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A Systematic Review of AI-Powered Language Teaching Trends, Innovations, and Challenges

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The integration of artificial intelligence (AI) into foreign language teaching has revealed significant disparities in global innovation and accessibility, necessitating systematic analysis. This systematic literature review analyzed 88 studies (2019–2024) from Scopus, Web of Science, and ProQuest. Geographically, AI development is concentrated in Asia (particularly China and West Asia), shifting from the previous U.S. dominance. Text- and audio-based tools dominate pedagogical practice, focusing overwhelmingly on productive skills (speaking and writing) and English-language instruction, marginalizing linguistic diversity. Stakeholders reflect dual perceptions: teachers acknowledge administrative efficiency but cite digital literacy gaps and content accuracy concerns; students report reduced anxiety yet criticize AI's inability to grasp socio-cultural nuances and highlight dependency risks. Pedagogically, AI aligns with social constructivism (adaptive scaffolding) and Self-Determination Theory (motivation gains), although limitations in human interaction depth persist. Three multidimensional challenges emerge: (1) inter-country research-policy disparities, (2) pedagogical risks (dehumanization and over-reliance), and (3) infrastructure access asymmetry. This study contributes to the global landscape mapping of AI trends, validates pedagogical synergies, and offers evidence-based frameworks for policymakers (equitable research), educators (blended learning), and developers (context-responsive multilingual tools). Strategic implications urge developing regions to strengthen inclusive frameworks through international collaboration to prevent epistemic inequalities.

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Public Interest Statement

This study explores how artificial intelligence (AI) is transforming global foreign language education, revealing both the opportunities and inequities. By systematically reviewing research from 2019 to 2024, it maps emerging trends, regional gaps, and pedagogical implications. The findings highlight that while AI improves personalization and engagement in language learning, unequal access and cultural bias risk widening the educational divide. This study provides insights for educators, policymakers, and developers to foster inclusive, ethical, and context-sensitive AI integration in language teaching, ensuring that technological progress supports—not replaces—human interaction in learning.

Introduction

Artificial Intelligence (AI) has garnered global attention across various fields, including education, owing to its tremendous potential to revolutionize teaching and learning. In the context of language instruction, AI offers numerous innovations that can transform how we learn and teach various foreign languages (Kohnke et al., 2023), such as English (Wei, 2023), Arabic (Alazzam et al., 2023a), and Mandarin (Jiang et al., 2023a). It enhances language

teaching by improving personal learning experiences, including interactive practice in speaking, writing, reading, listening, and assessment (Barrot, 2023). The significant increase in AI technology applications in this field demonstrates that AI is no longer just a concept of the future but a reality.

Despite the rapid adoption of AI in language teaching, this technology presents various challenges and concerns. The use of AI raises questions about the reliability of this technology, its impact on the quality of human interaction in teaching, and the potential biases that may arise (Holmes et al., 2019). Additionally, there are concerns that the use of AI in foreign language classrooms might disrupt learners, as it is not fully integrated into the current educational system (Maksimova et al., 2023), and may hinder tutors who have not received adequate training to use AI effectively (M. Liu, 2023). Privacy concerns, potential biases in algorithms, and technical and operational issues are some aspects that require serious consideration (Hockly, 2023). AI technology can collect and analyze large amounts of student data, posing privacy risks (L. Huang, 2023). Moreover, unconscious biases in AI algorithms can influence the decisions or recommendations generated, potentially exacerbating educational inequality (Shin and Shin, 2023). In one case, to address concerns about AI in the classroom, the New York City Department of Education blocked access to ChatGPT on school devices (Elsen-Rooney, 2023). Additionally, The Guardian reported that some universities in Australia reverted to conventional exams after students used ChatGPT to write essays (Striepe et al., 2023).

Research on the utilization of AI in education is increasingly being conducted in various countries, such as China (X. Yang, 2019), India (Sandu & Gide, 2019), Saudi Arabia (Almurayh, 2021), Vietnamese (Duong & Suppasetseree, 2024), Africa (Oyelere et al. 2022), American, Spanish, Portugal (Bhutoria, 2022; Guerreiro-Santalla et al. 2023), and also the Czech Republic (Belda-Medina & Kokošková, 2023). Meanwhile, implementing AI in foreign language teaching is also becoming a research focus. For instance, Kim et al. (2021) have shown that AI utilization can enhance reading skills; El Shazly (2021) examined AI and foreign language anxiety; and Sanosi (2022) Studied AI's impact on improving students' writing performance.

Integrating artificial intelligence (AI) in foreign language teaching has been the research focus in various countries, such as China, India, Saudi Arabia, Vietnam, Africa, the United States, Spain, Portugal, and the Czech Republic. However, the existing literature is fragmented and does not provide a comprehensive overview of AI use in this context. Several critical research gaps have been identified in the use of AI in foreign language teaching. *First*, most studies focused solely on applying AI to English teaching. In contrast, other international languages of global significance have received little attention. This limits the understanding of linguistic inclusivity and the potential adaptation of AI technology in diverse language contexts. *Second*, there has been no systematic mapping of countries actively adopting AI in foreign language teaching, the types of AI tools that are predominantly used, and their relevance to developing specific language skills (e.g., speaking, writing, and cultural understanding). *Third*, aspects of user perception (such as educators, students, and developers) and systematic challenges (technical, pedagogical, and ethical) in AI implementation have not been thoroughly investigated. These factors are crucial to ensure the integration of AI that is sustainable, equitable, and aligned with the educational needs.

This study aims to conduct a comprehensive systematic literature review to address critical gaps in the integration of artificial intelligence (AI) in foreign language teaching. It seeks to map the utilization of AI across various countries, identifying the types of AI tools employed and their relevance to developing specific language skills, while exploring applications beyond English language teaching to promote linguistic inclusivity. Additionally, this study investigates the perceptions of stakeholders, including educators, students, and developers, to understand their attitudes and the challenges faced during AI implementation, encompassing technical, pedagogical, and ethical dimensions. Ultimately, this research aspires to synthesize findings to provide actionable recommendations for effective, equitable, and sustainable AI integration in language education, contributing to a deeper understanding of AI's role in enhancing language learning experiences. Based on these objectives, the research questions of this study are as follows:

> RQ1: What are the recent global trends in the development of AI for foreign language teaching, particularly regarding geographical distribution, categories of AI tools, and targeted language skills?
>
> RQ2: What perceptions have stakeholders (teachers, students, developers) reported regarding the use of AI in teaching foreign languages, and what challenges are hindering its implementation?
>
> RQ3: To what extent are AI tools used in teaching foreign languages aligned with pedagogical frameworks (e.g., constructivist or task-based approaches) and ethical standards (such as transparency, accessibility, and fairness)?

Methods

This study employed a systematic literature review (SLR) based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol. The researcher used the updated PRISMA checklist by Page et al.

(2021) to ensure the quality of this study. Jesson et al. (2011) explain that this method, developed in evidence-based practice, involves explicit steps that must be well-documented to ensure transparency and replicability. Using the PRISMA-based SLR approach, the following steps will be undertaken: formulating the research questions, followed by the search strategy, determining the inclusion and exclusion criteria, and finally, assessing the quality and extracting the data (Jesson et al. 2011).

Search strategy

This research employed the Scopus, Web of Science, and ProQuest databases, which are recognized for their high indexing standards (Ahmed & Hussein, 2023; Stuart & Petersen, 2022), focusing on journal articles from 2019 to 2024 while excluding proceedings and book chapters. Articles were filtered using specific terms— "artificial intelligence" or "AI" and "language teaching" or "language education"—to ensure relevance to AI's role in language education, with non-relevant studies excluded. To ensure the quality of the articles, researchers specifically selected journal articles derived from original research rather than review articles, including systematic literature reviews (SLR), traditional reviews, bibliometric reviews, and book reviews. This approach aims to gather contextual data pertinent to the application of artificial intelligence in language teaching.

Based on the search process outlined, 808 articles were identified from various databases. From 808 identified articles (Scopus: 623, Web of Science: 73, ProQuest: 112), 364 duplicates and 46 irrelevant records were removed using automation tools. A total of 398 articles were screened for eligibility. After title/abstract screening, 260 articles were excluded for mismatched criteria, leaving 138 articles for eligibility assessment. Fifty articles were inaccessible, resulting in 88 full-text evaluations. After evaluation, 50 articles were excluded for irrelevance, and 38 articles were included in the final synthesis. The process is visualized in a PRISMA flow diagram (Figure 1), adapted from Haddaway et al. (2022). This detailed breakdown ensures clarity in the systematic approach from the initial identification to the final inclusion of studies, as depicted in Figure 1.

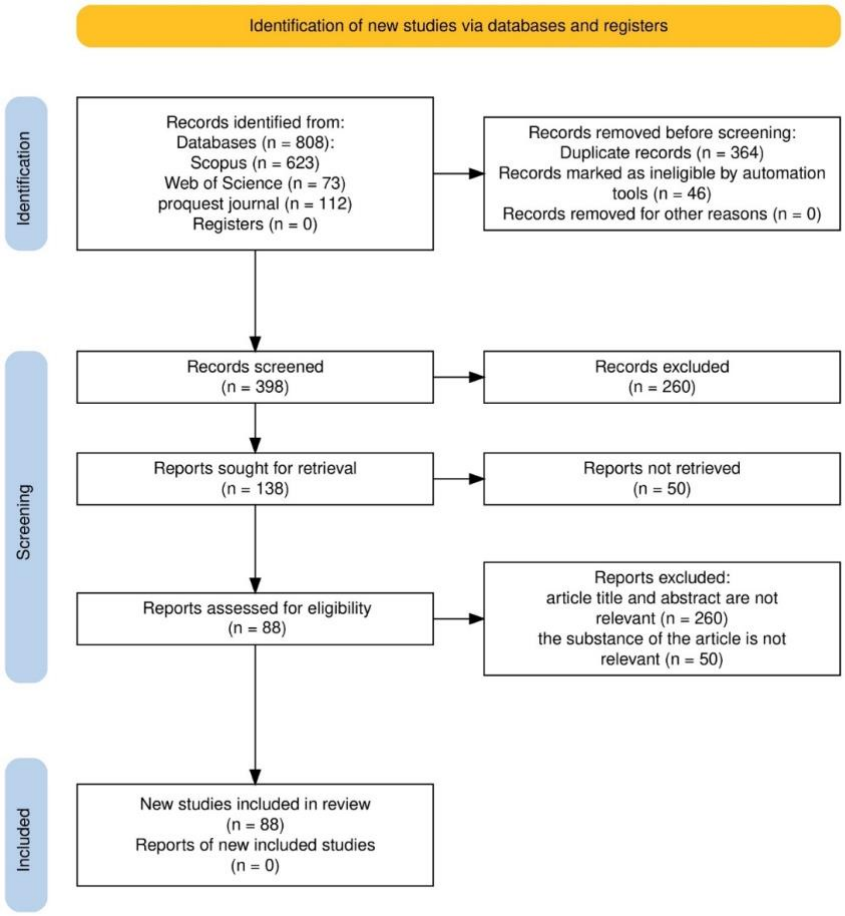

Figure 1. Data extraction by following Prisma flow charts

Data Extraction and Synthesis

Data extraction was systematically conducted using a structured template focusing on five core dimensions: (1) basic information (authors, publication year, country, and target language), (2) AI tools employed (e.g., chatbots, adaptive

systems), (3) targeted language skills (e.g., speaking, writing), (4) reported user perceptions and implementation challenges, and (5) alignment with pedagogical frameworks. For synthesis, a dual-method approach was applied: quantitative analysis mapped the frequency and distribution of AI tools across regions and language skills, revealing trends such as the prevalence of NLP-driven tools in English-focused contexts. The thematic qualitative analysis, supported by NVivo 12, identified patterns in user perceptions (e.g., enthusiasm for AI's efficiency versus concerns about its limitations) and systemic challenges (e.g., algorithmic bias and infrastructure gaps). The integration of the findings highlighted key technological disparities and skill prioritization, offering insights into how AI is currently shaping language education. *A list of all selected and reviewed articles is provided in Appendix 1 to ensure research transparency and replicability.*

Quality assessment

Quality assessment was conducted by two independent reviewers from the author team. Articles were retrieved from the Scopus, Web of Science, and ProQuest databases, focusing on studies published between 2019 and 2024, and screened according to pre-established inclusion and exclusion criteria.

Following an initial screening of the titles and abstracts, each reviewer independently classified the articles as included or excluded. Any discrepancies were resolved through discussion among the reviewers and, when necessary, consultation with other co-authors to reach a consensus.

After independent screening, the reliability between raters was calculated using Cohen's kappa statistics to assess the level of agreement between reviewers. A kappa value of 0.6744 was obtained, which indicates substantial agreement in accordance with the guidelines given by Landis and Koch (1977). Differences were resolved through discussion, and a third reviewer was consulted in cases where a consensus could not be reached. This process ensured that the article selection was consistent and aligned with the research objectives. Limitations included the inherent subjectivity in interpreting criteria such as "educational relevance" and "methodological rigor," which relied on reviewers' interpretive judgments. Additionally, qualitative bias emerged during the thematic analysis because of the reliance on reviewers' subjective frameworks. To mitigate these issues, operational definitions (e.g., "methodological rigor" was strictly defined as *explicit sampling strategies* combined with *validated instruments*) were enforced, and iterative consensus-building discussions among reviewers were prioritized to align interpretations and minimize individual bias.

Results

AI Trends in Language Teaching

Countries leading research on the use of AI in language teaching

Countries leading AI research in language teaching play a crucial role in shaping global educational technology advancements. The research conducted by these nations offers valuable insights into current trends and innovations and identifies best practices that other countries might adopt. This subtheme explores which countries are at the forefront of this research and examines their contributions to the advancement of language teaching through AI technology. For further details, see Figure 2.

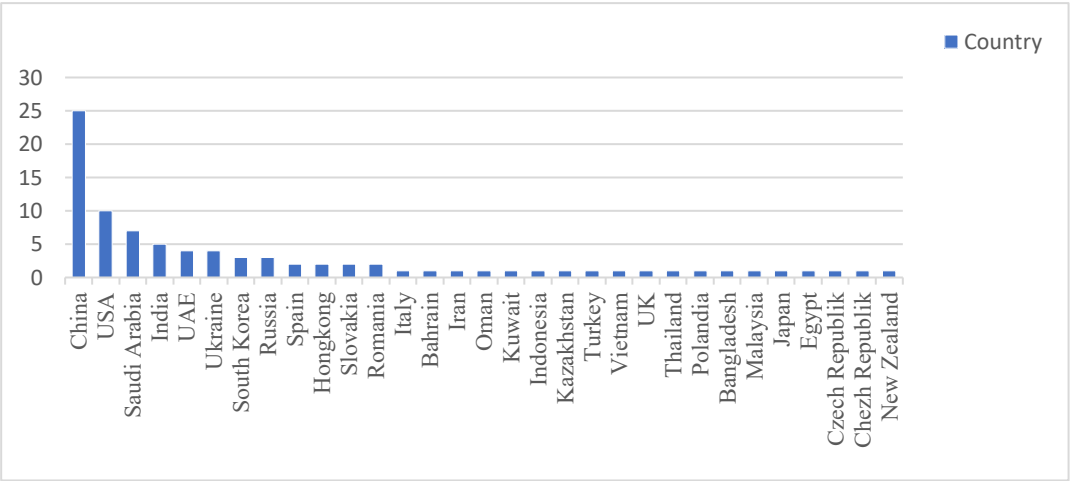

Figure 2. Distribution of Countries in AI in Language Teaching (2019-2024)

Based on Figure 2, from 2019 to 2024, 25 countries contributed to research on the use of AI in language teaching, reflecting the involvement of 83 such articles. China remains the leader, contributing significantly to 25 studies. This

underscores China's prominent role in advancing AI innovation in language education. Chinese research breadth includes explorations of best practices, policy considerations, and perceptions related to AI in teaching. Research produced in China is diverse, including studies on best practices for AI use (Moorhouse and Kohnke, 2024), perceptions of AI in teaching (Moorhouse, 2024), and policy discussions (Qiao and Zhao, 2023).

The United States follows with ten articles emphasizing various aspects of AI's application in language skills and education, such as those discussed by Pack and Maloney (2023b, 2023a) and Kostka et al. (2023). Most articles from the US focus on best practices in utilizing AI for language skills, except Bao and Li (2023), which explore the perception of the use of AI in language teaching.

Saudi Arabia also made a notable contribution, with seven studies focusing on enhancing language skills and AI-based interactions in educational settings, as outlined by Abdalgane and Othman (2023) and Al-Khresheh (2024). Meanwhile, the contribution of the United Arab Emirates (UAE) and India, with four studies each, was also significant, with research by Alazzam et al. (2023b) in the UAE and Moulieswaran and Kumar (2023b) in India researching the use of AI for personalization and improving language skills. In addition, there is also research from Ukraine that is quite significant, with four articles, such as research from Kostikova et al. (2024) and Synekop et al. (2024), which reveal that AI can support the role of teachers in various aspects of teaching, such as providing information, creating texts, assignments, tests, and answering questions. Thus, ChatGPT has become an important element in the development of professional English courses, especially for language education.

Tren AI tools and their categories

The use of AI tools in language teaching is evolving rapidly worldwide. This section provides insights into the various types of AI used in language teaching, drawing on Blanco et al. (2024), who divide AI into six main categories: AI that generates text, AI that generates voice, AI that generates 3D models, AI that generates videos, AI that generates programming languages, and AI that detects the work of AI. Understanding these categories is essential to read *landscape* foreign language teaching using AI to see how this technology is applied worldwide in various language education contexts (see Figure 3).

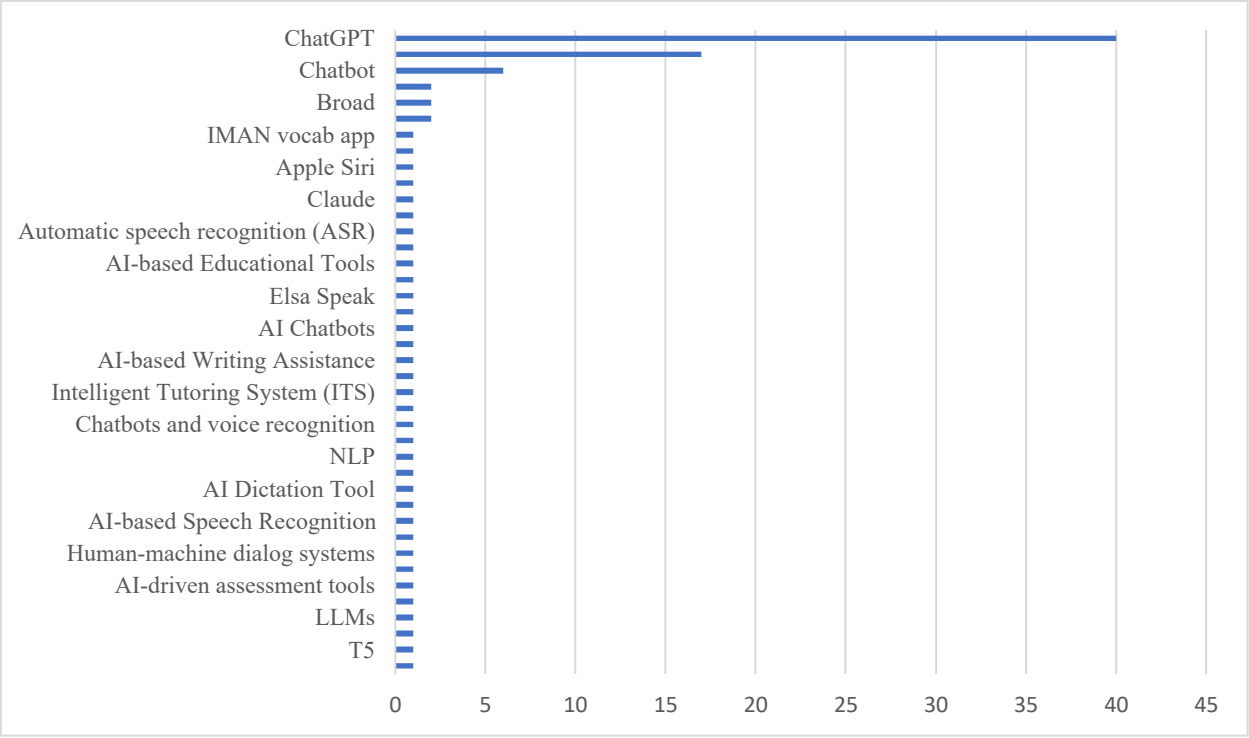

Figure 3. Types and categories of AI frequently used in language teaching (2019-2024)

Based on Figure 3, ChatGPT has emerged as the most dominant AI tool in language learning, appearing in 40 instances. The flexibility of this AI tool in generating text and supporting the improvement of various language skills has rendered it highly popular, especially within the Text Generation category. Authors who have highlighted the use of ChatGPT include Moorhouse (2024), Song and Song (2023), Bao and Li (2023), Naz and Robertson (2024), and Kostikova et al. (2024), among others. ChatGPT's applications span different countries, showcasing its wide geographic usage in China (D. Yan, 2023), USA (Kasun et al., 2024; Mabrito, 2024), India (Jadhav et al., 2024), Saudi

Arabia (Mohamed, 2024), Ukraine (Avsheniuk et al., 2024b), Vietnam (Hieu & Thao, 2024), Italy (Nizzolino, 2024a), Japan (Young & Shishido, 2023), and New Zealand (Du and Alm, 2024), suggesting that its dominance in the Text Generation category is coupled with extensive cross-country implementation reported in recent studies.

ChatGPT's contribution to language learning includes supporting a range of tasks, such as writing, reading, and conversation, making it integral to enhancing these skills. Text Generation tools, where ChatGPT plays a key role, account for 61.4% of all tools in this category. This makes it an invaluable tool for enhancing language proficiency by supporting comprehensive language skills development.

Chatbots, mentioned six times, highlight the growing importance of automated conversational tools in language practice. Chatbots are most frequently utilized in the UAE (Alazzam et al., 2023b, 2023a) and South Korea (Jeon, 2024; H. Yang et al., 2022), each with two recorded instances. Other countries where chatbots have been employed include China (Qiao & Zhao, 2023), Slovakia (Pokrivcakova, 2023), Thailand (Duong and Suppasetseree, 2024), the UK (Hockly, 2023), and Spain (Belda-Medina & Calvo-Ferrer, 2022). Chatbots are primarily associated with Text Generation, as evidenced by their appearance in six instances within this category, indicating their role in facilitating written conversations and interactive text-based learning. There are also applications involving Audio Generation, which appear in two instances, and combined text and audio generation, highlighting their use in more interactive learning environments that integrate both types of content. Chatbots enable users to practice speaking through simulated dialogue, fostering a more interactive and engaging learning environment.

Language context and language skills

Language context variables and language skills play crucial roles in understanding trends in the application of AI in language teaching. This section explores the languages that are the object of AI-based teaching and the language skills involved. Understanding these trends is important for understanding how AI supports language learning in various linguistic contexts. For more details, please refer to Figure 4.

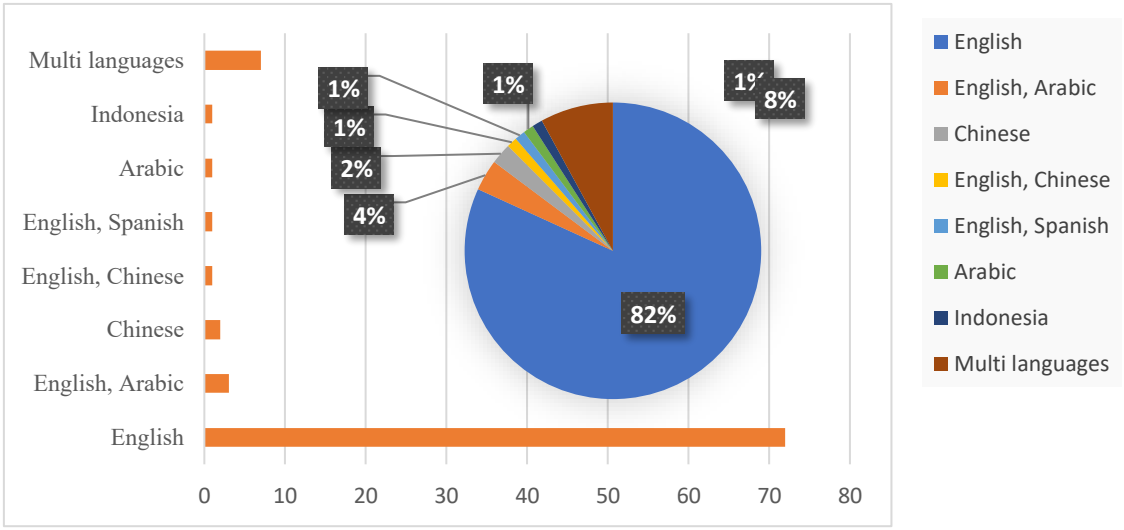

Figure 4. Languages that are starting to be taught with AI-based language (2019-2024)

Based on Figure 4, the use of AI in language teaching has predominantly focused on English, with 72 studies (82% of the total research identified) focusing on English. This indicates that English, as a global communication language and central medium of global knowledge, is more adaptive to AI advancements in education. Further identification revealed that AI research in English language teaching covers all language skills, including writing (Klimova et al., 2024), reading (Alhalangy and AbdAlgane, 2023), listening (Moulieswaran and Kumar, 2023), speaking (Kang et al., 2024), and fluency in speaking (Duong & Suppasetseree, 2024). In contrast, research on AI in the context of Arabic language teaching is less prevalent, with only three studies identified. Alazzam et al. (2023b, 2023a) developed an Ato address educational needs and compared it with Deep Machine Learning, while Mohd Nasir et al. (2023) utilized AI for interactive vocabulary learning in English and Arabic. Furthermore, subjects of other languages, such as Chinese (Jiang et al., 2023a) and Indonesian (Afandi, 2024), are also represented, albeit in smaller numbers, indicating an interest in using AI in various language contexts. The language skills that are the target of AI-based teaching are shown in Figure 5.

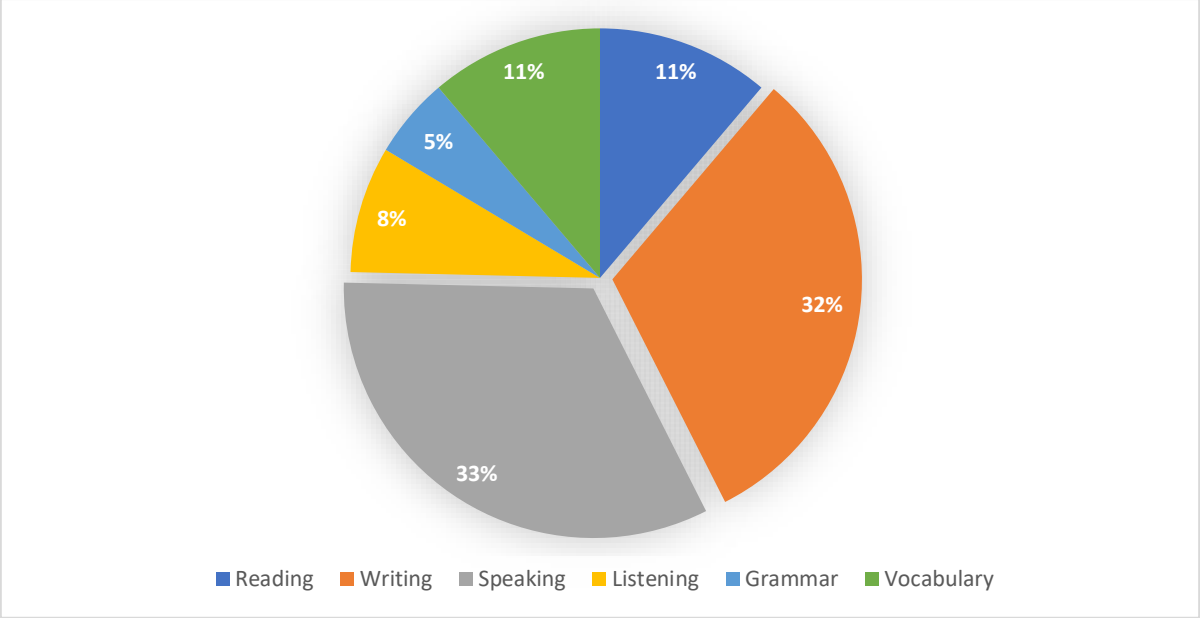

Figure 5. Language skills and supporting aspects of language proficiency involved (2019-2024)

According to Figure 5, the analysis of trends in AI-driven language skills indicates that tools such as ChatGPT and Generative AI significantly contribute to enhancing writing and grammar abilities, accounting for 32% of the emphasis on language learning. These text-generation tools are commonly used for grammar correction and creative writing tasks. For instance, studies by various researchers like Moorhouse (2024), Song and Song (2023), and Yan (2023) illustrate the effectiveness of AI in improving writing skills in China, with technologies such as ChatGPT providing interactive support and automated corrections. This trend signifies a growing reliance on text-based technologies to facilitate writing improvements in educational environments.

In addition to writing, speaking was identified as the most emphasized skill, accounting for 33% of the focus on language skills in AI development. Tools such as chatbots and voice recognition systems enhance speaking and listening abilities by providing real-time conversational practice, which is crucial for developing skills. Qiao and Zhao (2023) highlighted this significance in China, and Kostka et al. (2023) highlighted this significance in the US, where audio generation tools were utilized for conversation practice and pronunciation training.

Vocabulary and reading each accounted for 11% of the focus on AI-driven language skills, indicating that AI tools are moderately used to support vocabulary expansion and reading comprehension, as noted in Wei's (2023) research. Vocabulary enhancement is promoted through interactive tools that provide definitions and usage examples, whereas text-generation tools aid in developing reading skills. In addition, listening skills comprise 8% of the focus, supported by audio generation tools that help learners practice understanding spoken language, particularly English, as demonstrated by audio-based AI tools (Al-khresheh, 2024; T. Liu et al., 2019; X. Yan, 2024). Grammar, on the other hand, received the least attention at 5%, highlighting the targeted use of AI for grammar correction, mainly through text-based tools such as ChatGPT.

This distribution reinforces the earlier analysis, highlighting a strong AI application in speaking and writing skills, particularly in China, where there is a notable integration of these technologies into formal education systems to enhance English proficiency. The trends in AI development for language teaching have generated diverse perceptions. This discussion highlights an interesting aspect of uncovering the academic community's views on the increasing prevalence of AI.

Discussion

Along with the rapid development of technology, the use of artificial intelligence (AI) in the field of education, especially language teaching, has opened up new opportunities that are very promising and pose challenges at the same time. AI innovations have brought significant changes to teaching methods by providing a more personalized, interactive, and adaptive learning experience according to student needs. However, despite its benefits, the integration of AI in language teaching faces a variety of complex challenges. This section reveals the positive innovation results and concerns regarding the use of AI based on research articles selected through a rigorous selection process.

AI Innovations in Language Teaching: Opportunities and Complexities

The integration of AI into language education has introduced groundbreaking tools such as adaptive learning platforms (Jiang et al., 2023b) and conversational agents (Nizzolino, 2024b), which personalize instruction and enable real-time feedback. For instance, ChatGPT's semantic analysis capabilities have been shown to enhance the grammatical accuracy of English learners (Alazzam et al., 2023c), while gamified platforms like Duolingo increase engagement through interactive challenges (Alrishan, 2023). However, these innovations are not evenly distributed. Tran and Stell (2024) revealed that AI systems for tonal languages (e.g., Vietnamese) require datasets three times larger than those for English, exacerbating resource disparities and strengthening the AI infrastructure disparity in education (Hoque et al., 2023; Sarfo et al., 2024). Similarly, Wang et al. (2024) demonstrated that AI tools for sign language recognition suffer from low accuracy owing to limited training data, reinforcing the marginalization of minority languages. In contrast, Mateos Blanco et al. (2024) highlight successful AI adaptations for Spanish in immigrant communities through community-driven dataset curation, suggesting that inclusivity is achievable with contextualized approaches. These contradictions underscore the need for linguistic equity in AI development—a gap emphasized by Huang et al. (2023), who argue that current AI models prioritize linguistic dominance over diversity.

Challenges in AI Integration: Beyond Technical Limitations

The adoption of AI in language education is fraught with pedagogical and ethical complexities that transcend technical barriers to its use. First, algorithmic bias in tools such as speech recognition systems often marginalizes non-native accents, perpetuating linguistic inequities (Alharbi, 2024a). Second, overreliance on AI risks eroding human interaction, which is critical for developing sociopragmatic and cultural competencies (Wexell Machado & Canese, 2024). While Avsheniuk et al. (2024) validate concerns about diminished critical thinking, Busso and Sanchez (2024) counterargue with examples of culturally attuned AI systems, such as politeness analyzers for Japanese learners. Third, infrastructural disparities hinder access to low-resource regions (W. Liu, 2024), while in advanced settings, it exacerbates the skill gaps between teachers and students (Hockly, 2023). These challenges necessitate a paradigm shift: educators must reclaim their role as mediators between AI's efficiency and the irreplaceable human elements of language learning, ensuring that technology complements—rather than replaces—relational pedagogy.

Implication for Teacher Education and Policy

The rise of AI has demanded radical reforms in teacher training and systemic policy frameworks. Teacher education must prioritize *critical AI literacy*, equipping educators to evaluate algorithmic biases and integrate AI judiciously (Alharbi, 2024b). For example, hybrid models (e.g., 70% human-led activities for socio-cultural skills and 30% AI for vocabulary drills) could balance efficiency and authenticity (Alam and Asmawi, 2024). At the policy level, governments must allocate targeted funding to bridge infrastructural gaps in underserved regions (W. Liu, 2024), institutions should adopt ethical standards, such as the *EU's Guidelines for Trustworthily AI*, to enforce transparency and cultural fairness (Xia et al., 2024). Additionally, stringent regulations on dataset diversity are vital to ensure that AI tools reflect linguistic and cultural pluralism (Alrayes et al., 2024). Without such measures, AI risks exacerbating inequity rather than democratizing education.

Future Research Direction

Future research should address these unresolved challenges and explore untapped opportunities. First, AI's adaptability to linguistically complex languages (e.g., tonal languages such as Vietnamese) and multicultural contexts requires urgent investigation, including collaborations with native speakers to develop representative datasets (Mateos Blanco et al., 2024). Second, longitudinal studies are needed to assess AI's long-term impact of AI on creativity and intercultural competence, particularly its potential to stifle critical thinking (Avsheniuk et al., 2024a). Third, interdisciplinary partnerships between educators, linguists, and developers could yield pedagogically aligned tools such as AI-human collaborative projects for contextual dialogue simulations (El Shazly, 2021). Furthermore, *co-design frameworks* involving teachers in AI development processes may bridge the gap between technological innovation and classroom reality (Hockly, 2023). By prioritizing these avenues, research can steer AI toward roles that enrich the human dimensions of language education rather than undermine them.

Limitation

The scope of this research was restricted to the period from 2019 to 2024, which is characterized by a notable increase in AI research activities. This study utilized multiple databases from Scopus, Web of Science, and ProQuest for data extraction, thereby excluding potentially relevant studies that were not indexed in these three databases. Additionally, this review was limited to articles published in English and Arabic, which may have excluded relevant contributions from researchers who utilized similar methodologies in other languages. Consequently, the findings of this study may not encompass all pertinent research within the broader academic community.

Conclusion

This study offers three key contributions to the discourse on AI in foreign language teaching. First, it maps global trends, revealing the concentrated development of text- and speech-generating AI tools (e.g., ChatGPT and chatbots) in technologically advanced regions such as China, the U.S., and Saudi Arabia, with a pronounced focus on English and productive skills (writing/speaking). This underscores a critical gap in AI support for less-resourced languages (e.g., Arabic and Indonesian) and receptive skills (listening and reading), highlighting systemic inequities in AI accessibility. Second, stakeholders perceive AI as transformative for personalization and engagement, yet concerns persist about over-reliance, algorithmic bias, and the erosion of human-centric pedagogies—challenges amplified in regions like Southeast Asia, where infrastructural and training gaps hinder equitable implementation. Third, while AI tools demonstrate partial alignment with task-based approaches, their integration with constructivist frameworks remains limited, and ethical standards, such as transparency and cultural fairness, are inconsistently addressed.

The findings of this study have critical implications for Indonesia and Southeast Asia, where linguistic diversity, infrastructural disparities, and cultural contexts demand a tailored approach to AI integration in foreign language education. First, the region must address the dominance of English-centric AI tools by prioritizing the development of localized technologies that cater to its multilingual landscape and needs. For instance, AI applications for teaching Indonesian, Thai, Vietnamese, or regional languages (e.g., Javanese and Sundanese) could bridge gaps in accessibility while preserving linguistic heritage. This aligns with global frameworks, such as UNESCO's Beijing Consensus, but requires region-specific adaptations, such as datasets enriched with local dialects and culturally relevant content.

Second, the hybrid learning model has emerged as a strategic solution. Southeast Asian institutions can blend AI-driven tools (e.g., grammar checkers for repetitive drills) with teacher-led activities focused on sociocultural competence, such as role-playing traditional ceremonies or analyzing local literature. This approach mirrors successful implementations in Saudi Arabia, where chatbots supplement—rather than replace—human interaction, ensuring that technology enhances rather than undermines relational pedagogy.

Third, teacher empowerment is crucial. Professional development programs should equip educators with the skills to critically evaluate AI tools, identify algorithmic biases (e.g., accent discrimination in speech recognition), and integrate AI ethically. For example, training modules could guide teachers in using AI to automate assessments while retaining their roles in fostering critical thinking and intercultural dialogue.

Finally, ethical and infrastructural investments are urgently needed. Policymakers must advocate for funding to close technological gaps, particularly in rural and underserved areas, and enforce standards for transparency and data privacy. Collaborative regional initiatives, such as ASEAN-wide AI task forces, could pool resources to develop inclusive tools, share best practices, and establish accountability mechanisms.

By embracing these strategies, Southeast Asia can harness AI's potential of AI to democratize language education while avoiding the pitfalls of technological dependency and cultural homogenization observed in global trends. The goal is not merely to adopt AI but to adapt it, ensuring that it serves as a bridge to equitable, context-sensitive, and human-centered learning.

The findings of this study are constrained by its reliance on data from major academic databases (Scopus and Web of Science), which may underrepresent innovations in non-Anglophone contexts. Additionally, the 2019–2024 timeframe limits insights into AI's long-term pedagogical impacts, and the exclusion of grey literature risks overlooking grassroots technological adaptations in under-served regions.

Author Contributions: Kisno Umbar, a doctoral candidate in Islamic Studies at Syarif Hidayatullah State Islamic University Jakarta, contributed to software development and analyses. Siti Nurul Azkiyah, a professor of English Language Education, validated the research. Maswani, who holds a doctorate in Arabic Language Education, supervised the project. Muhbib Abdul Wahab, an Arabic Language Education scholar, contributed to methodology. Zulkifli provided conceptual guidance for the systematic review.

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Declaration of Generative AI: This research employed AI-assisted technologies: DeepSeek (contextual translation) and Grammarly (language polishing). The authors critically assessed all AI-processed outputs to ensure accuracy and coherence, retaining ultimate accountability for the integrity of the work.

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