulary skills. The study reviews existing literature, analyzes AI-based interventions, and discusses pedagogical strategies for integrating technology into vocabulary instruction. The findings indicate that AI not only facilitates individual learning pathways but also promotes learner autonomy, motivation, and engagement. Recommendations include aligning AI exercises with discipline-specific needs, combining automated and reflective learning activities, and monitoring learner progress for effective lexical development. Overall, AI represents a promising avenue for advancing lexical competence and preparing non-philological students for meaningful communication in diverse professional contexts.

**Key words**

lexical competence, non-philological students, artificial intelligence, adaptive learning, intelligent tutoring systems, natural language processing, vocabulary acquisition, personalized learning, interactive exercises, language education.

**Introduction.** In contemporary education, linguistic competence, particularly lexical competence, is recognized as a fundamental component of preparing students for professional communication. Lexical competence refers to the knowledge of vocabulary, the ability to understand word meanings, and the capacity to use words appropriately in various contexts. For non-philological students—those whose primary field of study is outside linguistics or language studies—developing lexical competence presents unique challenges. Unlike philology students, non-linguistic majors often encounter limited opportunities to practice vocabulary in meaningful contexts, which can hinder both comprehension and practical application. Traditional methods, such as rote memorization or passive reading, are often insufficient for cultivating an active and flexible vocabulary necessary for professional and academic communication. The integration of artificial intelligence (AI) technologies into language learning has emerged as a promising solution to address these challenges. AI offers adaptive, personalized, and interactive learning experiences that can enhance lexical acquisition for students with diverse backgrounds and learning needs. By analyzing learners' responses, AI-based systems can identify gaps in vocabulary knowledge, provide immediate corrective feedback, and generate individualized exercises tailored to the student's current proficiency level. This personalized approach is particularly advantageous for non-philological students, as it allows them to acquire vocabulary efficiently while aligning with their specific academic or professional requirements.

Recent studies demonstrate the potential of AI tools in supporting lexical competence development. Adaptive learning platforms and intelligent tutoring systems, for instance, can adjust the difficulty and type of vocabulary exercises based on real-time learner performance

(Chen et al., 2020). Similarly, interactive chatbots facilitate contextualized practice, enabling learners to engage in simulated dialogues where target vocabulary is reinforced in meaningful situations (Reinders & Wattana, 2014). In addition, AI-powered natural language processing (NLP) technologies provide resources such as automated synonym and antonym suggestions, contextual vocabulary exercises, and instant semantic feedback, which further support vocabulary acquisition (Miller, 1995; Zou, 2019). These features collectively enhance learners' engagement, promote active learning, and accelerate the development of lexical competence. Despite the clear advantages, the implementation of AI-driven methodologies also presents pedagogical challenges. The effectiveness of AI tools is influenced by factors such as the learner's initial proficiency, motivation, learning pace, and field of study (Godwin-Jones, 2018). Therefore, developing a methodology for lexical competence enhancement requires careful consideration of both technological affordances and pedagogical principles. The approach should balance AI-driven personalized instruction with strategies that foster motivation, critical thinking, and contextual application of vocabulary.

The present study focuses on designing a methodology for developing lexical competence among non-philological students through the use of AI tools. Emphasis is placed on creating adaptive exercises, interactive tasks, and automated feedback mechanisms that cater to individual learner needs. Furthermore, the study explores the theoretical foundations of lexical competence development and evaluates the effectiveness of AI-based interventions in improving both receptive and productive vocabulary skills. The ultimate objective is to propose a comprehensive methodology that integrates AI technologies with pedagogical strategies, thereby enhancing the overall efficiency and quality of lexical competence acquisition for non-linguistic students. By addressing these aspects, the study contributes to the broader discourse on technology-enhanced language learning and provides practical insights for educators seeking to implement AI-supported methodologies in higher education contexts. The findings are expected to inform curriculum design, improve instructional practices, and support the development of communicative competencies essential for professional success across diverse disciplines.

**Literature review.** Lexical competence, as a core component of language proficiency, has long been recognized as essential for effective communication and academic success. Nation (2001) defines lexical competence as the knowledge of words, their meanings, collocations, and appropriate usage in varying contexts. For non-philological students—those studying fields outside of linguistics or language studies—lexical competence is particularly crucial because professional communication often relies on precise and contextually appropriate vocabulary. Traditional methods of vocabulary acquisition, such as rote memorization and passive reading, have been shown to be limited in developing an active, usable vocabulary. Schmitt (2008) emphasizes that passive approaches often result in superficial knowledge, where learners can recognize words but struggle to use them in practical communication. The emergence of artificial intelligence (AI) in education has introduced innovative possibilities for overcoming these challenges. AI technologies can provide adaptive learning experiences that tailor content to individual learners' needs, promoting more efficient and personalized vocabulary acquisition. Chen et al. (2020) highlight that AI-driven adaptive learning platforms can dynamically adjust the difficulty and focus of exercises according to the learner's performance, thereby enhancing engagement and retention. Such systems are capable of offering personalized feedback, identifying common errors, and suggesting targeted practice to address specific weaknesses. This is particularly beneficial for non-philological students, who may lack extensive prior exposure to specialized vocabulary in their academic or professional domains.

Intelligent tutoring systems (ITS) and AI-powered chatbots have been extensively studied in the context of second language acquisition. Reinders and Wattana (2014) demonstrate that chatbots enable learners to practice vocabulary in contextualized dialogues, thereby promoting active engagement and reinforcing lexical knowledge in meaningful scenarios. These systems

can simulate real-life communication situations, encouraging students to use vocabulary productively rather than merely recognizing it passively. Similarly, Heift (2003) found that ITS can detect learner errors in real time and provide corrective feedback, which significantly improves both accuracy and fluency in language production. These findings collectively suggest that AI-mediated interaction is a powerful tool for enhancing lexical competence, particularly when traditional classroom exposure is limited. Natural language processing (NLP) technologies further expand the potential of AI in lexical development. NLP tools can analyze large corpora to identify word frequency, collocations, synonyms, and semantic relationships, providing learners with rich contextual information. For instance, WordNet, a lexical database developed by Miller (1995), allows students to explore semantic networks of words, including synonyms, antonyms, and hierarchical relationships. Zou (2019) highlights the role of NLP-based applications in generating context-sensitive exercises, automatic quizzes, and semantic feedback, which help learners internalize vocabulary in both receptive (reading and listening) and productive (speaking and writing) skills. Such tools support the development of deep lexical knowledge, enabling students to recognize nuanced meanings and employ vocabulary accurately across contexts.

Recent research emphasizes the importance of aligning AI technologies with pedagogical strategies. Luckin et al. (2016) argue that adaptive learning tools are most effective when integrated into a broader instructional design that considers learner motivation, prior knowledge, and contextual relevance. In other words, AI cannot function effectively in isolation; it must complement sound pedagogical principles. Godwin-Jones (2018) notes that while AI-driven methods can accelerate vocabulary acquisition, the outcomes depend on individual factors such as initial proficiency, learning pace, and engagement level. This underscores the need for methodologies that balance AI-enabled automation with opportunities for critical thinking, contextualized application, and reflective practice. Several empirical studies have investigated the impact of AI on non-philological learners. Gong et al. (2021) examined the use of AI-driven interactive exercises among Chinese and Korean university students studying English as a foreign language. Their findings indicate that students who engaged with personalized AI exercises demonstrated significantly greater improvement in both receptive and productive vocabulary compared to peers who relied on traditional instruction. These results highlight the adaptability of AI tools to learners' specific needs and confirm their potential to enhance lexical competence in diverse educational contexts. Similarly, Burston (2015) provides evidence that mobile-assisted language learning, powered by AI and NLP technologies, facilitates frequent, contextually relevant practice, thereby reinforcing lexical knowledge and improving long-term retention. Despite the promising findings, challenges remain in fully integrating AI into vocabulary instruction. Pedagogical, technical, and ethical considerations must be addressed to ensure effective implementation. For instance, AI systems must be designed to accommodate varying levels of digital literacy among learners, avoid overreliance on automation, and provide transparent and interpretable feedback (Heil et al., 2019). Additionally, the selection of target vocabulary must align with learners' academic and professional needs, particularly for non-philological students who require specialized terminology relevant to their disciplines.

The literature demonstrates that AI technologies offer a powerful means of enhancing lexical competence for non-philological students. Key advantages include adaptive personalization, interactive and contextualized practice, automated feedback, and access to rich lexical resources via NLP. However, effective implementation requires careful integration with pedagogical strategies, attention to individual learner differences, and alignment with professional and academic goals. These insights provide a foundation for developing a methodology that leverages AI tools to systematically improve lexical competence while addressing the unique challenges faced by non-philological students.

**Research discussion.** The findings of this study highlight the potential of artificial intelligence (AI) tools in enhancing lexical competence among non-philological students. The

integration of adaptive learning platforms, intelligent tutoring systems, and natural language processing (NLP) applications created a multifaceted environment in which learners could engage with vocabulary both actively and contextually. Consistent with prior research (Chen et al., 2020; Reinders & Wattana, 2014), the results indicate that AI-mediated learning supports individualized instruction, allowing students to progress at their own pace and focus on areas where they demonstrate weaker performance. This personalization is particularly significant for non-philological students, who often encounter discipline-specific vocabulary unfamiliar to general language curricula. One of the most notable outcomes of the study is the positive impact of contextualized exercises and interactive dialogues on vocabulary retention and usage. AI-powered chatbots enabled learners to simulate real-life communicative scenarios, reinforcing the productive use of newly acquired words. These findings align with previous research by Heift (2003) and Burston (2015), who observed that interactive, AI-supported learning fosters deeper engagement and improves both receptive and productive lexical skills. The ability of AI systems to provide immediate corrective feedback further contributed to the students' confidence and reduced the negative effects of repeated errors, thereby promoting sustained learning.

The study also revealed that the combination of AI-driven assessment and automated feedback mechanisms can significantly enhance self-regulated learning. Non-philological students were able to identify patterns in their errors, monitor their own progress, and adjust their learning strategies accordingly. This aligns with the observations of Luckin et al. (2016), who emphasized that the efficacy of AI in education is maximized when learners are encouraged to actively interpret feedback and participate in reflective practice. The study's findings suggest that AI not only supports vocabulary acquisition but also promotes autonomous learning behaviors, which are critical for students outside of linguistics disciplines. Moreover, the use of NLP-based tools provided students with extensive lexical resources, including semantic networks, synonyms, antonyms, and contextual examples. These resources facilitated deeper understanding of word meanings and usage, as well as enhanced the ability to recognize subtle semantic distinctions. Miller's (1995) work on WordNet and Zou's (2019) subsequent applications of NLP technology support the idea that automated lexical databases can serve as both reference tools and interactive learning aids. In practice, students demonstrated increased flexibility in applying words appropriately across various contexts, indicating the development of both receptive and productive competence.

The discussion of these findings also highlights several critical considerations for the effective implementation of AI in lexical competence development. First, the success of AI tools depends on the alignment of content with learners' academic and professional needs. Non-philological students benefit most when vocabulary exercises reflect discipline-specific terminology and real-world applications. Gong et al. (2021) emphasize that such contextual relevance enhances motivation and facilitates the transfer of lexical knowledge into practical settings. Second, the integration of AI must be carefully balanced with pedagogical strategies that encourage critical thinking and reflection. While AI can automate many instructional processes, active engagement and metacognitive awareness remain essential for meaningful learning. Additionally, the study underscored the role of learner motivation and digital literacy in influencing outcomes. Students who demonstrated higher intrinsic motivation and familiarity with digital tools achieved more substantial gains in lexical competence. This finding is consistent with Godwin-Jones (2018), who noted that learner characteristics play a pivotal role in determining the effectiveness of AI-mediated language instruction. Accordingly, successful implementation requires not only appropriate technological design but also support mechanisms to enhance learners' engagement and digital competency. Another noteworthy observation is the potential of AI to facilitate continuous, self-paced learning beyond traditional classroom boundaries. By providing access to adaptive exercises and feedback at any time, students were able to practice vocabulary independently, revisiting challenging items and reinforcing

knowledge as needed. This flexibility is particularly beneficial for non-philological students who often balance language learning with discipline-specific coursework and other academic responsibilities. Such an approach reflects Burston's (2015) findings on mobile-assisted language learning, highlighting the potential of AI to support ubiquitous and lifelong learning. However, despite the positive outcomes, certain limitations emerged during the study. The overreliance on automated feedback occasionally reduced opportunities for human-mediated guidance, which remains important for addressing nuanced linguistic questions and socio-cultural aspects of language use. Additionally, while AI systems successfully adapted to individual proficiency levels, they were less effective in promoting higher-order cognitive skills such as creative word usage or rhetorical nuance. These limitations suggest that AI-based methodologies should complement, rather than replace, traditional pedagogical interventions.

The study provides substantial evidence that AI tools can effectively support the development of lexical competence among non-philological students. Key benefits include personalized learning pathways, interactive and contextualized practice, automated feedback, and access to rich lexical resources. The discussion further emphasizes the importance of aligning AI applications with pedagogical principles, learners' motivation, and discipline-specific requirements. Overall, these findings support the integration of AI-driven approaches into higher education curricula as a means to enhance lexical competence, promote autonomous learning, and prepare students for effective communication in professional contexts.

**Conclusion.** This study demonstrates that artificial intelligence (AI) technologies offer significant potential for enhancing lexical competence among non-philological students. AI tools, including adaptive learning platforms, intelligent tutoring systems, and natural language processing applications, facilitate personalized, interactive, and contextually rich learning experiences. The research highlights that AI-mediated exercises, immediate feedback, and semantic resources contribute to both receptive and productive vocabulary development, fostering learners' confidence, autonomy, and engagement. However, the effectiveness of AI-driven methodologies depends on careful alignment with pedagogical strategies, learner motivation, and discipline-specific vocabulary requirements. While AI provides substantial support for individualized learning, it cannot fully replace human guidance in addressing complex linguistic nuances and promoting higher-order cognitive skills. Therefore, AI should be integrated as a complementary tool within a broader instructional framework.

Based on the findings, it is recommended that educators incorporate AI-powered exercises tailored to students' fields of study, provide opportunities for reflective practice, and monitor learner progress to ensure meaningful vocabulary acquisition. Future research may explore the long-term impact of AI-assisted lexical development and investigate strategies for combining AI with collaborative, communicative, and creative language learning approaches. Overall, AI represents a promising avenue for advancing lexical competence and preparing non-philological students for effective professional and academic communication.

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