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AI-Powered Tools and Their Impact on English Language Learning Outcomes

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Abstract: The rapid diffusion of artificial intelligence (AI) into language classrooms has reshaped how learners practice speaking, writing, vocabulary, and grammar, prompting researchers to ask whether these tools measurably improve English language learning outcomes. This paper reviews recent empirical and review-based literature on AI-powered applications -- including intelligent tutoring systems, automatic speech recognition tools such as ELSA Speak, adaptive platforms such as Duolingo, and generative chatbots such as ChatGPT -- to assess their effects on pronunciation, writing proficiency, vocabulary and grammar acquisition, engagement, and learner motivation. Drawing on mixed-methods studies, systematic reviews, and controlled comparisons published between 2023 and 2026, the paper finds consistent evidence that AI tools enhance engagement, provide timely and individualized feedback, and produce learning gains that are often comparable to, though not reliably greater than, traditional classroom instruction. At the same time, the literature identifies recurring concerns, including accent bias in speech-recognition feedback, superficial or inconsistent writing feedback, over-reliance on automated correction, and unequal access to premium features. The paper concludes that AI tools function most effectively as a complement to, rather than a replacement for, teacher-mediated instruction, and it offers recommendations for the pedagogically grounded integration of AI into English language teaching.

Keywords: artificial intelligence, English language learning, learning outcomes, computer-assisted language learning, generative AI feedback

Introduction

Artificial intelligence has moved from the margins of language education to its center. Tools that once functioned as supplementary novelties -- speech-recognition apps, grammar checkers, and gamified vocabulary drills -- now sit alongside, and in some contexts substitute for, live instruction. Large language models such as ChatGPT can generate individualized writing feedback within seconds, automatic speech recognition (ASR) systems such as ELSA Speak can flag mispronounced phonemes in real time, and adaptive platforms such as Duolingo can resequence lessons based on a learner's error patterns (Zhao). This shift raises an empirical question that is separate from the technological novelty of these tools: do AI-powered applications actually improve English language learning outcomes, and if so, under what conditions?

This paper synthesizes recent research -- primarily mixed-methods studies, systematic reviews, and controlled comparisons published between 2023 and 2026 -- to answer that question across four domains: speaking and pronunciation, writing development, vocabulary and general proficiency, and learner engagement and motivation.

It then considers the limitations and equity concerns that recur across this literature before offering pedagogical recommendations.

AI Tools in Language Education: An Overview

AI-powered language learning tools generally fall into three overlapping categories. The first consists of adaptive, gamified platforms such as Duolingo, which use algorithms to personalize the sequencing and difficulty of vocabulary and grammar exercises (Kim et al.). The second consists of automatic speech recognition and pronunciation-coaching applications such as ELSA Speak, which combine speech recognition with natural language processing to deliver phoneme-level feedback (Pham and Pham). The third consists of generative AI chatbots, most notably ChatGPT, which can produce conversational practice, explain grammar rules, and generate detailed feedback on student writing (Polakova and Ivenz; Mahapatra). A systematic review of dialogue-based AI systems found that such tools are increasingly used to build learners' interactional competence in university EFL contexts, supporting gains in reading, writing, and listening in addition to spoken interaction (Zhai and Wibowo). Because these categories serve different linguistic skills, their effects on learning outcomes are best evaluated separately.

Impact on Speaking and Pronunciation

Pronunciation training has benefited substantially from advances in automatic speech recognition. A study of 205 English-major students in Vietnam who used ELSA Speak across a fifteen-week pronunciation course found a high overall level of satisfaction ($M = 4.112$, $SD = .806$), with students' confirmation of the app's effectiveness -- more than either perceived usefulness or perceived ease of use in isolation -- serving as the strongest predictor of satisfaction (Pham and Pham). The same study reported that the ability to practice independently and receive immediate, accurate feedback was a key driver of positive outcomes, consistent with prior research on ELSA Speak's phoneme-level correction features (Pham and Pham).

Beyond individual pronunciation apps, a systematic review of twenty-four studies on AI-powered chatbots used for EFL speaking practice found that conversational agents significantly enhanced learners' enthusiasm for oral practice and, in several studies, reduced speaking anxiety while improving pronunciation accuracy (Du and Daniel). The review nonetheless noted that research in this area remains comparatively young, with most studies measuring short-term engagement rather than durable gains in spoken proficiency (Du and Daniel). Complementary evidence from dialogue-system reviews suggests that AI-mediated interaction can meaningfully build interactional competence -- turn-taking, negotiation of meaning, and repair strategies -- among university-level EFL learners, extending the benefits of speaking practice beyond pronunciation alone (Zhai and Wibowo).

Impact on Writing Development

Generative AI has had a particularly visible effect on writing instruction, largely because tools like ChatGPT can produce detailed, individualized feedback at a scale no single instructor could match. A quasi-experimental study of Gen Z EFL writers found that combining ChatGPT feedback with teacher feedback improved writing outcomes relative to teacher feedback alone, with the AI-generated feedback proving especially useful for identifying surface-level errors in grammar, structure, and word choice (Polakova and Ivenz). A separate mixed-methods intervention study of tertiary-level ESL students similarly found that ChatGPT functioning as a formative feedback tool produced a significant positive impact on academic writing skills, with students describing the feedback as fast, consistent, and non-judgmental compared with delayed teacher feedback in large classes (Mahapatra).

These gains, however, are not unconditional. Both studies caution that ChatGPT feedback tends to excel at identifying discrete, rule-based errors -- grammar, punctuation, and word-level accuracy -- while offering comparatively shallow guidance on argument development, coherence, and voice, areas where experienced

teachers still outperform the tool (Polakova and Ivenz; Mahapatra). This pattern suggests that AI feedback is best understood as a complement to, rather than a substitute for, instructor feedback on higher-order writing concerns.

Impact on Vocabulary, Grammar, and General Proficiency

Adaptive platforms such as Duolingo remain the most widely studied AI-driven tools for vocabulary and grammar acquisition, and the evidence here is more mixed than the marketing around such apps might suggest. A sixteen-week controlled comparison of beginner-level French learners divided into Classroom-Only (n = 58), Duolingo-Only (n = 65), and Classroom-plus-Duolingo (n = 60) conditions found that all three groups made significant and comparable gains in overall proficiency, grammar, and vocabulary, with Duolingo-only learners progressing at a rate similar to that of classroom-only learners (Kim et al.). The one notable exception was pragmatic competence -- specifically, learners' command of the *tu* versus *vous* distinction -- where the Classroom-plus-Duolingo group significantly outperformed both single-condition groups, suggesting that AI-driven practice is most effective when paired with, rather than substituted for, classroom instruction on socially and contextually nuanced language features (Kim et al.).

This finding is echoed in survey-based research: in a 2024 white paper, 96 percent of surveyed language educators reported that Duolingo helps students learn a language faster, a figure that reflects perceived efficiency gains even though independent, standardized-test-based evidence of superiority over classroom instruction remains limited (Duolingo). Taken together, the vocabulary and grammar literature indicates that AI-driven practice tools produce learning gains broadly on par with traditional instruction, with their comparative advantage lying less in raw proficiency outcomes and more in accessibility, self-paced repetition, and integration alongside classroom teaching.

Engagement, Motivation, and Personalized Learning

Across nearly all the reviewed studies, the most consistent and least contested finding is that AI tools increase learner engagement and motivation. A mixed-methods study involving 410 students and 120 teachers found that AI-driven instruction significantly boosted student interest and engagement, which in turn was associated with improved learning outcomes on a pre-post assessment (Zhao). Similarly, a study examining an AI-mediated instructional platform found that the technology enhanced engagement and fostered self-regulated learning, with qualitative interviews revealing that students felt more motivated and more autonomous when using AI-supported instruction than in comparable non-AI conditions (Wei).

This motivational effect appears to be closely tied to personalization. A systematic review focused on prospective English teachers found that AI tools were valued specifically for their capacity to adapt content, pacing, and feedback to individual learner needs -- personalizing pronunciation practice, adjusting lesson difficulty, and promoting learners' cultural understanding of the target language (Peña-Acuña and Corga Fernandes Durão). Because motivation and self-regulation are established predictors of long-term language achievement, these engagement effects may represent one of the more durable contributions AI tools make to learning outcomes, even in cases where raw proficiency gains are comparable to traditional instruction.

Limitations and Challenges

The literature also converges on a set of recurring limitations. First, speech-recognition tools can exhibit accent bias, delivering less accurate feedback to learners whose accents diverge from the data on which the underlying models were trained, a concern raised directly in research on ELSA Speak (Pham and Pham). Second, AI-generated writing feedback, while fast and consistent, tends to be strongest on surface-level correctness and weaker on argumentation, coherence, and rhetorical nuance, meaning that over-reliance on AI feedback risks narrowing students' writing development to editable, rule-based errors (Polakova and Ivenz; Mahapatra). Third, systematic reviews caution that much of the existing evidence base is short-term and skewed toward higher-

education participants, leaving open questions about the durability of gains and the applicability of these tools to younger learners or under-resourced settings (Du and Daniel; Peña-Acuña and Corga Fernandes Durão). Finally, access to the most effective AI tools is often gated behind subscription fees, and reliable internet connectivity is a precondition for real-time feedback, both of which raise equity concerns for learners in low-resource contexts (Zhao).

Discussion and Pedagogical Implications

The pattern that emerges across this literature is not that AI tools are unambiguously superior to traditional instruction, but that they are unambiguously effective at increasing engagement, providing scalable and immediate feedback, and personalizing practice -- benefits that translate into measurable, if often comparable rather than superior, learning outcomes. The clearest gains appear when AI tools are integrated alongside classroom instruction rather than used as a wholesale replacement for it, as demonstrated by the pragmatic-competence advantage of the Classroom-plus-Duolingo condition over either single-condition group (Kim et al.) and by the writing gains associated with combining ChatGPT feedback with teacher feedback (Polakova and Ivenz). For English language teachers, this suggests a blended model: using AI tools for repetitive, high-volume practice -- pronunciation drills, grammar correction, vocabulary review -- while reserving teacher attention for higher-order skills such as argumentation, pragmatics, and cultural nuance that current AI tools handle less reliably.

Conclusion

AI-powered tools have measurably reshaped English language learning, most clearly by increasing learner engagement, enabling personalized and immediate feedback, and making practice more accessible outside the classroom. The evidence reviewed here indicates that these tools produce learning gains in pronunciation, writing, vocabulary, and grammar that are often comparable to those achieved through traditional instruction, and in some cases -- particularly when AI tools supplement rather than replace classroom teaching -- outcomes exceed what either approach achieves alone. At the same time, persistent limitations around accent bias, shallow feedback on higher-order writing skills, short evaluation windows, and unequal access mean that AI tools are best positioned as a complement to skilled human instruction rather than a substitute for it. Future research should prioritize longer-term, standardized-assessment-based studies across more diverse learner populations to determine which specific combinations of AI-supported and teacher-led instruction produce the most durable English language learning outcomes.

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