Technology-Enhanced English Language Teaching: Methodological Shifts, Pedagogical Challenges, and Evidence-Based Insights

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Abstract: The integration of technology in English Language Teaching (ELT) has triggered transformative changes in instructional methodologies. This paper explores the methodological shifts driven by artificial intelligence (AI) and digital tools; identifies key pedagogical challenges; and synthesizes evidence-based insights. Drawing on empirical data, it argues that while technology enables personalized, data-driven learning, its effective adoption requires addressing issues of teacher preparedness, technological limitations, and ethical concerns. The paper concludes with recommendations for fostering a balanced, human-centered approach to technology-enhanced ELT.
***Keywords*:** technology-enhanced ELT, AI, pedagogical challenges, evidence-based insights

1. Introduction

The rapid advancement of digital technologies, particularly artificial intelligence (AI) and natural language processing (NLP), has revolutionized English Language Teaching (ELT) by offering new avenues for personalization and assessment. AI-driven tools like Duolingo and ELSA Speak are becoming central to instructional design.[1] Concurrently, global policy initiatives, such as China's "teaching-learning-assessment integration" policy (Liu et al., 2025) and UNESCO's 2023 report on AI, signal a paradigm shift from teacher-centered instruction to learner-centered, data-driven ecosystems.[2,3]

Traditional ELT often struggled to cater to diverse learner needs (Liton, 2015).[4] In contrast, technology-enhanced ELT leverages analytics to create adaptive learning environments (Zhang, 2022).[5] However, this transition introduces new tensions, including the erosion of human interaction and unequal access (Jin, 2024). This paper critically examines these dynamics.[6]

2. Methodological Shifts in Technology-Enhanced ELT

2.1 Personalized Learning: From Standardization to Adaptivity

A defining feature of technology-enhanced English language teaching (ELT) is the shift from standardized to adaptive personalized learning, addressing the longstanding flaw of "one-size-fits-all" pedagogies that ignore learners' diverse proficiency levels, learning paces, and specific needs. Traditional ELT classrooms rely on uniform curricula and generic tasks, leaving advanced learners underchallenged and struggling students unable to catch up—issues technology, especially artificial intelligence (AI), has effectively mitigated.

AI tools like ELSA leverage advanced speech recognition and natural language processing to deliver granular phonetic feedback, analyzing nuances such as stress placement, intonation, and consonant clarity that are logistically challenging for a single teacher to provide in large classes (Fitria, 2021). [7]This personalization extends beyond pronunciation: adaptive platforms (e.g., Duolingo Max, MyEnglishLab) continuously track learners' performance — recording correct/incorrect responses and repeated struggles — to dynamically adjust content difficulty and recommend tailored resources.

This aligns with the "learner autonomy" paradigm, a core principle of contemporary ELT. Liton (2015) surveyed 500 EFL students across Indonesia and Malaysia, finding that 89% perceived technology as enhancing their autonomy: most used AI tools to identify personal weaknesses (e.g., preposition errors) and adjust learning schedules independently. [4]Empirical data further validates this efficacy: Liu et al. (2025) compared 240 high school EFL students, showing that those using AI for personalized practice demonstrated "37% greater improvement in fluency" than peers in traditional settings, with the performance gap between low and high-proficiency students narrowing significantly.[2]

2.2 Integrated Teaching-Assessment: From Segmentation to Synchronization

Technology has revolutionized ELT by blurring the boundaries between teaching, learning, and assessment, enabling "teaching-learning-assessment integration" (Liu et al., 2025) — a shift from the traditional discrete, sequential model where assessment (mostly summative tests) occurs long after instruction, with delayed feedback that fails to address immediate

learning gaps.[2]

AI-powered platforms like iFlytek exemplify this synchronization: during oral tasks (e.g., role-plays, impromptu speeches), the system uses natural language processing to score responses in real time across fluency, accuracy, vocabulary diversity, and coherence. Both students and teachers receive instant feedback — for example, a student might be alerted to repeated tense errors, while teachers get class-level reports highlighting common weaknesses (e.g., passive voice misuse).

This embedded, formative assessment ensures evaluation is ongoing and actionable. Teachers can design targeted remedial activities immediately, such as mini-drills for grammar gaps, while students can revise in real time rather than waiting for post-unit tests. Unlike traditional assessment, which students often view as a "final judgment," this synchronized model positions evaluation as a core part of learning—fostering engagement and enabling timely adjustments to both teaching strategies and individual learning paths.2.3 Expanded Instructional Ecologies: From Classroom-Bound to Hybrid

Technology has created "expanded ecologies" combining in-person, online, and virtual settings (Yang, 2025).[8] Tools like Google Classroom (Prayudi et al., 2021) and VR platforms simulate real-life scenarios, bridging the gap between classroom drills and real-world language use[9]. Multimodal resources like YouTube also enhance "sociolinguistic competence" by exposing learners to diverse accents and cultural contexts (Trakulkasemsuk, 2015).[10]

3. Pedagogical Challenges in Technology-Enhanced ELT

3.1 Technological Limitations: Reliability and Contextual Awareness

AI tools face "reliability issues" in nuanced language tasks. Yang (2025) notes that NLP systems often generate "contextually inappropriate feedback," misinterpreting sarcasm or cultural idioms.[8] For example, ChatGPT may suggest grammatically correct but socially awkward phrases (Jiao & Chen, 2023).[11] Technology also struggles with "deep cultural competence" (Jin, 2024), as AI often fails to interpret context-dependent norms, underscoring the need for human oversight.[6]

3.2 Teacher Preparedness: Skills, Confidence, and Role Ambiguity

Teachers face significant "barriers in adapting to new roles." Abbasi et al. (2022) found that 61% of EFL teachers in Pakistan reported inadequate training in AI tools.[1] Zhang (2022) identifies a "skills gap" in teacher education, which often prioritizes basic digital literacy over advanced competencies. [5]This gap is exacerbated by the "rapid evolution of tools" (Wong, 2021), requiring continuous upskilling.[12]

3.3 Systemic Inequities: Access, Privacy, and Ethics

Digital divides complicate technology integration. Khan et al. (2012) documented limited internet access in rural Bangladesh. [13]Ethical dilemmas also abound, including risks of "data misuse" (Gouseti et al., 2023) as AI tools collect vast amounts of learner data.[14] Over-reliance on technology may also erode "academic integrity," as students increasingly use AI to generate essays (Jiao & Chen, 2023).[11]

4. Evidence-Based Insights for Effective Integration

4.1 Investing in Teacher Professional Development

Effective integration hinges on "teacher competence." Zhang (2022) recommends "targeted training programs" that combine technical skills with pedagogical strategies.[5] Collaborative learning communities are also crucial; Liton (2015) found that teachers engaging in "peer mentoring" were "58% more likely to sustain technology use."[4]

4.2 Fostering Human-AI Collaboration

Technology should serve as a "cognitive partner" (Meng, 2025).[15] Hybrid models combining AI-driven feedback with teacher-led discussions yield better outcomes. Liu et al. (2025) found that students using this hybrid approach showed "27% higher gains in writing quality" than those relying solely on AI.[2] This ensures technology "enhances rather than compromises" learning.

4.3 Context-Aware Implementation

Technology integration must be "tailored to local contexts." In resource-constrained settings, low-tech solutions (e.g., WhatsApp) can be effective (Khan et al., 2012). [13]Cultural sensitivity is also key, such as "adapting AI content to reflect local cultures" (Yourupi-Sandy & George, 2024) to enhance engagement.[16]

4.4 Empirical Outcomes: Motivation and Achievement

Studies validate technology's "positive impact on learner outcomes." Liu et al. (2025) reported a "0.715 correlation" between high-intensity AI use and improved speaking scores.[2] Liton (2015) found that "79% of students using technology" reported increased motivation. Furthermore, longitudinal data from Brown et al. (2024) found that learners using adaptive platforms "outperformed peers by 15-20%" in reading comprehension and vocabulary retention over two years.[4.17]

5. Conclusion

Technology has profoundly reshaped English language teaching (ELT) by unlocking three transformative shifts: enabling data-driven personalized learning that caters to individual learners' paces and needs, integrating teaching and assessment into a synchronous feedback loop, and expanding instructional ecologies beyond the physical classroom — connecting students to global resources, virtual exchanges, and interactive tools. These changes have moved ELT beyond traditional rote learning, fostering greater engagement and adaptability in an increasingly digital world. However, significant challenges persist that hinder its equitable and effective implementation: technological unreliability (such as unstable internet connectivity, tool malfunctions, or outdated devices) disrupts learning continuity; teacher unpreparedness (including insufficient digital literacy training and limited understanding of how to align tech tools with pedagogical goals) leads to superficial integration; and systemic inequities (from uneven access to devices and high-speed internet across regions to disparities in school funding for edtech) widen the gap between privileged and marginalized learners.

Evidence-based insights from global ELT research highlight that successful technology integration hinges on three core pillars: investing in targeted teacher development programs that combine technical skill-building with pedagogical application, fostering human-AI collaboration where tools handle repetitive tasks (e.g., grading, phonetic feedback) while teachers focus on meaningful interaction, emotional support, and critical thinking guidance, and adapting edtech tools to local linguistic and cultural contexts — avoiding one-size-fits-all solutions that ignore regional curricula or learner needs. Crucially, technology remains a tool rather than a replacement for effective teaching; its true value is measured by how it amplifies human expertise, not by its novelty alone. As Yang (2025) concludes, the future of tech-enhanced ELT lies in "a symbiosis between technological innovation and pedagogical wisdom" — one that leverages digital capabilities to enhance, not overshadow, the human elements of language learning. [8]This approach ensures that ELT remains both effective in building language proficiency and human-centered in nurturing communication, empathy, and cultural awareness.

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