Envisioning the Future: AI-Assisted Language Learning to Empower Multilinguals and Transform Pedagogies

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Abstract: Artificial intelligence (AI) is profoundly transforming English language teaching and learning. AI provides powerful tools for educators, including machine learning algorithms, Natural Language Processing, tailored lessons, 24/7 support, and progress monitoring, all of which promote autonomous learning. Specific applications like Duolingo MAX and ELSA Speak demonstrate positive impacts on linguistic competence, especially phonological/orthographic control, and pronunciation accuracy. In classrooms, AI functions as tutor, content generator, and assessment assistant, simulating human-like interactions, co-creating content, and supporting multilingual instruction through translanguaging. Despite AI's expanding role, educators remain central, serving as designers, facilitators, and ethical guides. Classroom challenges — inconsistent implementation, lack of standardized use, varying levels of teacher preparedness — remain, underscoring the need for professional development in pedagogical and ethical implications. Future developments involve examining long-term learning outcomes, addressing learning diversity beyond adult language learners, and fostering interdisciplinary collaboration for culturally responsive AI tools.

AI-Assisted Tools Support Autonomous Language Learning

Artificial intelligence (AI) has profoundly transformed English language teaching and learning by providing a transformative approach to instruction that personalizes learning experiences in terms of individual learners' paces and proficiency levels, offers real-time feedback, and fosters engagement (Kovalenko & Baranivska, 2024; Jegede, 2024; Mohebbi, 2024). AI is conceptualized as intelligent computer systems that possess human-like capabilities, such as memorizing knowledge, perceiving and manipulating environments, and understanding human natural language. Although AI may have its limitations, it offers powerful tools for educators to improve instructional methods. These systems use machine learning algorithms to identify learners' strengths and weaknesses and provide targeted exercises. Beyond direct learner applications, AI-assisted tools have also provided advanced analytics within various learner models or learning management systems (LMS) to monitor student progress, track engagement, performance, and comprehension, helping all educators identify struggling learners who need intervention (Meurers, 2020; Agrawal, 2024).

Scholars have pointed out two key features of AI-assisted instruction that improve upon human English language instruction: 24/7 support and Natural Language Processing (NLP). First, provision of 24/7 support through answering queries and providing explanations to learners outside of traditional classroom hours promotes a more flexible and accessible learning environment (Kovalenko & Baranivska, 2024; Jegede, 2024; Mohebbi, 2024; Kholis, 2021; Peláez-Sánchez & Velásquez-Durán, 2023; Widyasari & Maghfiroh, 2023). Moreover, Agrawal (2024) mentions that the field of AI in language education is influenced by disciplines such as philosophy, cognitive science, neuroscience, and economics, and AI can encompass various technologies for simulating human intelligence for a number of tasks like reasoning, decision-making, and problem-solving. Second, NLP technology has two broad applications: analysis of learner language and analysis of native language for learners. Meurers (2020) observes, NLP can analyze learners' language use in order to identify errors and provide real-time feedback on grammar, vocabulary, and style. NLP can also automate scoring in language testing and, in native language analysis, support learners in finding and interacting with authentic materials.

Several AI-assisted language learning tools/applications, such as Duolingo MAX (Kittredge et al., 2025), ELSA Speak (Kholis, 2021), Babbel (Mohebbi, 2024), and Rosetta Stone (Jegede, 2024), have gained prominence in supporting language learning. These tools aim to complement traditional teaching methods by offering accessible, interactive learning experiences. Duolingo MAX is a new subscription tier under the Duolingo application that gives learners access to brand-new features, "Explain My Answer" and "Roleplay," powered by the newest, most powerful generative AI technology, OpenAI (Duolingo Blog, 2024). Usage of this application revealed statistically significant positive impact on the development of students' linguistic competence, as defined by the Common European Framework of Reference for Languages. Notably, the application significantly improved students' phonological and orthographic control, which could be attributed to its pronunciation and dictation activities (Peláez-Sánchez & Velásquez-Durán, 2023). Another application, ELSA Speak, is a pronunciation software that leverages AI and Automatic Speech Recognition (ASR) to offer feedback on users' pronunciation accuracy (*ELSA Speak*, n.d.). Its advantages include focus on pronunciation features such as stress, intonation, accuracy, and fluency, which are more comprehensive than those offered by other pronunciation apps. Additionally, ELSA Speak provides instant feedback, which helps students pronounce words more accurately and increases their motivation to engage in pronunciation learning. These features support autonomous learning as students can practice at their own pace, anytime and anywhere (Widyasari & Magfiroh, 2023).

Integrating AI Technology into Language Classrooms

AI technology not only enables students to learn languages at their own pace and according to their individual interests but also holds significant potential for integration into classroom instruction. In this section, we explore the multifaceted roles that AI tools can play in language education — serving as a tutor, content generator, and assessment assistant.

Generative AI tools like ChatGPT simulate human-like conversational interactions, offering contextualized feedback that mirrors authentic language use. In terms of sociocultural learning frameworks, these tools function as More Knowledgeable Others (MKOs), scaffolding learners through real-time rehearsal, revision, and reflection during task-based learning activities (Tseng & Lin, 2024; Asrif, 2024). Their conversational nature helps lower affective filters often associated with writing, encouraging students to engage in iterative improvement without fear of embarrassing misuse of language with another person. Moreover, adaptive applications such as Duolingo, Grammarly, or custom GPT-powered platforms enable personalization of homework assignments by tailoring content to individual proficiency levels and goals. Students generally report positive perceptions of these tools, citing increased confidence, autonomy, and a stronger sense of achievement in their language learning (Feng et al., 2025). Importantly, learners appreciate immediate and tailored feedback, which contributes to a more responsive and supportive learning environment (Naz & Robertson, 2024; Lo et al., 2024).

AI also empowers both educators and learners to co-create content, from tailored writing prompts to interactive dialogues and multimodal simulations. For example, Yeh (2024) advocates for using generative AI tools to facilitate language transfer across modalities — such as text-to-speech and text-to-image — to support tasks like creating bilingual picture books. Tools like ChatGPT, Leonardo.ai, and ClipChamp enable a full cycle of comprehension, production, and creative reinvention, thereby enhancing both linguistic and digital literacy. Natural Language Generation capabilities are increasingly employed to generate context-specific

texts, including emails, narratives, and dialogues, fostering both fluency and creativity (Haleem et al., 2022; Hwang & Nurtantyana, 2022). AI's multilingual affordances further promote inclusivity by offering feedback and explanations in learners' first languages, bridging comprehension gaps and encouraging the use of learners' full linguistic repertoires (Tseng & Lin, 2024; Naz & Robertson, 2024). In multilingual and multicultural classrooms, such features support equitable access and representation, particularly for heritage and immigrant learners (Asrif, 2024; Lo et al., 2024).

Donley (2024, 9-11) identifies eight instances of instructional use of AI that emerged from classroom observations and interviews with 42 in-service teachers across various grade levels and instructional contexts. His findings suggest that AI technologies such as ChatGPT offer affordances for translanguaging, particularly by enabling students to transcribe oral language in their preferred language of communication and subsequently translate it to facilitate teacher comprehension. This process enhances students' self-expression and supports the use of their full communicative repertoire. In interviews with a Spanish immersion teacher — whose classroom included both English learners and English-dominant, Spanish-heritage speakers — Donley notes that the teacher successfully created and applied ChatGPT-generated content in both languages. This included instructional materials focused on rhyming, sound blending, and phoneme identification, all of which supported students' phonological awareness.

Additionally, AI's multimodal capacities — such as vocabulary visualization and authentic pronunciation through text-to-speech — enhance learner engagement and accommodate diverse learning styles (Rebolledo & González, 2023; Xie et al., 2019). Asrif (2023) likewise notes that AI-assisted tools are particularly effective in multilingual regions, as these tools can value and cater to varying language needs and promote equal access to educational resources. These features are particularly beneficial in inclusive classrooms where access and motivation are critical to language development.

Human-in-the-Loop: Pedagogical Design and Teacher Responsibility

Despite the expanding role of AI, educators remain central to its successful integration into classroom instruction. Li et al. (2025) identifies teachers as knowledge presenters, task designers, facilitators, assessors, and resource curators in AI-enhanced classrooms. Rather than replacing human instruction, AI should be embedded within pedagogically grounded, scaffolded tasks that promote interaction and critical thinking (Hsu et al., 2023; Chiu et al., 2023). During these activities, teachers can provide just-in-time support and elaborate on material to deepen learning. Teachers creatively design and organize tasks that incorporate AI into language learning. For example, some educators ask students to work in groups and provide keywords, genres, characters, and events to generate stories using ChatGPT to guide teachers in enhancing students' interest in reading. Others have developed image-based grammaticality tests using chatbot platforms to support acquisition of specific grammar structures (Tseng, 2018). And teachers have created games, songs, and chants through interactive dialogue with AI, encouraging students to engage directly with chatbots as part of language practice (Jeon, 2024).

These practices highlight the innovative potential and creative flexibility of AI-assisted language learning. However, they also present challenges — particularly in assessing the effectiveness of such approaches — due to lack of standardized use and consistent implementation. The current field does not provide educators with ready-made curricula or uniform guidelines for integrating AI but instead places considerable agency and responsibility

on individual teachers. This further complicates efforts to bring these practices to scale and raises concerns about educators' varying levels of preparedness to adopt and effectively implement AI tools in their classrooms. Frameworks such as ADDIE and TPACK offer theoretical scaffolds for aligning AI tools with instructional objectives (Tseng & Lin, 2024). The TPACK model — comprising Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK) — helps teachers meaningfully integrate AI into curriculum and lesson design. Some have argued for updates or adaptations to TPACK to address the evolving demands of AI-enhanced instruction, especially regarding teachers' digital and AI competencies (Hsu et al., 2023).

Educators must not only select tools that align with curricular goals but also design tasks that are contextually relevant and cognitively engaging (Lo et al., 2024). Increasingly, AI is being used in assessment through tools like Automated Writing Evaluation (AWE), Computerized Dynamic Assessment (CDA), and Intelligent Tutoring Systems (ITS). These systems provide feedback that helps both students and instructors identify developmental needs, allowing for more data-driven instruction. Crucially, teachers must also serve as ethical guides — monitoring AI outputs, identifying biases, and modeling critical digital literacies (Naz & Robertson, 2024). A lack of teacher preparedness in these areas can result in overreliance on automation or misinterpretation of AI-generated feedback. Professional development must therefore extend beyond tool functionality to include pedagogical and ethical implications.

Challenges and Future Directions

While current studies highlight AI's potential to enhance learner motivation, personalization, and autonomy (Feng et al., 2025), long-term learning outcomes across multiple areas of language skill remain insufficiently examined. Much of the existing literature focuses on short-term improvements in writing, with limited exploration into the transferability of these gains to other domains such as speaking, listening, and reading. Donley (2024) also raises an important question regarding how the multilingual and multimodal features of AI tools might contribute to legitimizing translanguaging practices in both formative and summative assessments. As AI technologies continue to evolve, it is crucial to investigate how their multilingual and multimodal capabilities can be leveraged for more inclusive and context-sensitive assessment strategies in multilingual education.

Moreover, learner diversity is a neglected dimension. Most studies focus on adult EFL/ESL learners in higher education. Future research should examine AI's impact on other populations — particularly K–12 students, heritage speakers, and learners in dual-language immersion programs. The integration of AI in early childhood settings remains largely speculative and demands careful attention to developmental and institutional constraints (Yeh, 2024). Finally, interdisciplinary collaboration is vital for developing domain-specific and culturally responsive large language models (LLMs). The next generation of AI in education will depend not only on technological sophistication but also on pedagogical relevance and cultural inclusivity. Collaboration among educators, technologists, and linguists will be critical to designing tools that are both technically robust and socially responsible.

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