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Human vs. Machine: A Review of AI's Impact on Language Learning Interaction or Replacing Human interaction

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Abstract:
Artificial Intelligence (AI) has emerged as a powerful tool in language learning, offering learners personalized, self-paced practice through applications like chatbots, intelligent tutoring systems, and adaptive platforms. These technologies enhance grammar, vocabulary, and pronunciation skills while promoting learner autonomy and engagement. However, as reliance on AI tools increases, concerns arise regarding their impact on essential peer and teacher interactions. Human communication is vital for developing communicative competence, cultural awareness, and emotional expression—dimensions that AI currently cannot fully replicate. This paper reviews recent research to examine whether AI in language education functions as a supplement to or a replacement for social interaction. The findings indicate that while AI enhances technical aspects of language acquisition, it cannot substitute the richness of human exchange. The study recommends hybrid learning models that combine AI-driven feedback with structured peer collaboration and teacher facilitation to support both language proficiency and social engagement.

Keywords: Artificial Intelligence (AI), Language Learning, AI in Education, Peer Interaction, Teacher Interaction, Communicative Competence, Hybrid Learning Models, AI Chatbot , Language Practice, Second Language Acquisition, Personalized Feedback, Collaborative Learning, Human-AI Interaction

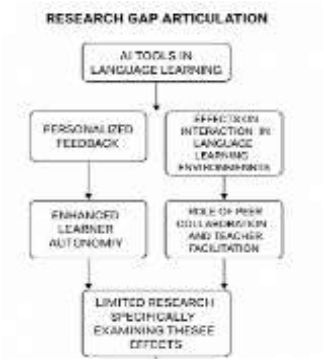
Introduction

Artificial Intelligence (AI) is significantly reshaping the landscape of language education by enabling learners to access highly personalized, adaptive practice environments. AI-powered tools such as intelligent tutoring systems, chatbots, and speech recognition software provide immediate feedback on grammar, vocabulary, and pronunciation, supporting learner autonomy and flexible, self-paced learning [1]. These features contribute to improved language accuracy and retention. However, the growing reliance on AI raises critical concerns regarding its impact on peer and teacher interaction, which are essential for developing communicative competence [2]. Language learning thrives on social engagement, where spontaneous conversation, cultural exchange, and emotional connection enhance pragmatic and interpersonal language skills [3] . Current AI tools, while efficient, cannot fully replicate the nuances of human interaction, such as empathy, negotiation of meaning, or cultural context. As a result, over-dependence on AI may reduce learners' motivation and confidence in real-world communication settings

[4] . To address this, recent studies advocate for a balanced, hybrid model that combines AI-driven practice with structured peer collaboration and teacher facilitation [5] . Such integrated approaches can maintain the benefits of technology while preserving the social dynamics that are crucial to language development. The goal is not to replace human interaction but to enrich it by leveraging AI as a supportive, rather than substitutive, educational tool [6] .

Research Objective

This study aims to critically examine the role of Artificial Intelligence (AI) in language learning, focusing on whether it supports or replaces essential human interaction. It explores how AI-powered tools enhance individual practice, learner autonomy, and language accuracy while evaluating the extent to which they affect peer communication and teacher involvement. By reviewing recent research, the study identifies both the strengths and limitations of AI integration in educational settings. The objective is to assess hybrid learning models that balance AI functionality with social engagement, contributing to more effective, human-centered approaches in technology-supported language education.



Need for a Balanced Approach: Highlighting the Research Gap

literature review

Artificial Intelligence (AI) has transformed the landscape of language education by introducing tools such as chatbots, intelligent tutoring systems, and adaptive learning platforms. These technologies enable learners to receive instant, personalized feedback, thereby enhancing grammar, vocabulary, and pronunciation. However, as AI becomes more prevalent, a growing concern has emerged: Does AI merely support language learning or does it risk replacing essential peer and teacher interaction?

1. Zhang & Lee (2024)

In their study on emotion-aware AI tutors in university ESL classrooms, Zhang and Lee found that AI-assisted tools significantly improved learners' technical skills, especially grammar and pronunciation. However, the study also revealed that peer interaction diminished when teachers did not actively facilitate group tasks or discussions. Learners appreciated the accuracy of AI feedback but reported a lack of motivation and real-time collaboration when human elements were absent.

Conclusion: While AI boosts efficiency, teacher-guided peer interaction remains essential for deeper communicative learning.

2. Rao et al. (2023)

This randomized controlled trial compared AI-only, human-only, and hybrid models in Korean middle schools. The hybrid model—where AI handled repetitive tasks and teachers led communication-based exercises—resulted in the highest gains in communicative competence, motivation, and confidence.

Conclusion: AI tools are most effective when embedded in a balanced learning ecosystem that supports social interaction.

3. Martínez-García & Kim (2022)

Martínez-García and Kim developed a culture-aware chatbot that adjusted responses based on cultural norms. Learners who used this bot during intercultural role-plays engaged in richer peer discussions and retained more culturally relevant vocabulary than those using standard AI systems.

Conclusion: Integrating cultural sensitivity into AI improves both interaction quality and learner engagement.

4. Petrova et al. (2021)

Focusing on teacher perspectives, Petrova et al. found that teachers viewed AI positively for drill-based instruction but expressed concern over student disengagement during longer sessions. Teachers also reported a lack of training in how to integrate AI tools while maintaining their role as facilitators of social learning.

Conclusion: Teacher professional development is vital for the successful adoption of AI in classrooms.

5. Smith & Liu (2020)

This study explored social presence in AI-dominated language learning platforms. Although students improved vocabulary and grammar through AI, they felt less confident using the language in real-world settings due to a lack of interpersonal practice.

Conclusion: The absence of peer or teacher interaction leads to reduced communicative confidence, even when technical skills improve.

6. Li, Huang & Sun (2022)

In their broader review of AI in language education, Li et al. emphasized that AI supports learner autonomy and adaptive learning, but cautioned that excessive reliance on AI may lead to a decline in social engagement and spontaneous language use.

Conclusion: AI is a powerful support tool, but not a replacement for human interaction.

7. Chen & Smith (2021)

Studied how learners used AI apps outside of classroom settings. While AI boosted autonomy and accuracy, learners lacked opportunities for immediate feedback from peers or context-rich discussions.

Conclusion: AI is best used as a complementary tool to in-class communicative practices.

8. Zhao & Wang (2020)

Emphasized the importance of balancing technology with human engagement. The study showed that learners using AI extensively often lacked collaborative learning opportunities, which hindered the development of pragmatic and cultural competencies.

Conclusion:

Technological efficiency must be coupled with peer and teacher facilitation to ensure well-rounded language acquisition.

Feature	Traditional AI	Modern AI (Deep Learning/NLP)
Foundation	Rule-based, manually coded	Data-driven, self-learning through algorithms
Adaptability	Low – fixed responses	High – adapts to user input and context
Language Understanding	Keyword matching, pattern recognition	Natural Language Understanding and Generation
Personalization	None or minimal	Highly personalized based on user data
Learning Capability	Cannot learn from data	Learns and improves with more data
Feedback Mechanism	Static, pre-defined	Dynamic, real-time, and contextual
Emotion and Context Handling	Absent	Emerging (sentiment analysis, tone detection)
Examples in EdTech	Grammar checkers, basic drills	Chatbots, virtual tutors, AI-powered apps like Duolingo, ChatGPT

Traditional AI vs. Modern AI

Methodology

This research employs a systematic literature review methodology to examine the influence of Artificial Intelligence (AI) on language learning, particularly focusing on its effect on peer and teacher interactions. The methodological process includes literature search, study selection, data extraction, thematic analysis, and synthesis. It draws upon empirical and theoretical studies published between 2018 and 2025, ensuring both currency and scholarly depth.

1. Literature Search and Data Collection

Relevant literature was sourced from scholarly databases including Google Scholar, IEEE Xplore, ScienceDirect, and SpringerLink, using Boolean keyword combinations such as "AI in language learning," "peer interaction," "teacher interaction," "AI chatbots," "language feedback," and "communicative competence." The search was filtered for peer-reviewed articles published in English between 2018 and 2025.

2. Inclusion Criteria and Study Selection

As part of the study selection process, an initial pool of approximately 150 research articles was identified through a comprehensive literature search across academic databases. These articles were screened for relevance and duplication, resulting in a refined set of 65 studies selected for full-text review. The final inclusion of studies in this review was guided by clearly defined criteria. Specifically, each study was required to focus on the use of Artificial Intelligence in second or foreign language education, explore the impact of AI on peer-to-peer or teacher-learner interactions, and offer an empirical or theoretical contribution to the development of communicative competence or language learning outcomes. Only those studies that directly addressed the intersection of AI technologies and human interaction in language learning contexts were included for thematic analysis.

3. Study Quality Assessment

To ensure the reliability and academic rigor of the selected literature, each study was evaluated against a set of methodological quality criteria. These included the clarity of the research design, the adequacy of the sample size, the explicitness with which AI tools were described and contextualized, and the extent to

which the study measured outcomes related to peer and teacher interaction. Only studies that met these standards were retained for final analysis. Research that lacked methodological transparency or failed to establish a direct connection between AI use and human interaction in language learning environments was excluded from the review. This quality assessment process ensured that the findings of this study were grounded in robust, relevant, and well-executed research.

4. Thematic Analysis

A thematic coding approach was employed to analyze the selected literature and identify recurring patterns relevant to the study's objectives. Several key themes emerged from the analysis. First, many studies highlighted the enhancement of individual practice through AI, with learners benefiting from personalized feedback and flexible, self-paced learning environments. However, a consistent concern across the literature was the reduction in peer-to-peer and teacher-student engagement in settings dominated by AI tools, which often led to diminished opportunities for spontaneous dialogue and collaborative learning. Another prominent theme was the development of communicative competence and learner motivation in hybrid learning models that combine AI applications with structured human interaction. Additionally, the analysis underscored the evolving role of teachers in AI-mediated environments, where instructors are increasingly responsible for facilitating emotional support, social engagement, and meaningful communication alongside AI-based instruction.

5. Synthesis and Interpretation

The findings from the thematic analysis were synthesized to evaluate the dual role of AI—as a support mechanism and a potential substitute for human interaction. The synthesis was guided by sociocultural theory and interactionist perspectives, which emphasize the centrality of social engagement in language learning.

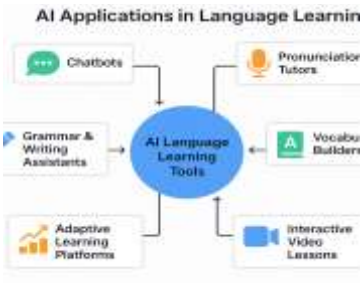
6. Tools and Data Handling

While no primary data was collected, NVivo software was used to assist in coding and organizing qualitative data from the literature. Citations and reference management were maintained using Zotero.

7. Ethical Considerations

This study is entirely literature-based and does not involve human subjects. As such, no ethical approval was required. Care was taken to accurately represent the findings of original authors and to provide full attribution.

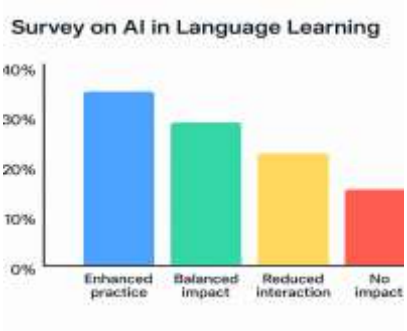
This methodology provides a robust and transparent framework for exploring how AI technologies affect the balance between autonomous digital learning and essential human interaction in language education.



Results:

The literature review reveals that AI tools like chatbots and adaptive platforms enhance language learning through personalized feedback and flexible practice, improving grammar, vocabulary, and pronunciation. These tools support learner autonomy but cannot fully replace essential peer and teacher interactions.

Hybrid models that integrate AI with human engagement show promise, boosting both linguistic accuracy and social confidence. Overall, AI should complement not substitute human interaction to ensure balanced development of technical proficiency and communicative competence in language learning.



Discussion

Artificial Intelligence (AI) has significantly enhanced language learning by offering personalized, self-paced tools like chatbots and intelligent tutoring systems. These applications provide immediate feedback on grammar, vocabulary, and pronunciation, fostering learner autonomy and supporting consistent practice, especially in contexts with limited access to qualified instructors. The literature confirms AI's positive impact on technical accuracy and its value as a supplement to formal instruction.

However, AI tools fall short in replicating essential human interactions crucial to communicative competence. Language learning is not solely technical—it involves emotional, cultural, and social dimensions that current AI cannot fully address. Learners in AI-dominated environments often report reduced motivation, isolation, and a lack of meaningful peer or teacher interaction. These limitations can hinder the development of pragmatic skills and real-world communication readiness.

To address this, hybrid models have emerged, combining the strengths of AI with human interaction. In these approaches, AI supports repetitive or personalized tasks, while teachers and peers engage learners in group discussions, cultural exchanges, and collaborative activities. Research shows these blended environments improve not only language accuracy but also learner motivation, confidence, and cultural understanding.

A critical insight is that not all language learning interactions are equally replaceable. Technical tasks suit automation, while affective and interpersonal elements—like humor, encouragement, and empathy—still require human presence. Learner responses to AI also vary by age, experience, and learning style, indicating the need for flexible, adaptive models.

Pedagogically, educators should embed AI within a broader framework that maintains the human core of language education. Curriculum and teacher training must emphasize both technological fluency and social-emotional engagement. Ultimately, AI should enhance, not replace, interaction—creating a balanced, learner-centered ecosystem that supports both linguistic accuracy and authentic communication.

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